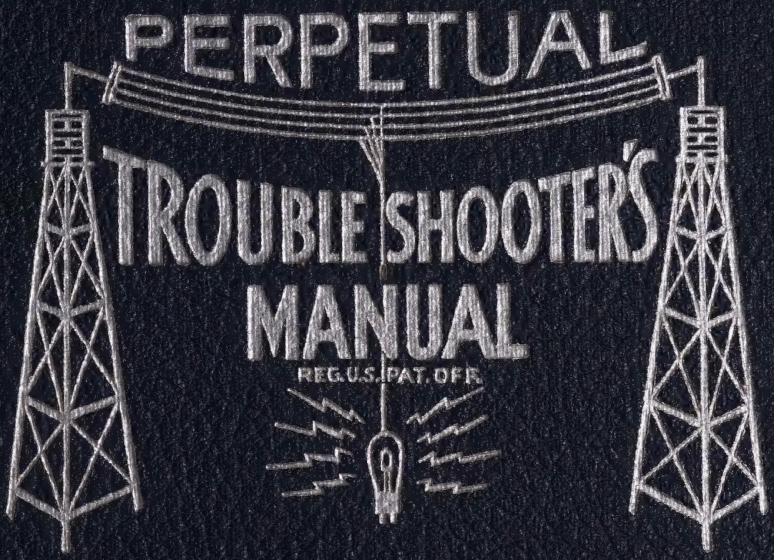
VOLUME XIV

PERPETUAL TROUBLE SHOOTER'S MANUAL

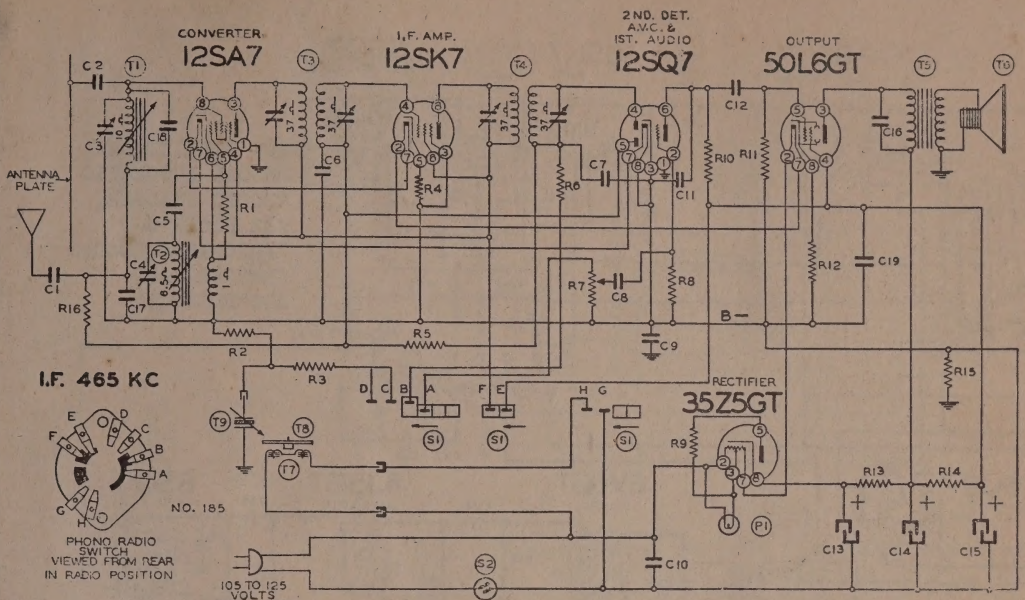


REG. U.S. PAT. OFF.

JOHN F. RIDER

MODEL 533, Series C

BELMONT RADIO CORP.



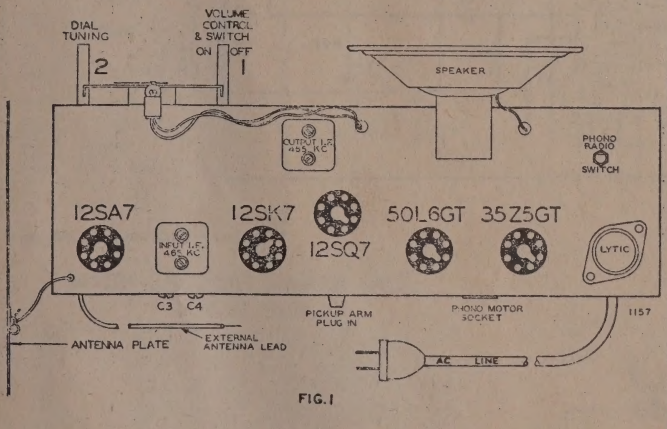
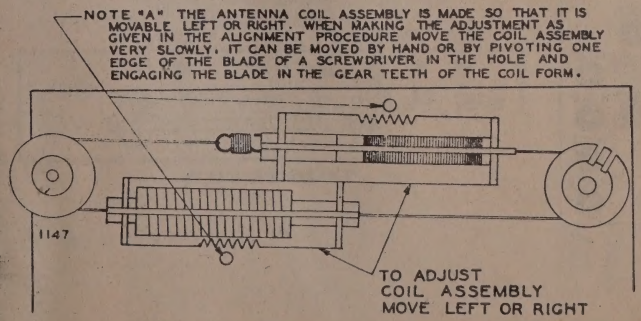


FIG. 1


NOTE "A". THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE MOVE THE COIL ASSEMBLY VERY SLOWLY. IT CAN BE MOVED BY HAND OR BY PIVOTING ONE EDGE OF THE BLADE OF A SCREWDRIVER IN THE HOLE AND ENGAGING THE BLADE IN THE GEAR TEETH OF THE COIL FORM.
1147
TO ADJUST COIL ASSEMBLY MOVE LEFT OR RIGHT

Circuit Ref. No.	Part No.	Description
		RESISTORS
R1	130176	20M ohm—½ w.
R2	130118	600M ohm—½ w.
R3	130118	600M ohm—½ w.
R4	13056	100 ohm—½ w.
R5	130170	3 megohm—½ w.
R6	13012	50M ohm—½ w.
R7	101217	½ megohm—volume control
R8	130257	5 megohm—½ w.
R9	130215	25 ohm—½ w.
R10	1309	200M ohm—½ w.
R11	13037	750 ohm—½ w.
R12	130166	150 ohm—½ w.
R13	13097	200 ohm—½ w.
R14	130287	1200 ohm—1 watt
R15	1309	200M ohm—½ w.
R16	1309	200M—½ w.
		CONDENSERS
C1	1295	.0001 Mica Condenser
C2	129114	.0003 mfd. mica
C3	124136	Antenna Trimmer
C4	124136	Oscillator Trimmer
C5	1295	.0001 mica
C6	1009	.05 x 200 v.
C7	1295	.0001 mica
C8	10025	.002 x 600 v.
C9	100119	.1 x 400 v.
C10	1001	.1 x 400 v.
C11	12912	.00025 mica
C12	10019	.006 x 600 v.
C13	11994	40 mfd. lytic—150 w. v.
C14	11994	20 mfd. lytic—150 w. v.
C15	11994	20 mfd. lytic—150 w. v.
C16	10011	.01 x 400 v.
C17	129162	.0008 Mica Condenser
C18	129163	.000025 Ceramicon Condenser
C19	10013	.05 x 400 v. Cond.
		C3 and C4 in same unit
		C13, C14 and C15 are in same unit
		PARTS
T1	112866	Antenna Coil—Permeability tuning assembly complete
T2	112866	Oscillator Coil
T3	108140F	Input I. F. Coil—465 kc.
T4	108145D	Output I. F. Coil—465 kc.
T5	105108	Output Transformer
T6	114193	5" P.M. Speaker
T7	104206	Phono Motor
T8	12228	Turntable
T9	114194	Phono pick up arm
S1	125113	Phono Switch
S2		Switch on volume control
P1	107249	Pilot light T47
		T1 and T2 in same unit

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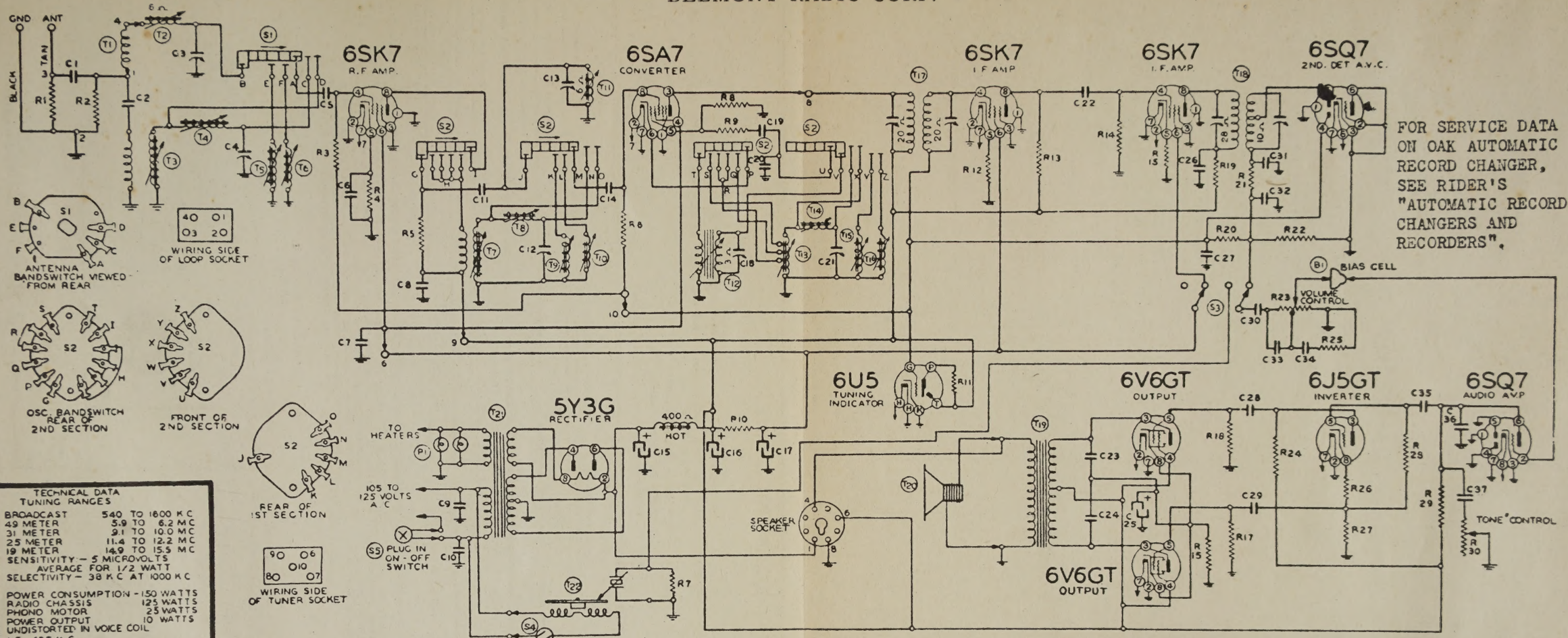
BELMONT RADIO CORP.



TECHNICAL DATA

TUNING RANGES

BROADCAST	540 TO 1600 K.C.
49 METER	5.9 TO 6.2 MC
31 METER	9.1 TO 10.0 MC
25 METER	11.4 TO 12.2 MC
19 METER	14.9 TO 15.5 MC

SENSITIVITY – 5 MICROVOLTS AVERAGE FOR 1/2 WATT
SELECTIVITY – 38 K.C. AT 1000 K.C.

POWER CONSUMPTION	150 WATTS
RADIO CHASSIS	125 WATTS
PHONO MOTOR	25 WATTS
POWER OUTPUT	10 WATTS

UNDISTORTED IN VOICE COIL
I.F. 455 K.C.

MAIN CHASSIS PARTS LIST

CONDENSERS

1009	C29, C30	.05 x 200 Volt Tubular Condenser....2
10037	C37	.003 x 600 Volt Tubular Condenser....1
10013	C38, C35	.05 x 400 Volt Tubular Condenser....2
1001	C26	.1 x 400 Volt Tubular Condenser....1
10065	C23, C24	.015 x 600 Volt Tubular Condenser....2
10022	C27	.05 x 200 Volt Tubular Condenser....1
100134	C34	.006 x 120 Volt Tubular Condenser....1
10061	C9, C10	.02 x 600 Volt Bakelite Condenser....2
11969	C25	Electrolytic Filter Condenser. 16 Mfd. x 350 Volts....1
119112	C15, C16, C17	Electrolytic Filter Condenser. 30 Mfd.; 30 Mfd.; 10 Mfd. x 450 Volts....1
		or
119112B	C15, C16, C17	Electrolytic Filter Condenser 30 Mfd.; 30 Mfd.; 10 Mfd. x 450 Volts....1
1292	C1, C22	.0005 Mica Type Condenser—20%....2
12912	C36	.00025 Mica Type Condenser—20%....1
12939	C33	.00005 Mica Type Condenser—20%....1
129161	C31, C32	.0001 Mica Dual Condenser—10%....1

RESISTORS

101275	R23	Volume Control (2.8 Megohm)....1
125180	R30, S3	Tone Control and Phono-Radio Switch (1 Megohm)....1
13070	R12	500 Ohm—1/3 Watt Resistor—10%....1
13082	R13	10M Ohm—1/3 Watt Resistor—10%....1
130317	R16	250 Ohm—2 Watt Resistor—10%....1
13094	R21, R24, R27	50M Ohm—1/3 Watt Resistor—10%....3
130192	R19	2M Ohm—1/3 Watt Resistor—10%....1
130235	R15	1500 Ohm—1/3 Watt Resistor—10%....1
130218	R26	5M Ohm—1/3 Watt Resistor—10%....1
130172	R29	250M Ohm—1/3 Watt Resistor—10%....1
13019	R20	1 Megohm—1/3 Watt Resistor—20%....1
13020	R14	10M Ohm—1/3 Watt Resistor—20%....1
1307	R25	40M Ohm—1/3 Watt Resistor—10%....1
130238	R22	400M Ohm—1/3 Watt Resistor—20%....1
1303	R7, R17, R18, R28	500M Ohm—1/3 Watt Resistor—20%....4
130232	R1, R2	25M Ohm—1/3 Watt Resistor—10%....2
10667	R10	16M Ohm—3.5 Watt Resistor—10%....1

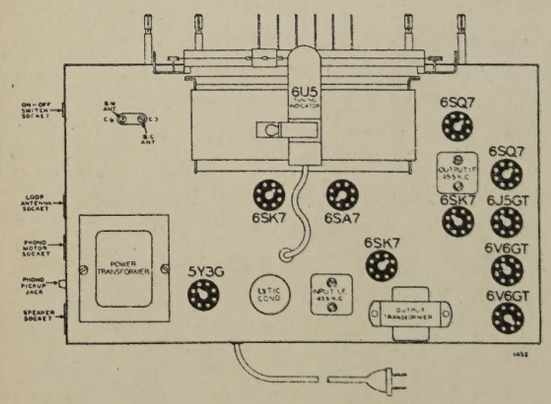
TUNER CHASSIS PARTS LIST

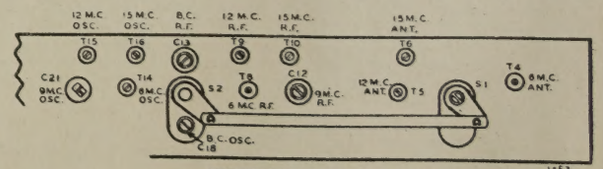
CONDENSERS

10020	C6	.1 x 200 Volt Tubular Condenser....1
10047	C2	.002 x 600 Volt Tubular Condenser....1
10074	C7, C8	.1 x 400 Volt Tubular Condenser....2
124138	C12	9 Mc., R.F. Adjustable Trimmer Condenser 1
124139	C13	B.C., R.F. Adjustable Trimmer Condenser 1
124143	C3, C4	B.C. and 9 Mc. Dual Adjustable Antenna Trimmer Condenser....1
124144	C18	B.C. Oscillator Adjustable Trimmer Condenser....1
124145	C21	9 Mc. Oscillator Adjustable Trimmer Condenser....1
1292	C5, C14	.0005 Mica Type Condenser—20%....1
129165	C19	.00005 Mica Type Condenser—10%....1
129168	C11	.00001 Mica Type Condenser—20%....1
129167	C20	.0002 Silver Mica Type Condenser—3%....1

RESISTORS

13019	R3, R6	1 Megohm—1/3 Watt Resistor—20%....2
130218	R5	5M Ohm—1/3 Watt Resistor—10%....1
130232	R8	25M Ohm—1/3 Watt Resistor—10%....1
130239	R4	250 Ohm—1/3 Watt Resistor—10%....1
	R11	1 Megohm—In Tuning Eye Cable....1
130174	R9	50 Ohm—1/3 Watt Resistor....1





TRIMMER VIEW

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ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect — B of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mfd., and 200 Mmf.

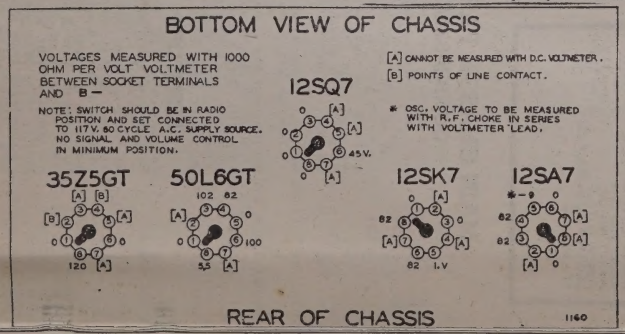
BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Connect to Antenna Plate (See Fig. 4)	Iron Cores All the way out	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Connect to Antenna Plate (See Fig. 4)	Iron Cores All the way out	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1690 Kc.	.1 MFD.	Connect to Antenna Plate (See Fig. 4)	Iron Cores All the way out	Trimmer C4 (See Fig. 4)	Oscillator	Adjust to maximum output
	1690 Kc.	200 MMF.	Connect to Antenna Lead (See Fig. 4)	Iron Cores All the way out	Trimmer (C3) (See Fig. 4)	Antenna	Adjust to maximum output
	1400 Kc.	200 MMF.	Connect to Antenna lead (See Fig. 4)	Turn Dial to 1400 Kc.	Adjust position of antenna coil right or left.	Antenna Coil Adjustment	(See Note "A") Adjust to maximum output
	1690 Kc.	200 MMF.	Connect to Antenna lead (See Fig. 4)	Turn Dial to 1690 Kc.	Adjust trimmer (C3) (See Fig. 4)	Antenna	Check for tracking (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable right or left. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment again at 1690 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1690 Kc.

FREQUENCY RANGE
535 to 1690 K.C.

Power Consumption ..... Radio Only 30 Watts
Power Output ..... 900 Milliwatts Undistorted, 1.7 Watts Maximum
Intermediate Frequency ..... 465 K.C.


BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B—
NOTE: SWITCH SHOULD BE IN RADIO POSITION AND SET CONNECTED TO 117 V. 60 CYCLE A.C. SUPPLY SOURCE. NO SIGNAL AND VOLUME CONTROL IN MINIMUM POSITION.
[A] CANNOT BE MEASURED WITH D.C. VOLTMETER.
[B] POINTS OF LINE CONTACT.
* OSC. VOLTAGE TO BE MEASURED WITH R.F. CHOKE IN SERIES WITH VOLTMETER LEAD.
12SQ7
35Z5GT
50L6GT
12SK7
12SA7
REAR OF CHASSIS
1160

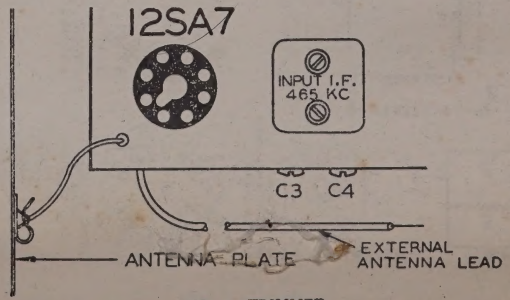


FIG. 4.—TRIMMER

THE CROSLEY CORP.

MODELS 03CA, 03CB, 03CC, 03CP, 03CQ, 03CR
Chassis 95

ALIGNMENT PROCEDURE

Preliminary

Output Meter Connections ..... Plate to Plate of Adjacent 6K6's
Generator Ground Connection ..... To Chassis or Ground Lead
Dummy Antenna to be in Series with Generator Output ..... See Chart Below
Position of Volume Control ..... Fully On
Position of Master Tone Control ..... All Buttons Out

ALIGNMENT PROCEDURE CHART

Signal Generator							
Alignment Seq.	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02MF.	455Kc.	Stator lug Rear section of Gang Cond.	B.C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	.0002MF.	1620Kc.	Antenna Terminal	B.C.	Fully open	B.C."OSC" 62A	Adjust for peak; gang does not have to tune thru signal. Loop must be connected.
3.	.0002MF.	1400Kc.	Antenna Terminal	B.C.	Approx. 140 on dial	B.C."Ant."64 B.C."R-F" 60A	Adjust for max. output. Do not touch B.C. Osc. trimmer. Adjust for maximum output.
4.	.0002MF.	600Kc.	Antenna Terminal	B.C.	Approx. 60 on dial	B.C."OSC" Series 81	Adjust for max. output while rocking gang thru signal.
5.	400 ohm (Carbon)	6.5Mc.	Antenna Terminal	Police	Fully open	Pol "OSC" 62P	Adjust for peak; gang does not have to tune thru signal. And repeat No. 3
6.	400 ohm (Carbon)	6.0Mc	Antenna Terminal	Police	Approx. 6.0	Pol "ANT." 60B	Adjust for maximum output.
8.	400 ohm (Carbon)	18.3Mc.	Antenna Terminal	S.W.	Fully open	S.W."OSC" 62C	Adjust for peak. Gang does not have to tune thru signal.
9.	400 ohm (Carbon)	18.0Mc	Antenna Terminal	S.W.	Approx. 18	S.W."ANT." 60C	Adjust for maximum output while rocking gang thru signal.

10. Repeat the above alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A. V. C. circuit.

IMPORTANT ALIGNMENT NOTES: When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency and not on the image which is approximately 910 kilocycles less as indicated on the Receiver dial. To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles lower on the Receiver dial than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position).

ADJUSTING PUSH BUTTONS TO STATIONS.

1—To simplify setup carefully preset "ANT" adjusting screw by turning clockwise until moderately tight and then backing out (turning counter-clockwise) the oscillator ADJUSTING SCREWS until the threaded portion extends approximately ½ inch. DO NOT EXERT PRESSURE.

2—Turn band switch to the "American" position and carefully manually tune in the station to which the No. 1 Push Button is to be set.

3—Turn band switch to the "Automatic" position and with a small screw driver carefully turn the No. 1 push button **oscillator adjusting** screw in a clockwise direction until the station previously tuned in manually is heard again. Adjust for maximum output on speaker.

4—Adjust No. 1 Ant. adjusting screw for maximum output in speaker.

5—Repeat above procedure for remaining buttons to be set.

6—From call letter sheets supplied, carefully remove the call letters of the stations to which the buttons have been set.

7—Break celluloid into separate "V's" and insert call letter tab in "V", then slide into push button from side.

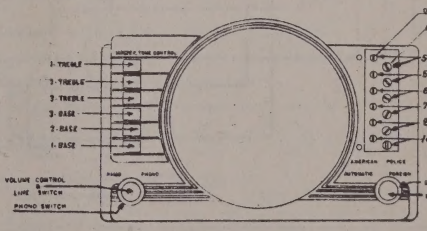


Fig. 1

TUBE VOLTAGE CHART

Socket voltages measured at 117.5 V. Line (between socket pin and chassis) with 1000 OHM PER VOLT, 500 V. RANGE VOLTMETER (D.C.)

TUBE	FUNCTION	1	2	3	4	5	6	7	8
6SK7	R. F. Amplifier	Gnd	Gnd	Gnd	0	Gnd	80	6.3 A.C.	175
6SA7	Converter	Gnd	Gnd	175	80	Neg	0	6.3 A.C.	0
6SK7	1.F Amplifier	Gnd	Gnd	Gnd	0	Gnd	80	6.3 A.C.	175
6SQ7	Det. A. V. C. 1st A. F.	Gnd	0	Gnd	Gnd	0	67	6.3 A.C.	Gnd
6J5GT	Phase Inverter	Gnd	Gnd	125	...	0	...	6.3 A.C.	Gnd
6K6GT	(4) P. P. Parallel Output	Gnd	Gnd	295	175	0	...	6.3 A.C.	...
5Y3G	Rectifier	N.C.	300	...	A.C.	...	A.C.	.....	300

Max. Power Output ..... 12.0 Watts Power Consumption ..... 90 Watts Drop Across Speaker Field ..... 125 Volts
Voltages may vary 10% of values given.

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BELMONT RADIO CORP.

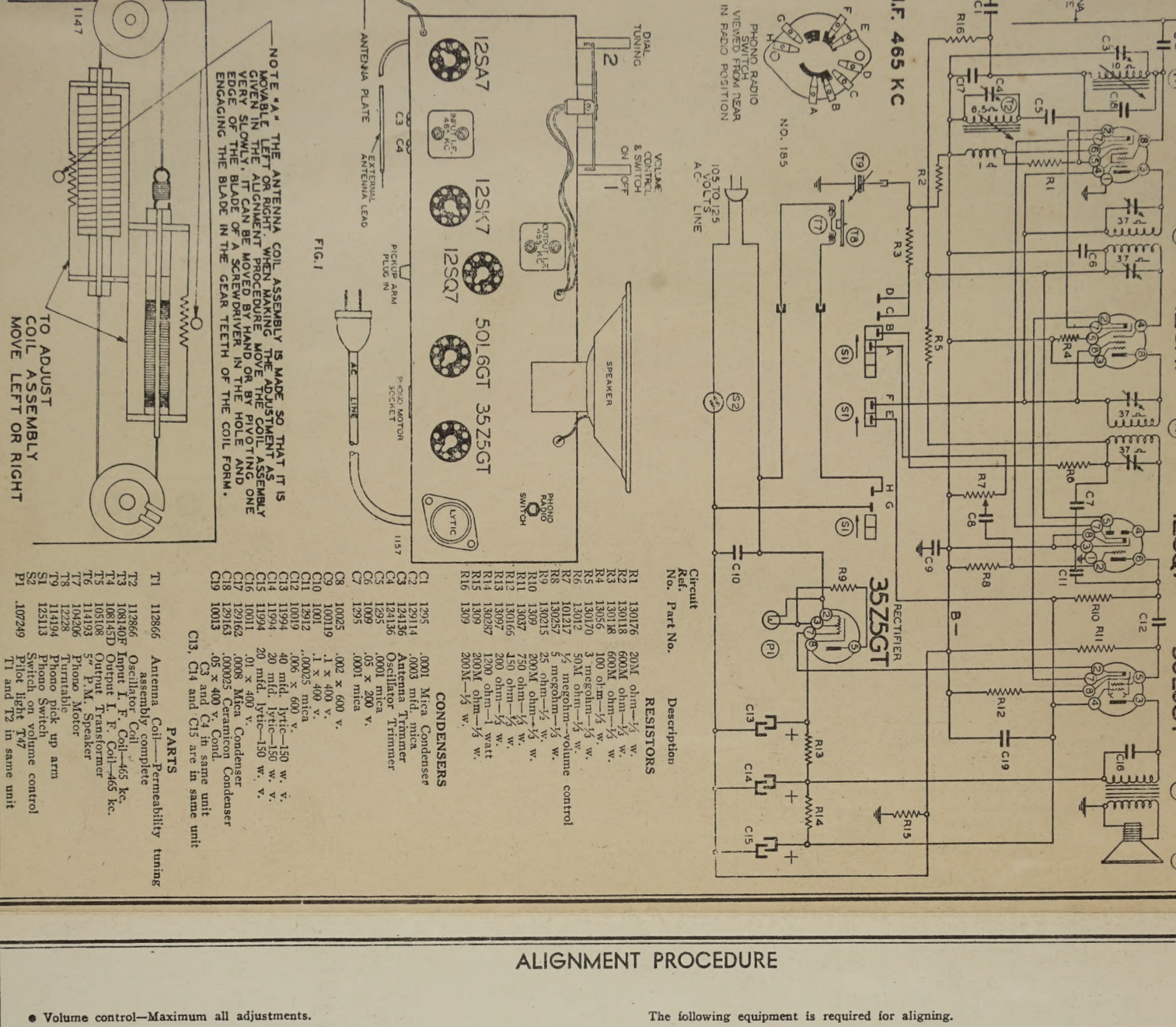
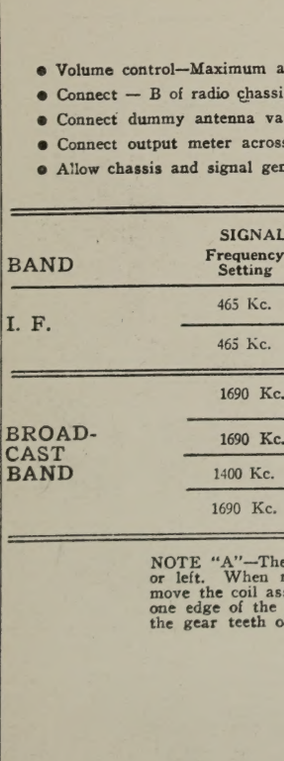


FIG. 1

NOTE "A" THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE TO THE LEFT OR RIGHT WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE. MOVE THE COIL ASSEMBLY VERY SLOWLY. IT CAN BE MOVED BY HAND OR BY PIVOTING ONE EDGE OF THE BLADE OF A SCREWDRIVER IN THE HOLE AND ENGAGING THE BLADE IN THE GEAR TEETH OF THE COIL FORM.



Circuit Ref. No.	Part No.	Description
		RESISTORS
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R2	130118	600M ohm—½ w.
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R6	13012	50M ohm—½ w.
R7	101217	¼ megohm—volume control
R8	130257	5 megohm—½ w.
R9	130215	25 ohm—½ w.
R10	1309	200M ohm—½ w.
R11	13037	750 ohm—½ w.
R12	130166	150 ohm—½ w.
R13	13097	200 ohm—1 watt
R14	130287	1200 ohm—½ w.
R15	1309	200M—½ w.
R16	1309	
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C6	1009	.05 x 200 v.
C7	1295	.0001 mica
C8	10025	.002 x 600 v.
C9	100119	.1 x 400 v.
C10	1001	.1 x 400 v.
C11	12912	.00025 mica
C12	10019	.006 x 600 v.
C13	11994	40 mfd. lytic—150 w. v.
C14	11994	20 mfd. lytic—150 w. v.
C15	11994	20 mfd. lytic—150 w. v.
C16	10011	.01 x 400 v.
C17	129162	.0008 Mica Condenser
C18	129163	.000025 Ceramicon Condenser
C19	10013	.05 x 400 v. Cond.
		C3 and C4 in same unit
		C13, C14 and C15 are in same unit
		PARTS
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T2	112866	Oscillator Coil
T3	108140F	Input I. F. Coil—465 kc.
T4	108145D	Output I. F. Coil—465 kc.
T5	105108	Output Transformer
T6	114193	5" P.M. Speaker
T7	104206	Phono Motor
T8	12228	Turntable
T9	114194	Phono pick up arm
S1	125113	Phono Switch
S2		Switch on volume control
P1	.107249	Pilot light T47
		T1 and T2 in same unit

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ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect — B of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mfd., and 200 Mmf.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Connect to Antenna Plate (See Fig. 4)	Iron Cores All the way out	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Connect to Antenna Plate (See Fig. 4)	Iron Cores All the way out	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output.
BROADCAST BAND	1690 Kc.	.1 MFD.	Connect to Antenna Plate (See Fig. 4)	Iron Cores All the way out	Trimmer C4 (See Fig. 4)	Oscillator	Adjust to maximum output
	1690 Kc.	200 MMF.	Connect to Antenna Lead (See Fig. 4)	Iron Cores All the way out	Trimmer (C3) (See Fig. 4)	Antenna	Adjust to maximum output
	1400 Kc.	200 MMF.	Connect to Antenna lead (See Fig. 4)	Turn Dial to 1400 Kc.	Adjust position of antenna coil right or left.	Antenna Coil Adjustment	(See Note "A") Adjust to maximum output
	1690 Kc.	200 MMF.	Connect to Antenna lead (See Fig. 4)	Turn Dial to 1690 Kc.	Adjust trimmer (C3) (See Fig. 4)	Antenna	Check for tracking (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable right or left. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment again at 1690 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1690 Kc.

FREQUENCY RANGE
535 to 1690 K.C.

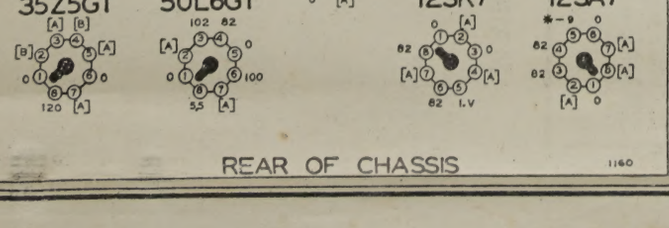
Power Consumption ..... Radio Only 30 Watts
Power Output ..... 900 Milliwatts Undistorted, 1.7 Watts Maximum
Intermediate Frequency ..... 465 K.C.

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B—

NOTE: SWITCH SHOULD BE IN RADIO POSITION AND SET CONNECTED TO 117 V. 60 CYCLE A.C. SUPPLY SOURCE. NO SIGNAL AND VOLUME CONTROL IN MINIMUM POSITION.

[A] CANNOT BE MEASURED WITH D.C. VOLTMETER.
[B] POINTS OF LINE CONTACT.
* OSC. VOLTAGE TO BE MEASURED WITH R.F. CHOKE IN SERIES WITH VOLTMETER LEAD.



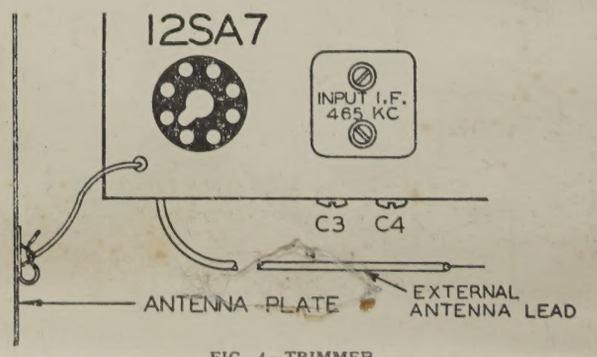


FIG. 4.—TRIMMER

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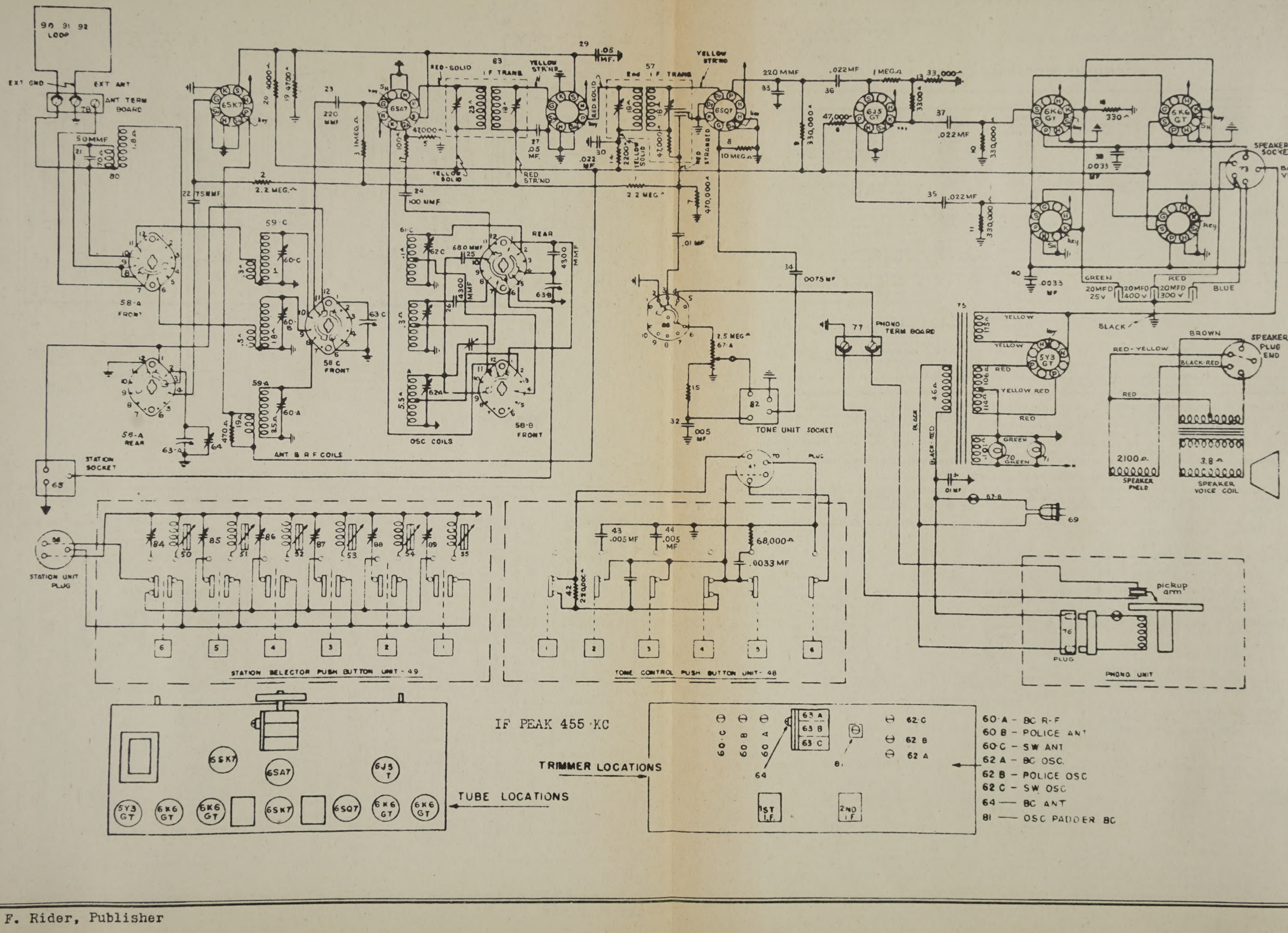
MODELS 03CA, 03CB, 03CC,
03CP, 03CQ, 03CR.
Chassis 95

THE CROSLEY CORP.



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MODEL 7V2

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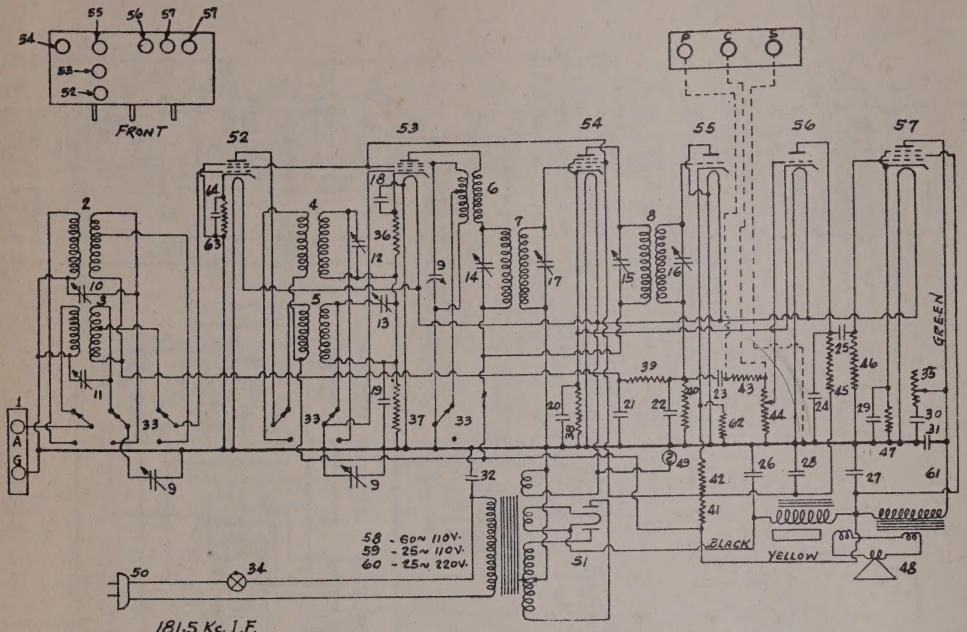

PARTS LIST—MODEL 7V2

*** Figures in 2nd last column refer to parts shown in wiring diagram of Model 7V2**

Qty.	Part No.	Description	* Item	List Each
1	G15-32000	Ant. Transformer Coil L. F. (Short Wave)	2	.60
1	G16-32000	Ant. Transformer Coil H. F. (Broadcast)	3	.45
1	G9-32001	R. F. Transformer Coil L. F.	4	.50
1	G8-32001	R. F. Transformer Coil H. F.	5	.50
1	G11-32002	Osc. Transformer Coil	6	.70
1	G5-32003	1st I. F. Transformer Coil	7	.70
1	G1-32003	2nd I. F. Transformer Coil	8	.80
7	W25200	Coil Socket		.05
5	W25024A	Coil Shield (Large)		.10
2	W25025A	Coil Shield (Small)		.10
7	W26891	Insulating Washer		.05
7	W21541B	Retaining Ring		.05
1	G1-29099	L. F. & H. F. Ant. Trimmer Cond.	10-11	.20
1	G1-29099	L. F. & H. F. R. F. Trimmer Cond.	12-13	.20
1	G1-33007	1st & 2nd I. F. Primary and 2nd I. F. Secondary Trimmer Cond.	14-15	
			16	.70
1	W25008A	1st I. F. Sec. Trimmer Cond. Adj. Blade	17	.05
1	W32291B	Dial Support Brkt.		.05
1	G6-32084	Dial Drive Assm.		1.20
1	W32208A	Dial Hand		.05
1	G14-33002	Variable Tuning Condenser Gang	65	3.75
1	W25666B	Level Control (Volume)	44	.90
1	W25594B	Tone Control & Line Switch	34-35	1.10
2	G4-27134	Light Bracket Assm.	49	.20
1	B30569D	6 Pole D. T. Switch	33	1.90
3	G24-27456	58 Socket	52-53	
			54	.10
2	G18-27456	56 Socket	55-56	.10
1	G43-27456	2A5 Socket	57	.10
1	G6-27456	80 Socket	51	.10
1	W26010	Tube Shield Base (58 Tube)		.05
3	B26009C	Tube Shield		.10
1	G17-23559	Power Transformer 110 Volt 60 cy.	58	3.25
1	G18-23559	Power Transformer 110 Volt 25 cy.	59	4.75
1	G19-23559	Power Transformer 220 Volt 25 cy.	60	4.75
1	B-21491C	A. C. Cord & Plug	50	.50
1	LW-20264	Ant.-Gnd. Terminal	1	.15
		FILTER & BY-PASS CONDENSERS		
1	W29150B	12.-6.-8. Mfd. 25 V.-450 V.-450 V. Cond.	27-28	
			29	2.60
1	W26194B	12. Mfd. 475 Volt Cond.	26	1.25
1	W24049B	0.1 Mfd. 200 Volt Cond.	20	.15
1	W23142	0.02 Mfd. 400 Volt Cond.	21	.20
1	W25537A	0.001-0.03 Mfd. 400 V.-400 V. Cond.	24-25	.30
1	W25517A	0.05-0.008 Mfd. 400 V.-400 V. Cond.	30-31	.30
1	W30805	0.01 Mfd. 400 Volt Cond.	32	.20
1	W29263B	0.00017-0.03 Mfd. 400 V.-400 V. Cond.	66-67	.25
1	W28621	0.02 Mfd. 200 Volt Cond.	68	.15
1	W28623	0.02-0.02 Mfd. 200 V.-200 V. Cond.	69-70	.25
		RESISTORS		
3	W25937	275 Ohm	36-38	
			63	.15
1	31094	4500 Ohm	37	.15
1	26577	3 Megohm	39	.15
1	21454	1 Megohm	40	.15
1	W28471	8500-25000 Ohm	41-42	.45
2	23785	500000 Ohm	43-46	.15
1	24403	150000 Ohm	45	.15
1	W25521	450 Ohm	47	.15
1	W30127	450 Ohm	62	.15
1	W31009A	Speaker Cable	61	.15
1	W32353	Knob (Large)		.10
3	W32352	Knob (Small)		.10
1	B21335	Tube & Condenser Shield		.20

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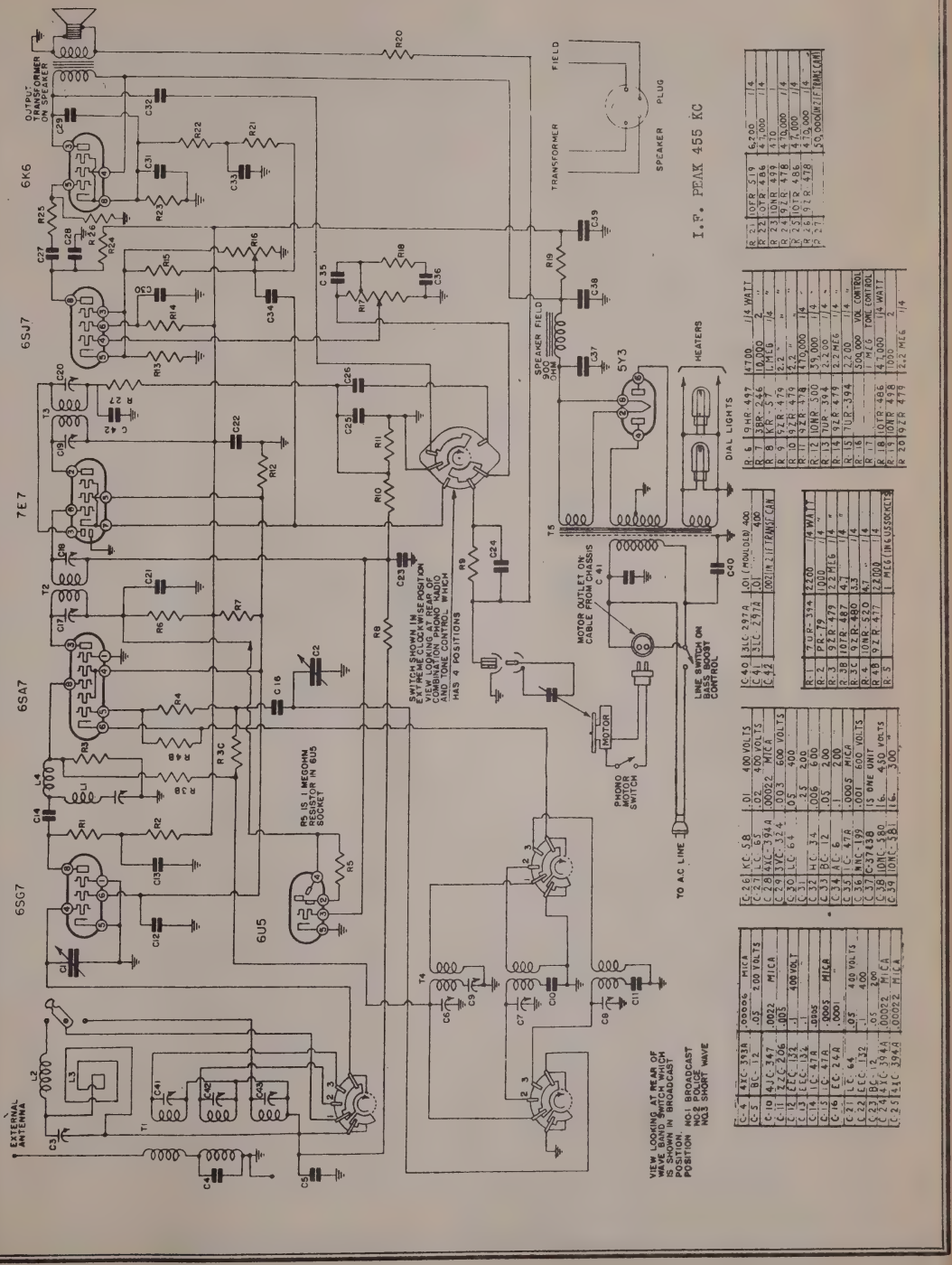
MODEL GF-462,
Chassis GF



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THE CROSLEY CORP.

MODELS 03CA, 03CB, 03CC, 03CP, 03CQ, 03CR
Chassis 95

ALIGNMENT PROCEDURE

Preliminary

Output Meter Connections.....Plate to Plate of Adjacent 6K6's
Generator Ground Connection.....To Chassis or Ground Lead
Dummy Antenna to be in Series with Generator Output.....See Chart Below
Position of Volume Control.....Fully On
Position of Master Tone Control.....All Buttons Out

ALIGNMENT PROCEDURE CHART

	Signal Generator						
Alignment Seq.	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02MF.	455Kc.	Stator lug Rear section of Gang Cond.	B.C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	.0002MF.	1620Kc.	Antenna Terminal	B.C.	Fully open	B.C."OSC" 62A	Adjust for peak; gang does not have to tune thru signal. Loop must be connected.
3.	.0002MF.	1400Kc.	Antenna Terminal	B.C.	Approx. 140 on dial	B.C."Ant."64 B.C."R-F" 60A	Adjust for max. output. Do not touch B.C. Osc. trimmer. Adjust for maximum output.
4.	.0002MF.	600Kc.	Antenna Terminal	B.C.	Approx. 60 on dial	B.C."OSC" Series 81	Adjust for max. output while rocking gang thru signal.
5.	400 ohm (Carbon)	6.5Mc.	Antenna Terminal	Police	Fully open	Pol "OSC" 62P	Adjust for peak; gang does not have to tune thru signal. And repeat No. 3.
6.	400 ohm (Carbon)	6.0Mc	Antenna Terminal	Police	Approx. 6.0	Pol "ANT." 60B	Adjust for maximum output.
8.	400 ohm (Carbon)	18.3Mc.	Antenna Terminal	S.W.	Fully open	S.W."OSC" 62C	Adjust for peak. Gang does not have to tune thru signal.
9.	400 ohm (Carbon)	18.0Mc	Antenna Terminal	S.W.	Approx. 18	S.W."ANT." 60C	Adjust for maximum output while rocking gang thru signal.

10. Repeat the above alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A. V. C. circuit.

IMPORTANT ALIGNMENT NOTES: When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency and not on the image which is approximately 910 kilocycles less as indicated on the Receiver dial. To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles lower on the Receiver dial than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position).

ADJUSTING PUSH BUTTONS TO STATIONS.

1—To simplify setup carefully preset "ANT" adjusting screw by turning clockwise until moderately tight and then backing out (turning counter-clockwise) the oscillator ADJUSTING SCREWS until the threaded portion extends approximately ½ inch. DO NOT EXERT PRESSURE.

2—Turn band switch to the "American" position and carefully manually tune in the station to which the No. 1 Push Button is to be set.

3—Turn band switch to the "Automatic" position and with a small screw driver carefully turn the No. 1 push button **oscillator adjusting screw** in a clockwise direction until the station previously tuned in manually is heard again. Adjust for maximum output on speaker.

4—Adjust No. 1 Ant. adjusting screw for maximum output in speaker.

5—Repeat above procedure for remaining buttons to be set.

6—From call letter sheets supplied, carefully remove the call letters of the stations to which the buttons have been set.

7—Break celluloid into separate "V's" and insert call letter tab in "V", then slide into push button from side.

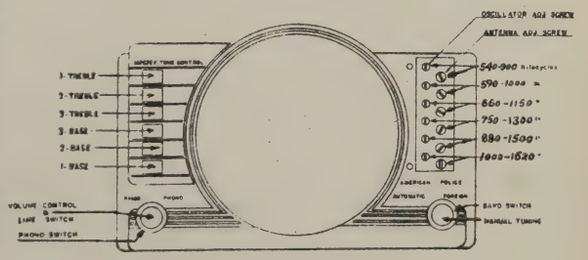

Fig. 1

TUBE VOLTAGE CHART

Socket voltages measured at 117.5 V. Line (between socket pin and chassis) with 1000 OHM PER VOLT, 500 V. RANGE VOLTMETER (D.C.)

TUBE	FUNCTION	1	2	3	4	5	6	7	8
6SK7	R. F. Amplifier	Gnd	Gnd	Gnd	0	Gnd	80	6.3 A.C.	175
6SA7	Converter	Gnd	Gnd	175	80	Neg	0	6.3 A.C.	0
6SK7	1.F Amplifier	Gnd	Gnd	Gnd	0	Gnd	80	6.3 A.C.	175
6SQ7	Det. A. V. C. 1st A. F.	Gnd	0	Gnd	Gnd	0	67	6.3 A.C.	Gnd
6J5GT	Phase Inverter	Gnd	Gnd	125	...	0	..	6.3 A.C.	Gnd
6K6GT	(4) P. P. Parallel Output	Gnd	Gnd	295	175	0	...	6.3 A.C.	...
5Y3G	Rectifier	N.C.	300	...	A.C.	...	A.C.	.....	300

Max. Power Output.....12.0 Watts Power Consumption....90 Watts Drop Across Speaker Field.....125 Volts
Voltages may vary 10% of values given.

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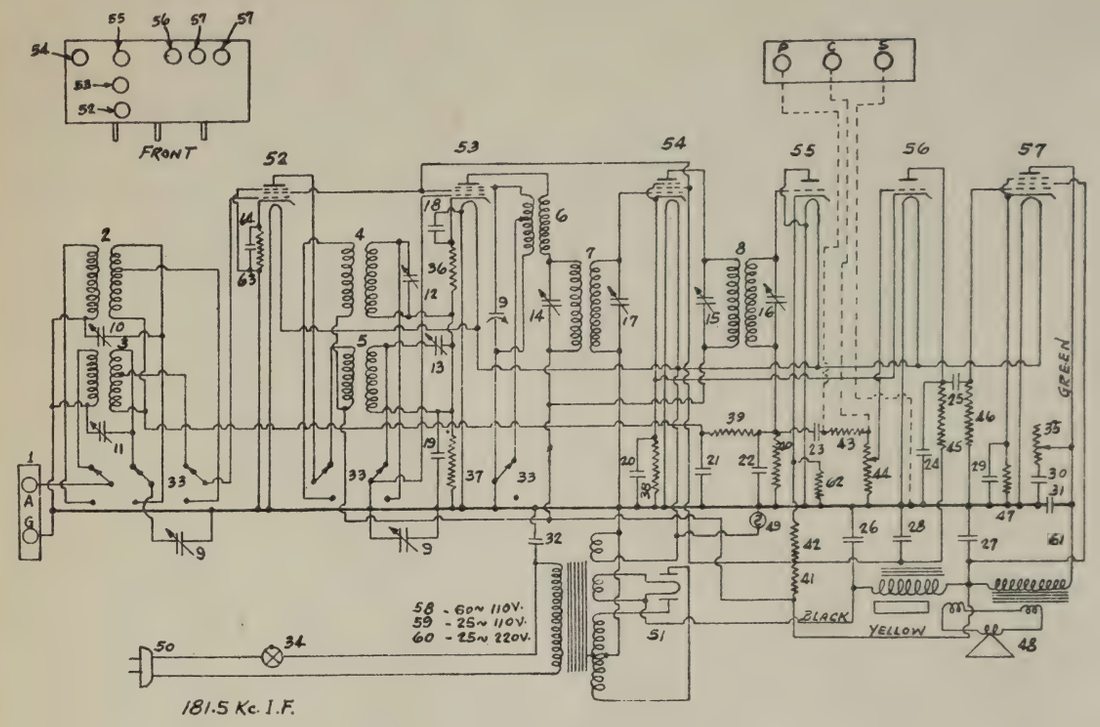
MODEL 7V2

THE CROSLEY CORP.



PARTS LIST—MODEL 7V2

* Figures in 2nd last column refer to parts shown in wiring diagram of Model 7V2

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1	G16-32000	Ant. Transformer Coil H. F. (Broadcast)	3	.45
1	G9-32001	R. F. Transformer Coil L. F.	4	.50
1	G8-32001	R. F. Transformer Coil H. F.	5	.50
1	G11-32002	Osc. Transformer Coil	6	.70
1	G5-32003	1st I. F. Transformer Coil	7	.70
1	G1-32003	2nd I. F. Transformer Coil	8	.80
7	W25200	Coil Socket		.05
5	W25024A	Coil Shield (Large)		.10
2	W25025A	Coil Shield (Small)		.10
7	W26891	Insulating Washer		.05
7	W21541B	Retaining Ring		.05
1	G1-29099	L. F. & H. F. Ant. Trimmer Cond.	10-11	.20
1	G1-29099	L. F. & H. F. R. F. Trimmer Cond.	12-13	.20
1	G1-33007	1st & 2nd I. F. Primary and 2nd I. F. Secondary Trimmer Cond.	14-15	.70
1	W25008A	1st I. F. Sec. Trimmer Cond. Adj. Blade	16 17	.05
1	W32291B	Dial Support Brkt.		.05
1	G6-32086	Dial Drive Assm.		1.20
1	W32208A	Dial Hand		.05
1	G14-33002	Variable Tuning Condenser Gang	63	3.75
1	W25666B	Level Control (Volume)	44	.90
1	W25594B	Tone Control & Line Switch	34-35	1.10
2	G4-27134	Light Bracket Assm.	49	.20
1	B30569D	6 Pole D. T. Switch	33	1.90
3	G24-27456	58 Socket	52-53 54	.10
2	G18-27456	56 Socket	55-56	.10
1	G43-27456	2A5 Socket	57	.10
1	G6-27456	80 Socket	51	.10
3	W26010	Tube Shield Base (58 Tube)		.05
3	B26009C	Tube Shield		.10
1	G17-23559	Power Transformer 110 Volt 60 cy.	58	3.25
1	G18-23559	Power Transformer 110 Volt 25 cy.	59	4.75
1	G19-23559	Power Transformer 220 Volt 25 cy.	60	4.75
1	B-21491C	A. C. Cord & Plug	50	.50
1	LW-20264	Ant.-Gnd. Terminal	1	.15
		FILTER & BY-PASS CONDENSERS		
1	W29150B	12.-6.-8. Mfd. 25 V.-450 V.- 450 V. Cond.	27-28 29	2.60
1	W26194B	12. Mfd. 475 Volt Cond.	26	1.25
1	W24049B	0.1 Mfd. 200 Volt Cond.	20	.15
1	W23142	0.02 Mfd. 400 Volt Cond.	21	.20
1	W25537A	0.001-0.03 Mfd. 400 V.-400 V. Cond.	24-25	.30
1	W25517A	0.05-0.008 Mfd. 400 V.-400 V. Cond.	30-31	.30
1	W30805	0.01 Mfd. 400 Volt Cond.	32	.20
1	W29266B	0.00017-0.03 Mfd. 400 V.-400 V. Cond.	66-67	.25
1	W28621	0.02 Mfd. 200 Volt Cond.	68	.15
1	W28623	0.02-0.02 Mfd. 200 V.-200 V. Cond.	69-70	.25
		RESISTORS		
3	W25937	275 Ohm	36-38	
			63	.15
		4500 Ohm	37	.15
		3 Megohm	39	.15
		1 Megohm	40	.15
	W28471	8500-25000 Ohm	41-42	.45
	23785	500000 Ohm	43-46	.15
	24403	150000 Ohm	45	.15
	W25521	450 Ohm	47	.15
	W30127	450 Ohm	62	.15
	W31009A	Speaker Cable	61	.15
	W32353	Knob (Large)		.10
3	W32352	Knob (Small)		.10
1	B21335	Tube & Condenser Shield		.20

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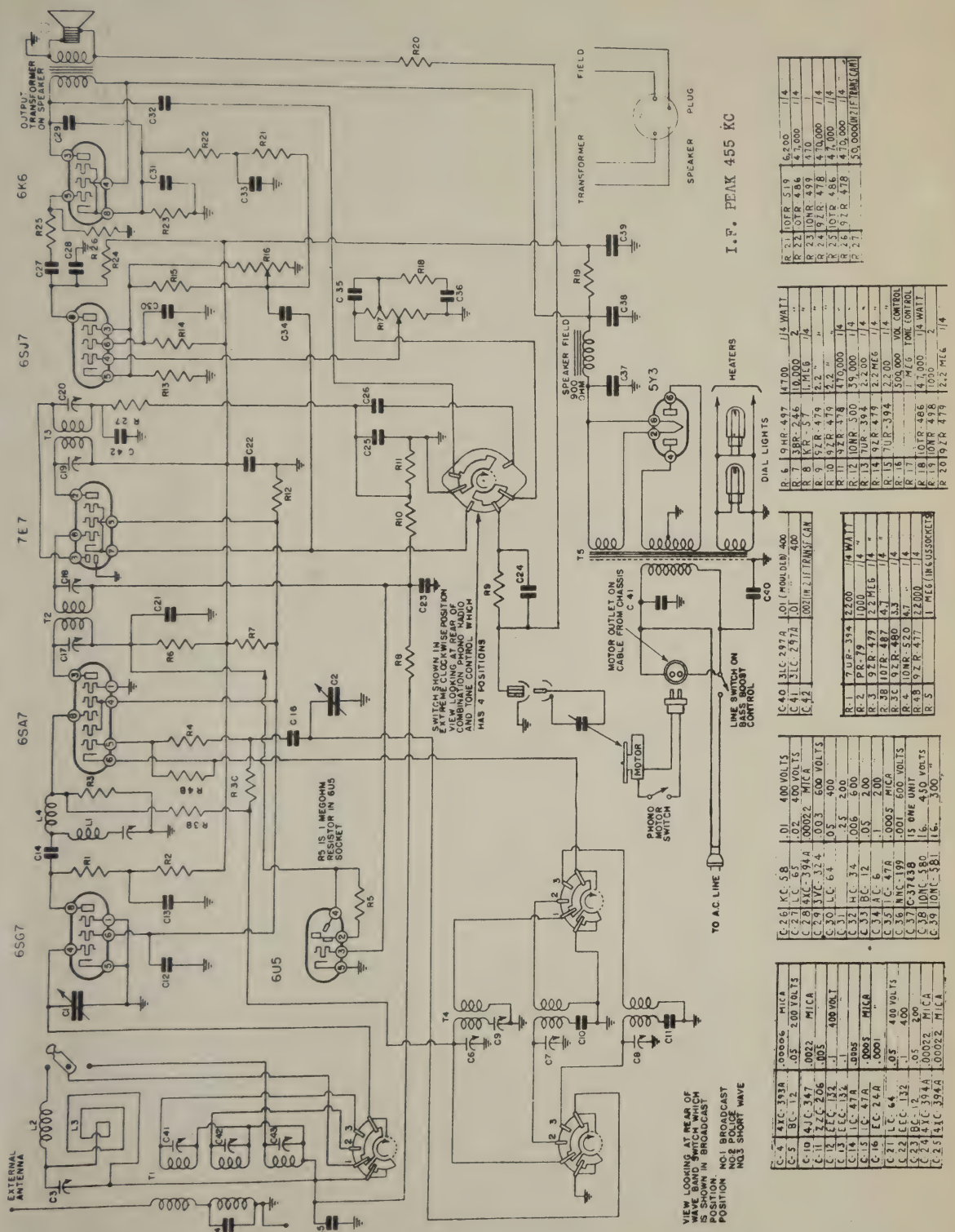
MODEL GF-462,
Chassis GF



C-4	4XC-393A	.00006	MICA
C-5	BC-12	.05	200 VOLTS
C-10	4JC-347	.0022	MICA
C-11	3ZC-206	.003	
C-12	ECC-132	.1	400 VOLT
C-13	ECC-132	.1	
C-14	LC-47A	.0005	
C-15	LC-47A	.0005	MICA
C-16	EC-24A	.0001	
C-21	LC-64	.05	400 VOLTS
C-22	ECC-132	.1	400
C-23	BC-12	.05	200
C-24	4XC-394A	.00022	MICA
C-25	4XC-394A	.00022	MICA

C-26	KC-58	.01	400 VOLTS
C-27	BC-12	.02	400 VOLTS
C-28	4XC-394A	.00022	MICA
C-29	3YC-324	.003	600 VOLTS
C-30	LC-64	.05	400
C-31		.25	200
C-32	HC-34	.006	600
C-33	BC-12	.05	200
C-34	AC-16	.1	200
C-35	AC-47A	.0005	MICA
C-36	KNC-199	.001	600 VOLTS
C-37	C-37438	15	ONE UNIT
C-38	10NC-380	16.	450 VOLTS
C-39	10NC-381	16.	300 "

C40	3LC-297A	.01	(MOULDED) 400
C 41	3LC-297A	.01	" " 400
C 42		.002	MICA TRIMMER CAP

R-1	7UP-394	22.00	1/4 WATT
R-2	PR-79	1.000	1/4 "
R-3	9ZR-479	2.2	MEG 1/4 "
R-3B	10TR-487	4.7	1/4 "
R-3C	9ZR-480	3.3	1/4 "
R-4	10NR-520	4.7	1/4 "
R 4B	9ZR-477	22.000	1/4 "
R 5		1	MEG (IN 6U5 SOCKET)

R 6	9HR-497	47.00	1/4 WATT
R 7	3BR-246	10,000	2 "
R 8	KR-5	1.	MEG 1/4 "
R 9	9ZR-479	2.2	" "
R 10	3ZR-479	2.2	" "
R 11	9HR-498	470.000	1/4 "
R 12	10NR-500	59.000	1/4 "
R 13	7UR-394	2.000	1/4 "
R 14	9ZR-479	2.2	MEG 1/4 "
R 15	7UR-394	2.000	VOL CONTROL
R 16		500.	MEG TONE CONTROL
R 17		4.7	000 1/4 WATT
R 18	10TR-486	4.700	2 "
R 19	10NR-498	1.00	MEG 1/4 "
R 20	9ZR-479	2.2	MEG 1/4 "

R 21	10FR-519	6.200	1/4 "
R 22	10TR-486	47.000	1/4 "
R 23	10NR-499	4.70	" "
R 24	9ZR-478	47.000	1/4 "
R 25	10TR-486	47.000	1/4 "
R 26	9ZR-478	47.000	1/4 "
R 27		50.000	OHM WIRE WOUND (CAM)

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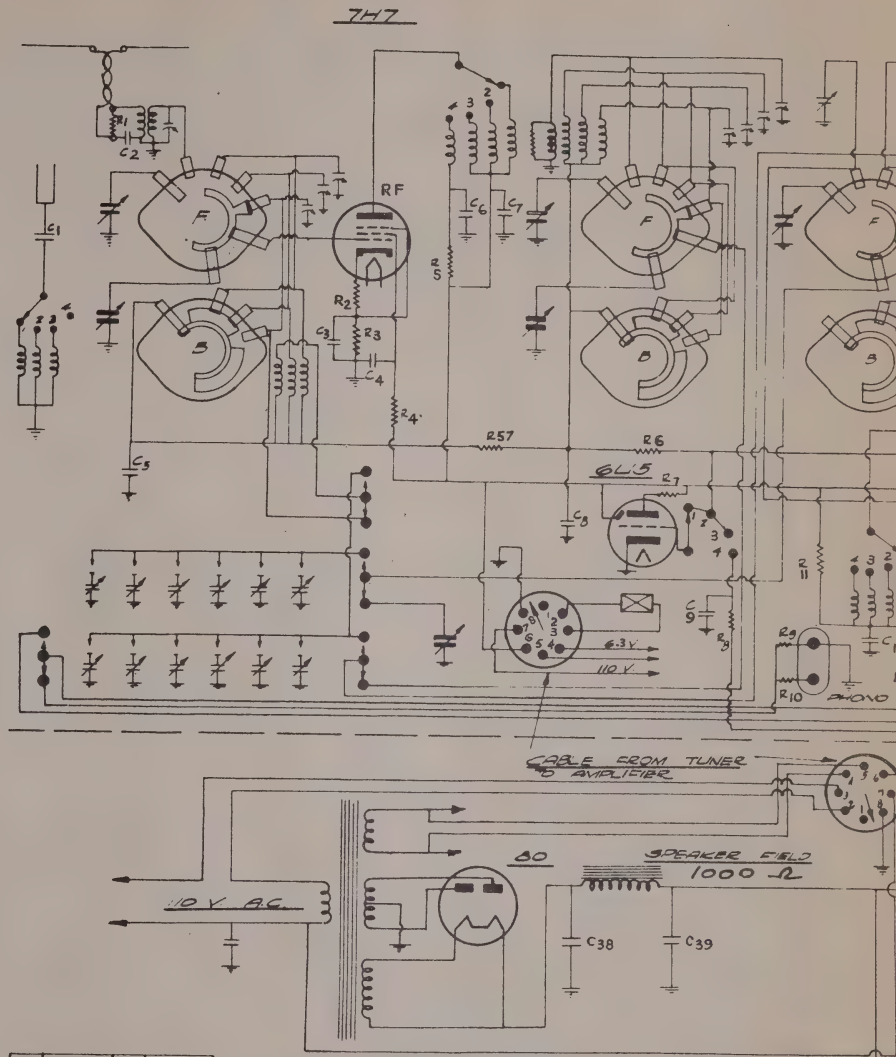
MODEL 1150

ESPEY MI



R1	1000 Ω	C1	.001 mf
R2	50 Ω	C2	.00023 mf
R3	100 Ω	C3	.05 mf
R4	30 KΩ	C4	.02 mf
R5	1000 Ω	C5	.02 mf
R6	.00 KΩ	C6	.02 mf
R7	1 MEG.	C7	.1 mf
R8	1 MEG	C8	.02 mf
R9	50 KΩ	C9	.05 mf
R10	250 KΩ	C10	50 mmf
R	10 KΩ	C11	.03 mf
R11	50 KΩ	C12	.03 mf
R13	200 Ω	C13	.05 mf
R14	200 Ω	C14	.05 mf
R15	30 KΩ	C15	.05 mf
R16	4000 Ω	C16	.25 mf
R17	1/2 MEG	C17	.05 mf
R18	1000 Ω	C18	.0001 mf
R19	30 KΩ	C19	.05 mf
R20	.000 Ω	C20	.05 mf
R21	30 KΩ	C21	.05 mf
R22	50 KΩ	C22	30 mmf
R23	250 KΩ	C23	.02 mf
R24	1/2 MEG	C24	.02 mf
R25	5 MEG	C25	.006 mf
R26	5000 Ω	C26	20 mmf
R27	250,000 Ω	C27	.005 mf
R28	250,000 Ω	C28	.05 mf
R29	100 KΩ	C29	.300 mf
R30	200 Ω	C30	.05 mf
R31	30 KΩ	C31	.05 mf
R32	50 KΩ	C32	30 mmf
R33	500 Ω	C33	.02 mf
R34	1000 Ω	C34	10 mmf
R35	25,000 Ω	C35	20 mmf
R36	10,000 Ω	C36	20 mmf
R37	2,000 Ω	C37	100 mmf
R38	2,000 Ω	C38	16 mf
R39	50 KΩ	C39	16 mf
R40	100 KΩ	C40	10 mf
R41	.00 KΩ	C41	16 mf
R42	.00 KΩ	C42	10 mf
R43	100 KΩ	C43	.01 mf
R44	5000 Ω	C44	25 mf
R45	250 KΩ	C45	.006 mf
R46	250 KΩ	C46	.006 mf
R47	50 KΩ	C47	100 mmf
R48	2000 Ω	C48	100 MMF
R49	100 KΩ	C49	3 mf ± 1/2
R50	50 KΩ	C50	.01 mf
R51	100 KΩ		
R52	2000 Ω		
R53	100 KΩ		
R54	250 KΩ		
R55	250 KΩ		
R56	240 Ω		
R57	100 KΩ		

R7 IN GL5 SOCKET

C44 PART OF TRIMMER

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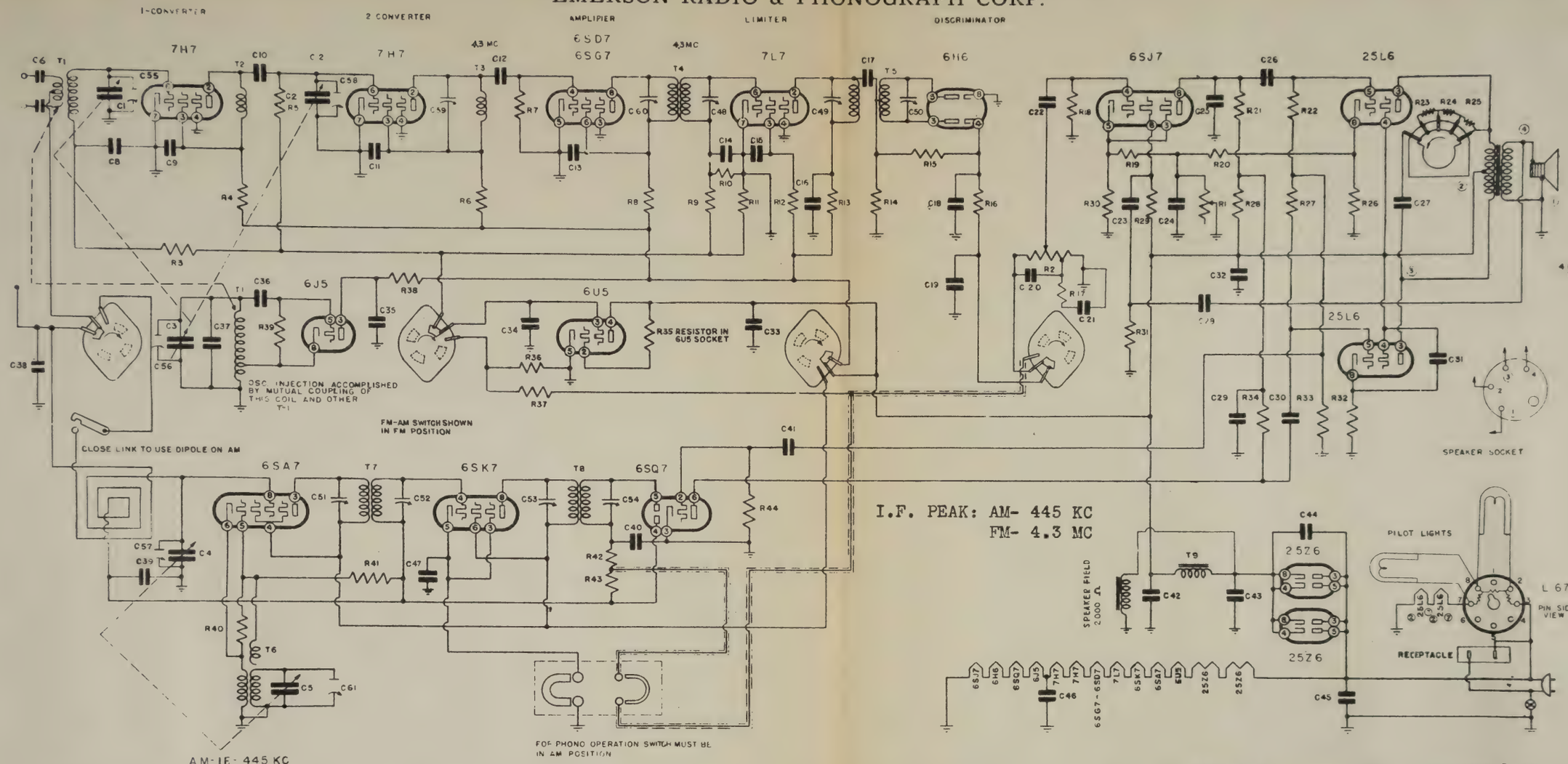
EMERSON RADIO & PHONOGRAPH CORP.

MODEL FM-460:
Chassis FM



I.F. PEAK: AM- 445 KC
FM- 4.3 MC

SYMBOL	DESCRIPTION
T1	FM OSC & ANTENNA COIL
T2	FM 2nd R-F COIL
T3	FM 1st I-F COIL
T4	FM 2nd I-F COIL
T5	FM DISCRIMINATOR TRANS.
T6	AM OSC COIL
T7-	AM 1st I-F TRANS.
T8	AM 2nd I-F TRANS.
T9	IRON CORE FILTER CHOKE
L-1	LOOP ANTENNA
C1,C2,C3	FM 3 GANG VARIABLE
C4,C5	AM 2 GANG VARIABLE
C6	.00006 mf MICA TYPE "C"
C7	.00006 mf MICA TYPE "C"
C8	.0005 mf MICA TYPE "W"
C9	.002 mf MICA TYPE "W"
C10	.0005 mf MICA TYPE "W"
C11	.002 mf MICA TYPE "W"
C12	.0005 mf MICA TYPE "W"
C13	.002 mf MICA TYPE "W"
C14	.00006 mf MICA TYPE "C"
C15	.002 mf MICA TYPE "W"
C16	.001 mf MICA TYPE "W"
C17	PART OF T2
C16	.00006 mf MICA TYPE "C"
C19	.0003 mf MICA TYPE "C"
C20	.0005 mf MICA TYPE "W"
C21	.002 mf 600 V. ROLL TYPE
C22	.002 mf 600 V. ROLL TYPE
C23	.05 mf 200 V. ROLL TYPE
C24	.05 mf 200 V. ROLL TYPE
C25	.00022 mf MICA TYPE "C"
C26	.002 mf 600 V. ROLL TYPE
C27	.04 mf 400 V. ROLL TYPE
C28	.1 mf 200 V. ROLL TYPE
C29	.1 mf 200 V. ROLL TYPE
C30	.01 mf 400 V. ROLL TYPE
C31	.0001 mf MICA TYPE "C"
C32	DUAL 40 mf 150V. ELECTROLYTIC
C33	DUAL 40 MF 150V. ELECTROLYTIC
C34	.05 mf 200 V. ROLL TYPE
C35	.0005 mf MICA TYPE "W"
C36	.0001 mf MICA TYPE "C"
C37	.00003 mf MICA TYPE "C"
C38	.002 mf 600V. ROLL TYPE
C39	.05 mf 200V. ROLL TYPE
C40	.00001 mf MICA TYPE "C"
C41	.002 mf 600 V. ROLL TYPE
C42	DUAL 40 mf 150 V. ELECTROLYT.
C43	DUAL 40 mf 150 V. ELECTROLYT.
C44	.004 mf 600 V. ROLL TYPE
C45	.05 mf 400 V. ROLL TYPE
C46	.002 mf MICA TYPE "W"
C47	.05 mf 200 V. ROLL TYPE
R1	TONE CONTROL
R2	VOLUME CONTROL
R3	4.7 MEG. ¼ W.
R4	470 ¼ W.
R5	3.3 MEG. ¼ W.
R6	470 ¼ W.
R7	1 MEG. ¼ W.
R8	470 MEG. ½ W.
R9	3.3 MEG. ¼ W.
R10	47,000 ¼ W.
R11	3.3 MEG. ¼ W.
R12	68,000 ¼ W.
R13	22,000 ¼ W.
R14	100,000 ¼ W.
R15	100,000 ¼ W.
R16	100,000 ¼ W.
R17	47,000 ¼ W.
R18	2.2 MEG. ¼ W.
R19	25,000 ¼ W.
R20	30,000 ¼ W.
R21	470,000 ¼ W.
R22	470,000 ¼ W.
R23	10,000 ½ W.
R24	2,700 ½ W.
R25	470 ½ W.
R26	150 ½ W.
R27	470,000 ¼ W.
R28	47,000 ¼ W.
R29	2.2 MEG. ¼ W.
R30	3,900 ¼ W.
R31	100,000 ¼ W.
R32	150 ½ W.
R33	220,000 ¼ W.
R34	470,000 ¼ W.
R35	1 MEG. in 6U5
R36	10 MEG. ¼ W.
R37	4.7 MEG. ¼ W.
R38	470 ¼ W.
R39	27,000 ¼ W.
R40	22,000 ¼ W.
R41	15 MEG. ¼ W.
R42	47,000 ¼ W.
R43	3.3 MEG. ¼ W.
R44	10 MEG. ¼ W.

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MODEL 1141 with 7H7 Loktals
MODEL 1141 with 6SK7 Octals

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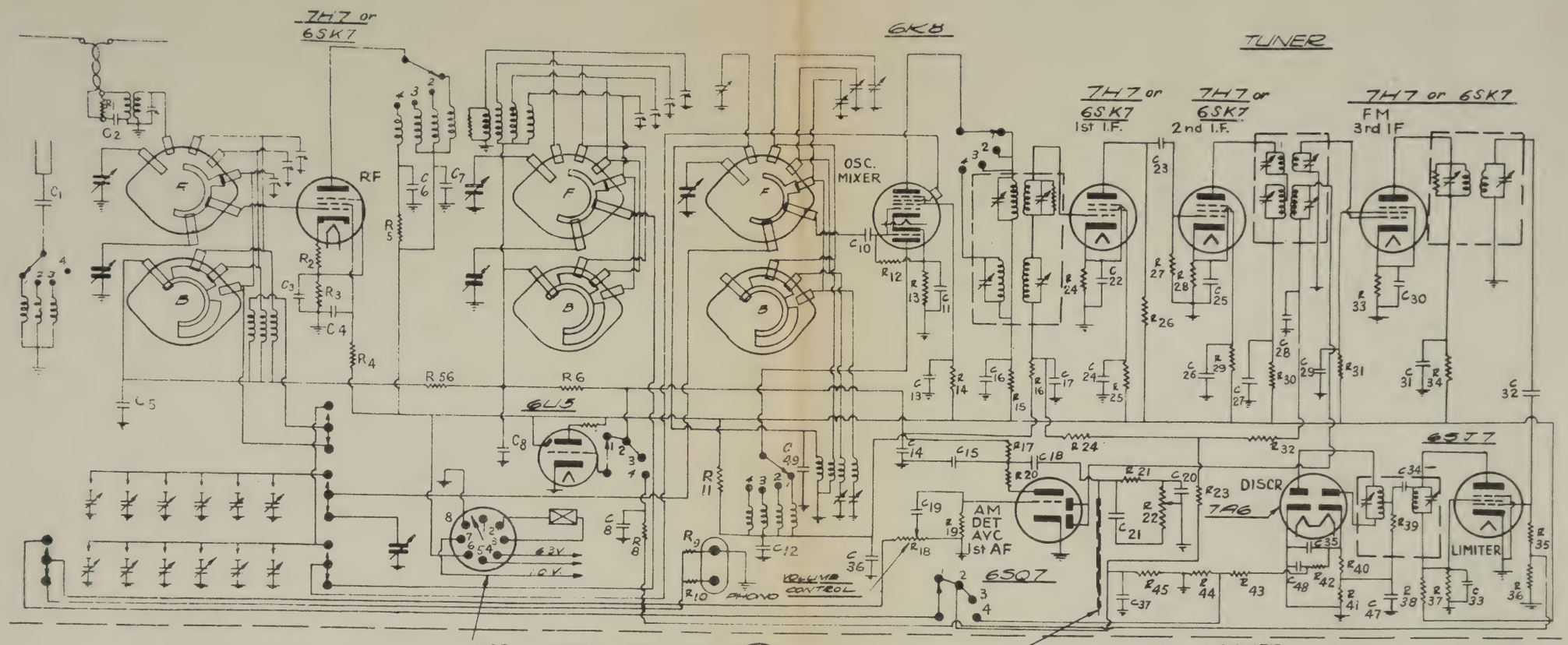

I.F. PEAK: A.M. 455 KC
F.M. 4.3 MC

POSITION No. 1. - BROADCAST
POSITION No. 2. - POLICE BAND
POSITION No. 3. - 31-METER BAND
POSITION No. 4. - F.M.

F = FRONT OF BAND SWITCH
B = BACK OF BAND SWITCH
BAND SWITCH SHOWN IN BROADCAST POSITION

R1	1000 Ω	C1	.001 mf
R2	50 Ω	C2	.00025 mf
R3	100 Ω	C3	.05 mf
R4	30 KΩ	C4	.02 mf
R5	1000 Ω	C5	.02 mf
R6	100 KΩ	C6	.02 mf
R7	1 MEG	C7	.1 mf
R8	1 MEG	C8	.02 mf
R9	50 KΩ	C9	.05 mf
R10	250 KΩ	C10	50 mmf
R11	0 KΩ	C11	.05 mf
R12	50 KΩ	C12	.05 mf
R13	200 Ω	C13	.05 mf

R14	25 KΩ	C14	.02 mf
R15	1000 Ω	C15	.0001 mf
R16	100 KΩ	C16	.05 mf
R17	250 KΩ	C17	.02 mf
R18	1/2 MEG	C18	.02 mf
R19	5 MEG	C19	.006 mf
R20	250,000 Ω	C20	.015 mf
R21	3000 Ω	C21	.02 mf
R22	500,000 Ω	C22	.05 mf
R23	100,000 Ω	C23	.0001 mf
R24	200 Ω	C24	.05 mf
R25	30 KΩ	C25	.05 mf
R26	4000 Ω	C26	.05 mf
R27	1/2 MEG	C27	.05 mf

R28	1000 Ω	C28	.0001 mf
R29	30 KΩ	C29	.05 mf
R30	1000 Ω	C30	.05 mf
R31	30 KΩ	C31	.05 mf
R32	50 KΩ	C32	30 mmf
R33	500 Ω	C33	.02 mf
R34	1000 Ω	C34	10 mmf
R35	25,000 Ω	C35	20 mmf
R36	20,000 Ω	C36	20 mmf
R37	12,000 Ω	C37	100 mmf
R38	12,000 Ω	C38	16 mf
R39	50 KΩ	C39	16 mf
R40	100 KΩ	C40	10 mf
R41	100 KΩ	C41	16 mf

R42	100 KΩ	C42	10 mf
R43	100 KΩ	C43	.01 mf
R44	3000 Ω	C44	25 mf
R45	250 KΩ	C45	.006 mf
R46	240 Ω	C46	.006 mf
R47	30 KΩ	C47	100 mmf
R48	2000 Ω	C48	100 mmf
R49	100 KΩ	C49	5 mmf ±1%
R50	30 KΩ	C50	.01 mf
R51	100 KΩ		
R52	2000 Ω		
R53	100 KΩ		
R54	250 KΩ		
R55	250 KΩ		
R56	100 KΩ		

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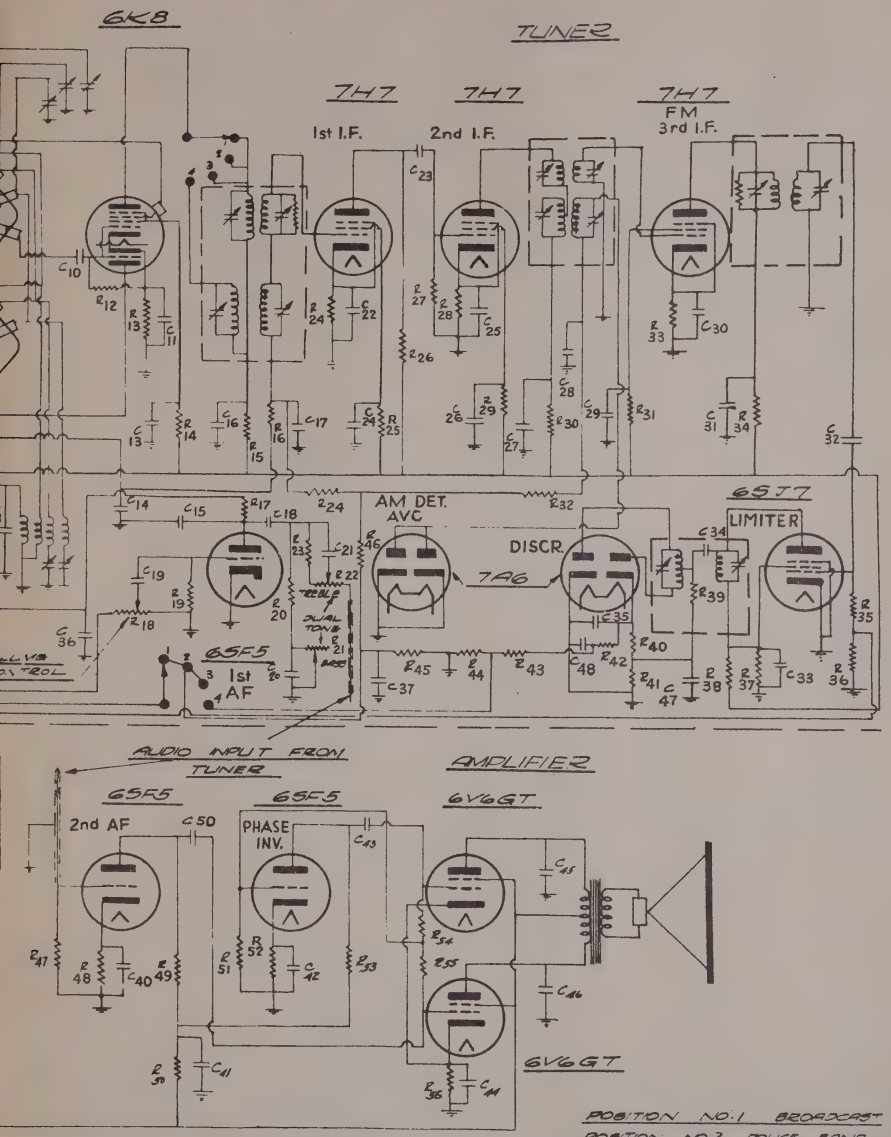
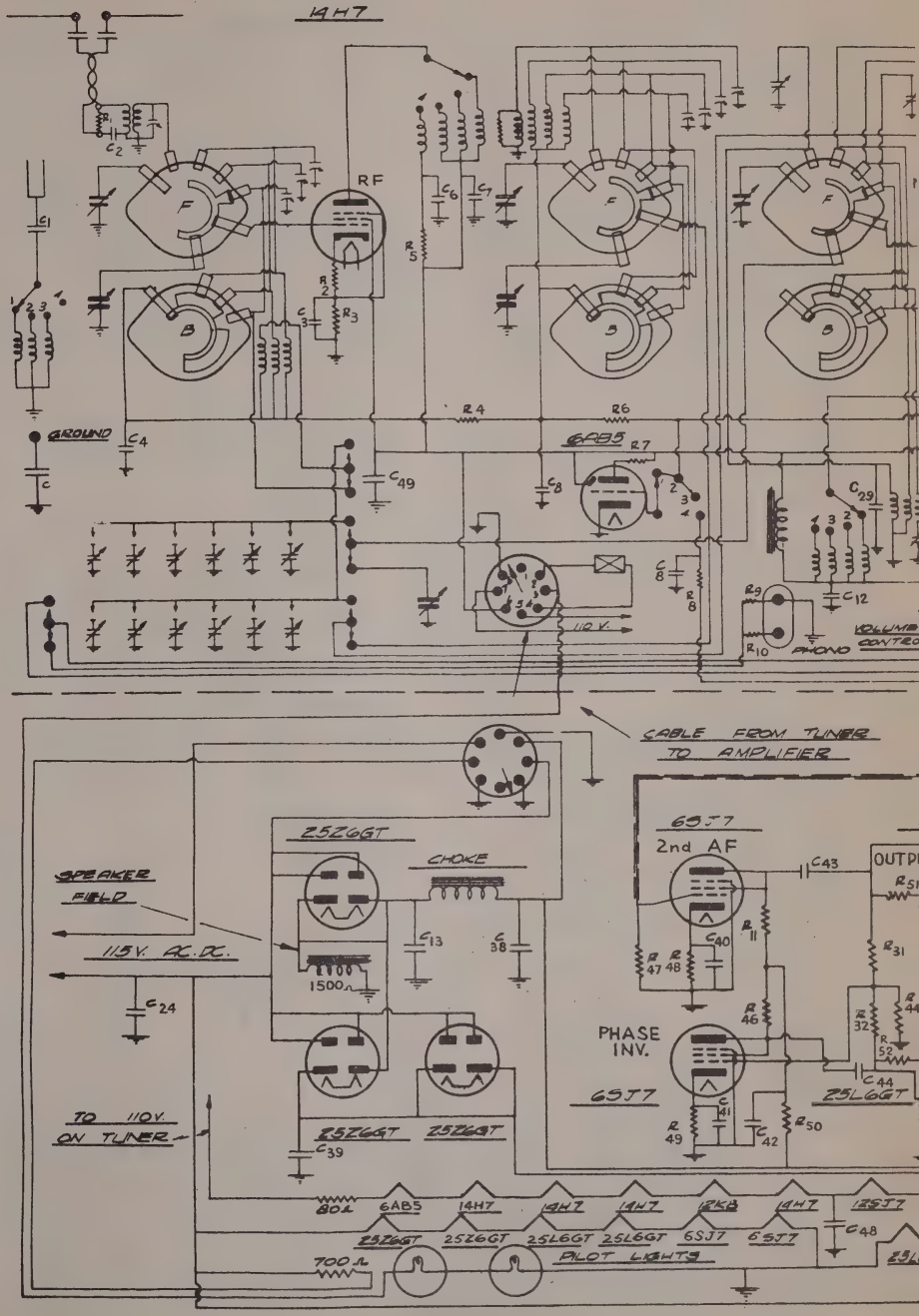


I.F. PEAK: A.M. 455 KC
F.M. 4.3 MC

POSITION NO. 1 BROADCAST
POSITION NO. 2 POLICE BAND
POSITION NO. 3 31 M. BAND
POSITION NO. 4 F.M.
F. = FRONT OF BAND SWITCH
B. = BACK OF BAND SWITCH
BAND SWITCH SHOWN IN
BROADCAST POSITION

MODEL 1190

ESPEY MFG



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MODEL 1150

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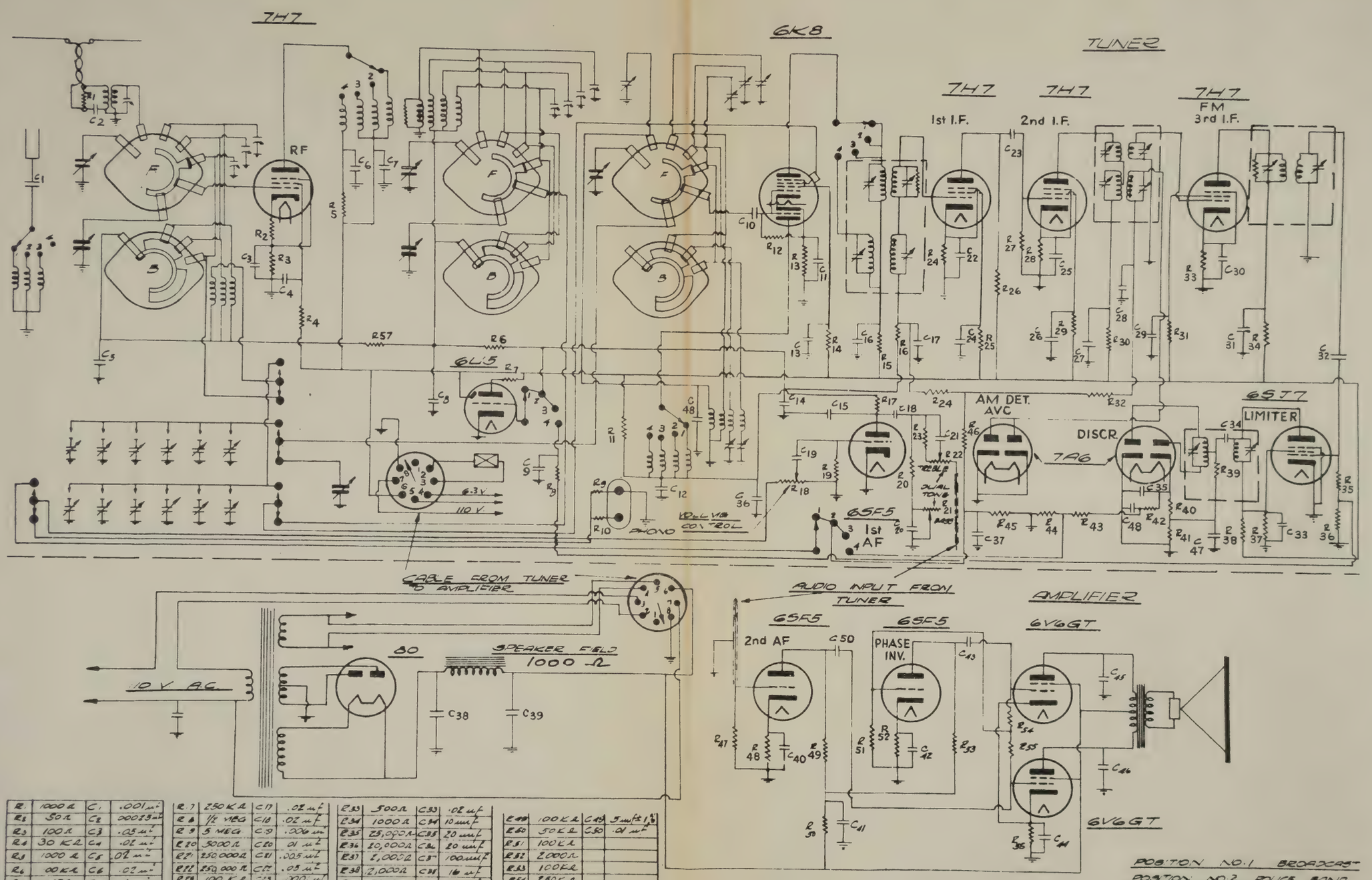

R1	1000 Ω	C1	.001 mf
R2	50 Ω	C2	00035 mf
R3	100 Ω	C3	.05 mf
R4	30 KΩ	C4	.02 mf
R5	1000 Ω	C5	.02 mf
R6	00 KΩ	C6	.02 mf
R7	1 MEG	C7	.1 mf
R8	1 MEG	C8	.02 mf
R9	50 KΩ	C9	.03 mf
R10	250 KΩ	C10	50 mmf
R	10 KΩ	C11	.03 mf
R12	50 KΩ	C12	.03 mf
R13	200 Ω	C13	.05 mf
R14	25 KΩ	C14	.02 mf
R15	1000 Ω	C15	.0001 mf
R16	100 KΩ	C16	.03 mf

R17	250 KΩ	C17	.02 mf
R18	½ MEG	C18	.02 mf
R19	5 MEG	C19	.006 mf
R20	5000 Ω	C20	.01 mf
R21	250 000 Ω	C21	.005 mf
R22	250 000 Ω	C22	.05 mf
R23	100 KΩ	C23	.000 mf
R24	200 Ω	C24	.05 mf
R25	30 KΩ	C25	.05 mf
R26	4000 Ω	C26	.05 mf
R27	½ MEG	C27	.05 mf
R28	1000 Ω	C28	.0001 mf
R29	30 KΩ	C29	.05 mf
R30	1000 Ω	C30	.05 mf
R31	30 KΩ	C31	.05 mf
R32	50 KΩ	C32	30 mmf

R33	500 Ω	C33	.02 mf
R34	1000 Ω	C34	10 mmf
R35	25,000 Ω	C35	20 mmf
R36	10,000 Ω	C36	20 mmf
R37	2,000 Ω	C37	100 mmf
R38	2,000 Ω	C38	16 mf
R39	50 KΩ	C39	16 mf
R40	100 KΩ	C40	10 mf
R41	100 KΩ	C41	16 mf
R42	00 KΩ	C42	10 mf
R43	100 KΩ	C43	.01 mf
R44	5000 Ω	C44	25 mf
R45	250 KΩ	C45	.006 mf
R46	250 KΩ	C46	.006 mf
R47	50 KΩ	C47	100 mmf
R48	2000 Ω	C48	100 mmf

R49	100 KΩ	C49	5 mf ½
R50	50 KΩ	C50	.01 mf
R51	100 KΩ		
R52	2000 Ω		
R53	100 KΩ		
R54	250 KΩ		
R55	250 KΩ		
R56	240 Ω		
R57	100 KΩ		

R7 IN 6L5 SOCKET

C34 PART OF TRIMMER

I.F. PEAK: A.M. 455 KC
F.M. 4.3 MC

POSITION NO.1 BROADCAST
POSITION NO.2 POLICE BAND
POSITION NO.3 31 M. BAND
POSITION NO.4 F.M.
F. FRONT OF BAND SWITCH
B. BACK OF BAND SWITCH
BAND SWITCH SHOWN IN BROADCAST POSITION

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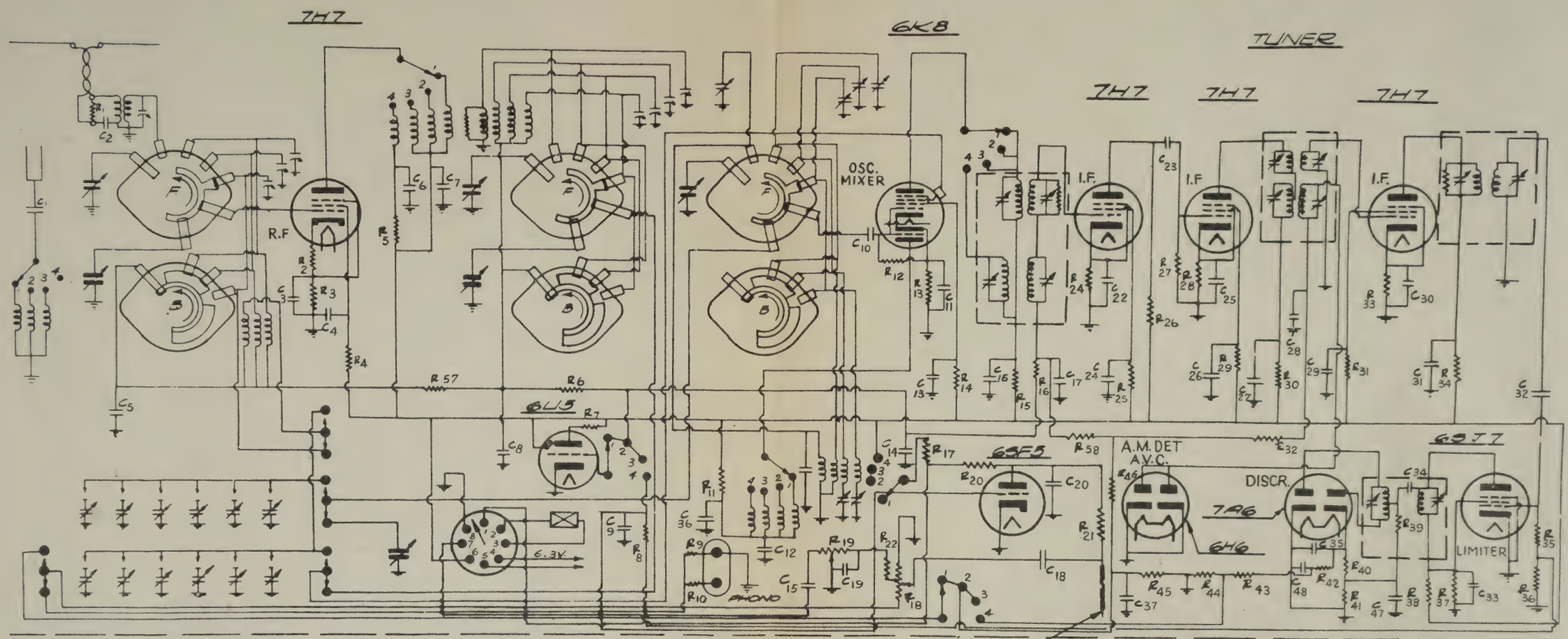

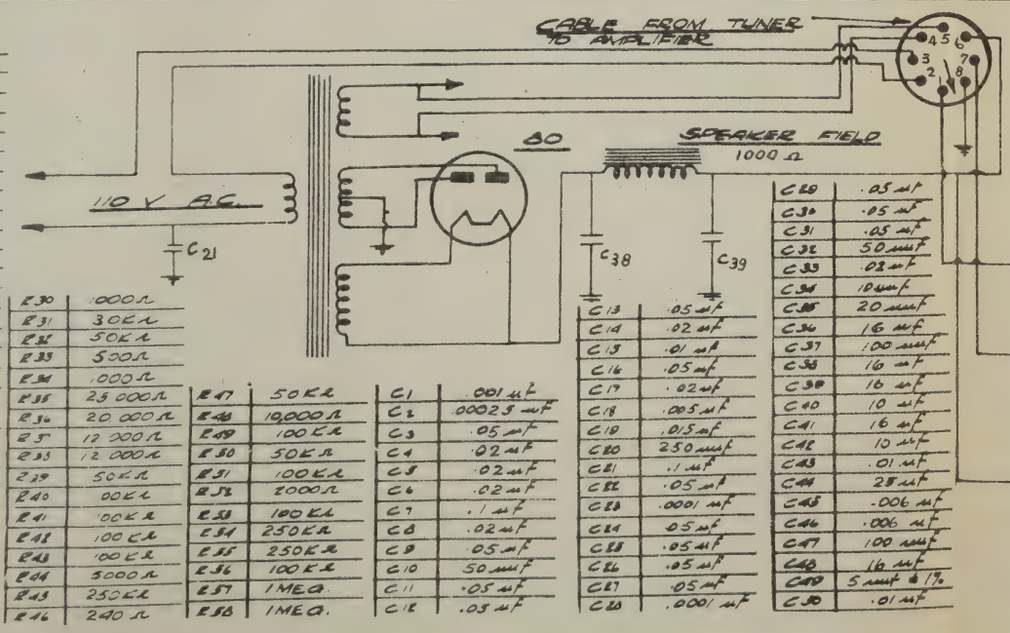

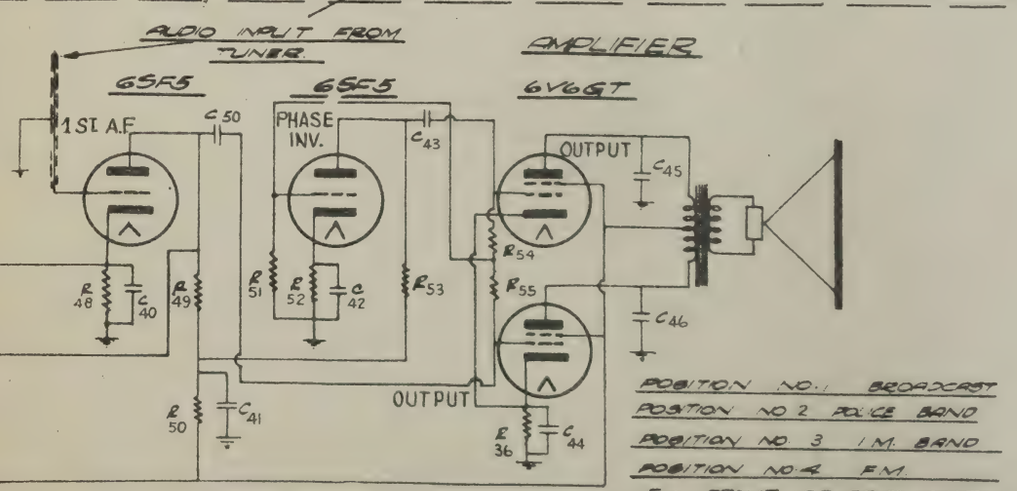

R1	200 Ω
R2	50 Ω
R3	100 Ω
R4	30K Ω
R5	1000 Ω
R6	100K Ω
R7	1 MEG
R8	1 MEG
R9	50K Ω
R10	250K Ω
R11	10K Ω
R12	50K Ω
R13	200 Ω
R14	25K Ω
R15	1,000 Ω
R16	100K Ω
R17	75,000 Ω
R18	1 MEG
R19	1/2 MEG
R20	10 MEG
R21	2 MEG
R22	25,000 Ω
R23	100 K Ω
R24	200 Ω
R25	30K Ω
R26	1000 Ω
R27	1/2 MEG.
R28	1000 Ω
R29	30K Ω

R30	1000 Ω
R31	30K Ω
R32	50K Ω
R33	500 Ω
R34	1000 Ω
R35	25,000 Ω
R36	20,000 Ω
R37	12,000 Ω
R38	12,000 Ω
R39	50K Ω
R40	00K Ω
R41	00K Ω
R42	100 K Ω
R43	100 K Ω
R44	5000 Ω
R45	250K Ω
R46	240 Ω

R47	50K Ω
R48	10,000 Ω
R49	100 K Ω
R50	50K Ω
R51	100 K Ω
R52	2000 Ω
R53	100 K Ω
R54	250 K Ω
R55	250 K Ω
R56	100 K Ω
R57	1 MEG.
R58	1 MEG.

C1	.001 μf
C2	.00025 mf
C3	.05 mf
C4	.02 mf
C5	.02 mf
C6	.02 mf
C7	.1 mf
C8	.02 mf
C9	.05 mf
C10	50 mmf
C11	.05 mf
C12	.05 mf

C13	.05 mf
C14	.02 mf
C15	.01 mf
C16	.05 mf
C17	.02 mf
C18	.005 mf
C19	.015 mf
C20	250 mmf
C21	.1 mf
C22	.05 mf
C23	.0001 mf
C24	.05 mf
C25	.05 mf
C26	.05 mf
C27	.0001 mf

C28	.05 mf
C29	.05 mf
C30	.05 mf
C31	50 mmf
C32	.02 mf
C33	10 mmf
C34	20 mmf
C35	16 mf
C36	100 mmf
C37	16 mf
C38	16 mf
C39	10 mf
C40	16 mf
C41	10 mf
C42	.01 mf
C43	25 mf
C44	.006 mf
C45	.006 mf
C46	100 mmf
C47	16 mf
C48	5 mmf ± 1%
C50	.01 mf

POSITION NO. 1 BROADCAST
POSITION NO 2 POLICE BAND
POSITION NO 3 I.M. BAND
POSITION NO 4 F.M.
F. = FRONT OF BAND SWITCH
= BACK OF BAND SWITCH
BAND SWITCH SHOWN IN BROADCAST POSITION

I.F. PEAK: A.M. 455 KC
F.M. 4.3 MC

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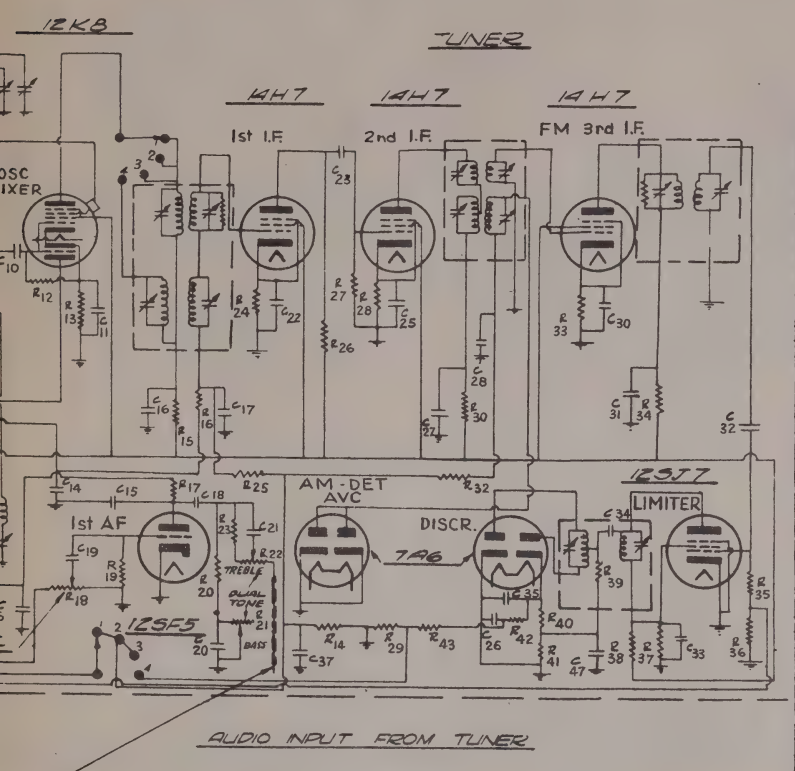
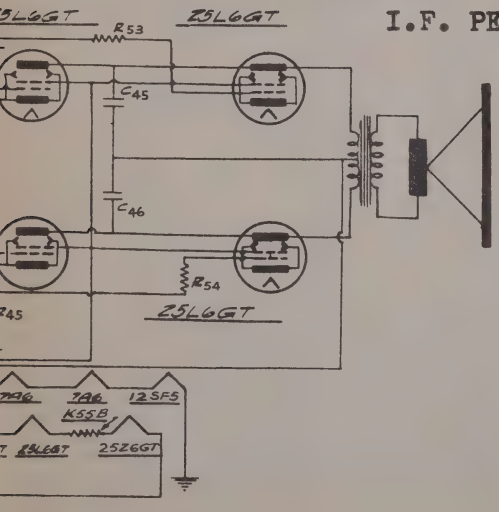




I.F. PEAK: A.M. 455 KC
F.M. 4.3 MC

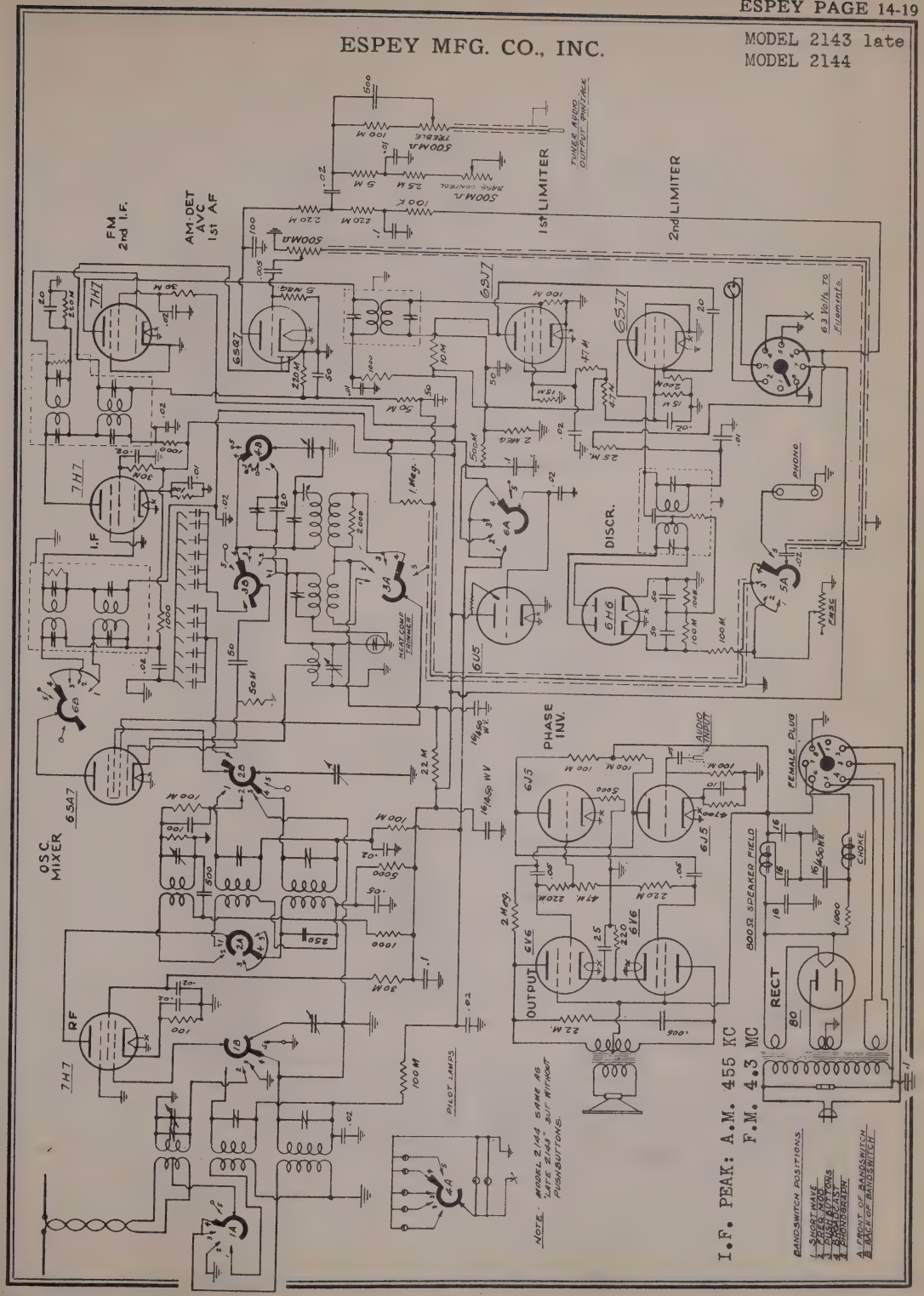
R 1	500Ω
R 2	30Ω
R 3	100Ω
R 4	100KΩ
R 5	1000Ω
R 6	100KΩ
R 7	1 MEG
R 8	1 MEG
R 9	50KΩ
R 10	250KΩ
R 11	250KΩ
R 12	50KΩ
R 13	200Ω
R 14	250 KΩ
R 15	1000Ω
R 16	100 KΩ
R 17	250 KΩ
R 18	½ MEG
R 19	5 MEG
R 20	5000Ω
R 21	250 KΩ
R 22	250 KΩ
R 23	100 KΩ
R 24	200Ω
R 25	1 MEG
R 26	4000Ω
R 27	½ MEG
R 28	200Ω
R 29	25 KΩ
R 30	1000Ω
R 31	250KΩ
R 32	50 KΩ
R 33	500Ω
R 34	1000Ω
R 35	25,000Ω
R 36	20,000Ω
R 37	12,000Ω
R 38	12,000Ω
R 39	50 KΩ
R 40	100 KΩ
R 41	100KΩ
R 42	100 KΩ
R 43	100 KΩ
R 44	250 KΩ
R 45	80Ω
R 46	250 KΩ
R 47	50 KΩ
R 48	10,000Ω
R 49	10,000Ω
R 50	10,000Ω
R 51	500Ω
R 52	500Ω
R 53	500Ω
R 54	500Ω

C 1	.001 mf
C 2	250 mmf
C 3	.05 mf
C 4	.01 mf
C 5	.02 mf
C 6	.02 mf
C 7	.01 mf
C 8	.02 mf
C 9	.05 mf
C 10	50 mmf
C 11	.05 mf
C 12	.05 mf
C 13	60 mf
C 14	.02 mf
C 15	000 mf
C 16	05 mf
C 17	02 mf
C 18	.02 mf
C 19	.008 mf
C 20	.01 mf
C 21	.0005 mf
C 22	.05 mf
C 23	.0001 mf
C 24	.1 mf
C 25	.05 mf

C 26	100 mmf
C 27	.05 mf
C 28	.0001 mf
C 29	5 mmf ±1%
C 30	.03 mf
C 31	.05 mf
C 32	50 mmf
C 33	.02 mf
C 34	10 mmf
C 35	20 mmf
C 36	16 mf
C 37	100 mmf
C 38	60 mf
C 39	30 mf
C 40	10 mf
C 41	10 mf
C 42	.25 mf
C 43	.01 mf
C 44	.01 mf
C 45	.005 mf
C 46	.005 mf
C 47	20 mmf
C 48	.05 mf
C 49	.1 mf

ESPEY MFG. CO., INC.

MODEL 2143 late
MODEL 2144



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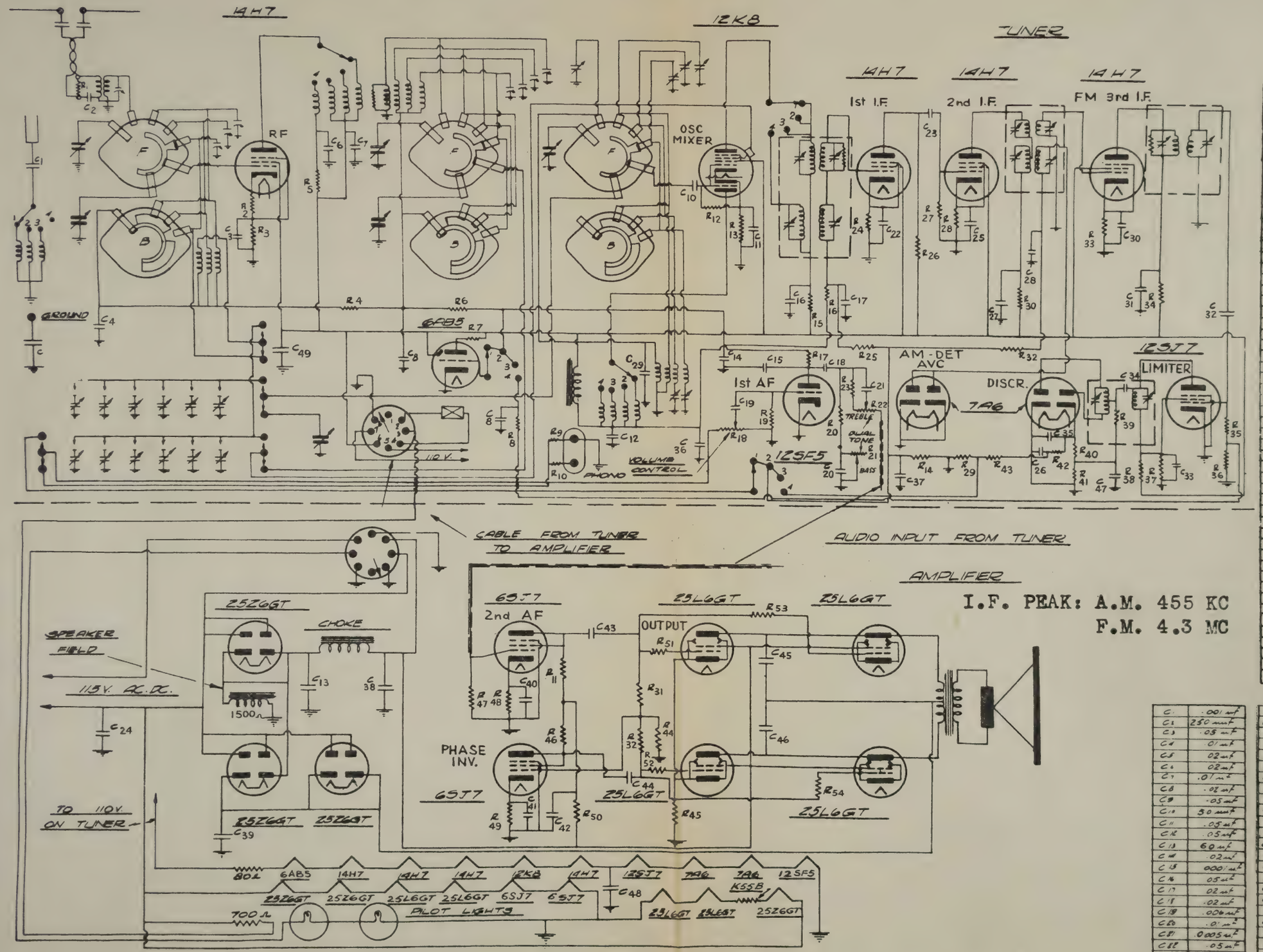
MODEL 1190

ESPEY MFG. CO., INC.



I.F. PEAK: A.M. 455 KC
F.M. 4.3 MC

R 1	500Ω
R 2	30Ω
R 3	100Ω
R 4	100KΩ
R 5	1000Ω
R 6	100KΩ
R 7	1 MEG
R 8	1 MEG
R 9	50KΩ
R 10	250KΩ
R 11	250KΩ
R 12	50KΩ
R 13	200Ω
R 14	250 KΩ
R 15	1000Ω
R 16	100 KΩ
R 17	250 KΩ
R 18	1/2 MEG
R 19	5 MEG
R 20	5000Ω
R 21	250 KΩ
R 22	250 KΩ
R 23	100 KΩ
R 24	200Ω
R 25	1 MEG
R 26	4000Ω
R 27	1/2 MEG
R 28	200Ω
R 29	25 KΩ
R 30	1000Ω
R 31	250KΩ
R 32	50 KΩ
R 33	500Ω
R 34	1000Ω
R 35	25,000Ω
R 36	20,000Ω
R 37	12,000Ω
R 38	12,000Ω
R 39	50 KΩ
R 40	100 KΩ
R 41	100 KΩ
R 42	100 KΩ
R 43	100 KΩ
R 44	250 KΩ
R 45	80Ω
R 46	250 KΩ
R 47	50 KΩ
R 48	10,000Ω
R 49	10,000Ω
R 50	10,000Ω
R 51	500Ω
R 52	500Ω
R 53	500Ω
R 54	500Ω

C 1	.001 mf
C 2	250 mmf
C 3	.05 mf
C 4	.01 mf
C 5	.02 mf
C 6	.02 mf
C 7	.01 mf
C 8	.02 mf
C 9	.05 mf
C 10	30 mmf
C 11	.05 mf
C 12	.05 mf
C 13	60 mf
C 14	.02 mf
C 15	000 mf
C 16	05 mf
C 17	02 mf
C 18	.02 mf
C 19	.006 mf
C 20	.01 mf
C 21	.0005 mf
C 22	.05 mf
C 23	.0001 mf
C 24	.1 mf
C 25	.05 mf

C 26	100 mmf
C 27	.05 mf
C 28	0001 mf
C 29	5 mmf ±1%
C 30	.05 mf
C 31	.05 mf
C 32	50 mmf
C 33	.02 mf
C 34	10 mmf
C 35	20 mmf
C 36	16 mf
C 37	100 mmf
C 38	60 mf
C 39	30 mf
C 40	10 mf
C 41	10 mf
C 42	.25 mf
C 43	.01 mf
C 44	.01 mf
C 45	.005 mf
C 46	.005 mf
C 47	20 mf
C 48	.05 mf
C 49	1 mf

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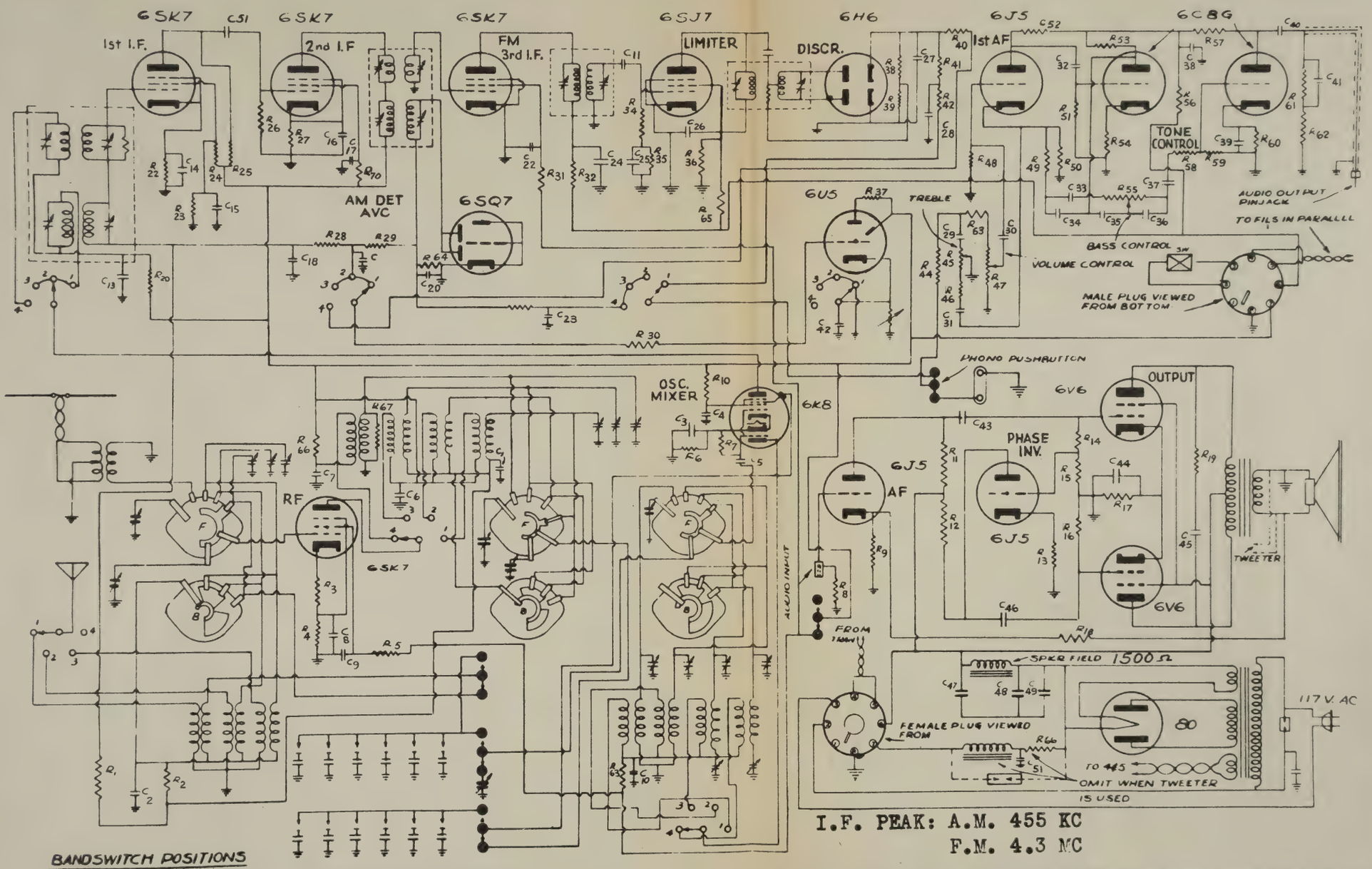

R1	100K
R2	100K
R3	50K
R4	100
R5	30K
R6	200
R7	50K
R8	100K
R9	4K
R10	25K
R11	100K
R12	100K
R13	4K
R14	250K
R15	50K
R16	250K
R17	250
R18	50K
R19	25K
R20	1K
R21	
R22	200
R23	50K
R24	25K
R25	10K
R26	0.5 MEG
R27	100
R28	100K
R29	1.0 MEG
R30	100K
R31	50K
R32	1K
R33	50K
R34	50K
R35	350K
R36	10K
R37	1.0 MEG
R38	100K
R39	100K
R40	250K
R41	100K
R42	10K
R43	1.5K
R44	250K
R45	5 MEG
R46	4K
R47	0.5 MEG
R48	250K
R49	50K
R50	2K
R51	500K
R52	50K
R53	50K
R54	2K
R55	2 MEG
R56	50K
R57	50K
R58	200K
R59	20K
R60	2K
R61	250K
R62	100K
R63	100K
R64	150K
R65	2K
R66	1K
R67	7500

BANDSWITCH POSITIONS

1. BROADCAST
2. POLICE AND AMATEUR
3. SHORT WAVE
4. FREQ. MOD.

F=FRONT OF BANDSWITCH
B=BACK OF BANDSWITCH

I.F. PEAK: A.M. 455 KC
F.M. 4.3 MC

C1	0.02 μf	C9	0.02	C17	0.05	C25	0.00025	C33	.01	C41	0.0005	C49	16.0		
C2	0.02	C10	0.02	C18	0.02	C26	0.02	C34	0.005	C42	0.05	C50	0.05		
C3	0.05	C11	0.00005	C19	0.02	C27	0.00025	C35	.01	C43	0.05	C51	16.0 μfd		
C4	0.05	C12		C20	0.00005	C28	0.00025	C36	0.001	C44	25.0				
C5	0.00005	C13	0.05	C21	0.05	C29	0.001	C37	0.05	C45	0.005				
C6	0.02	C14	0.05	C22	0.05	C30	0.1	C38	8.0	C46	0.05				
C7	0.02	C15	0.05	C23	0.00005	C31	0.05	C39	10.0	C47	16.0				
C8	0.05	C16	0.05	C24	0.05	C32	0.1	C40	0.05	C48	16.0				

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MODEL 2170

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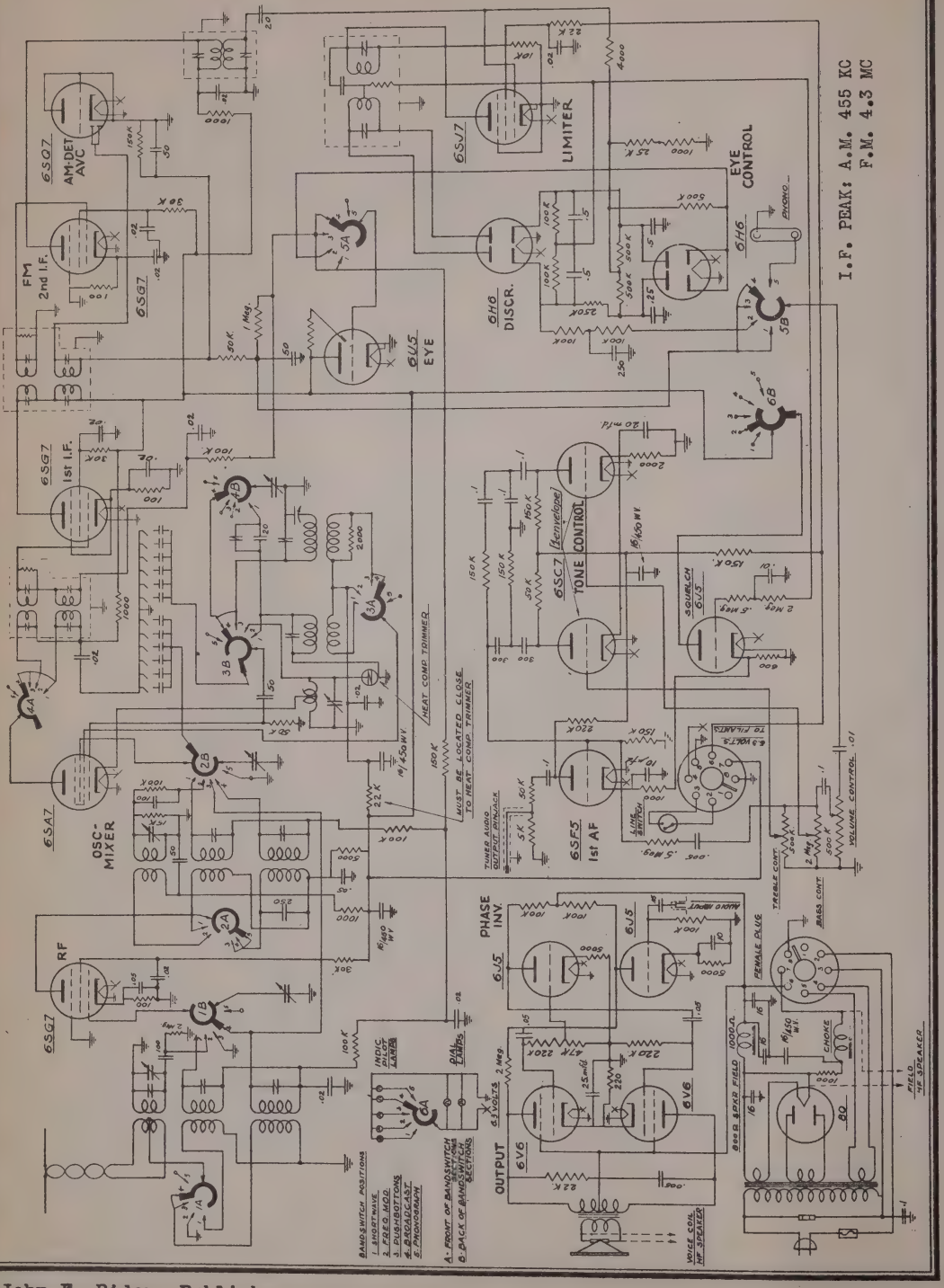

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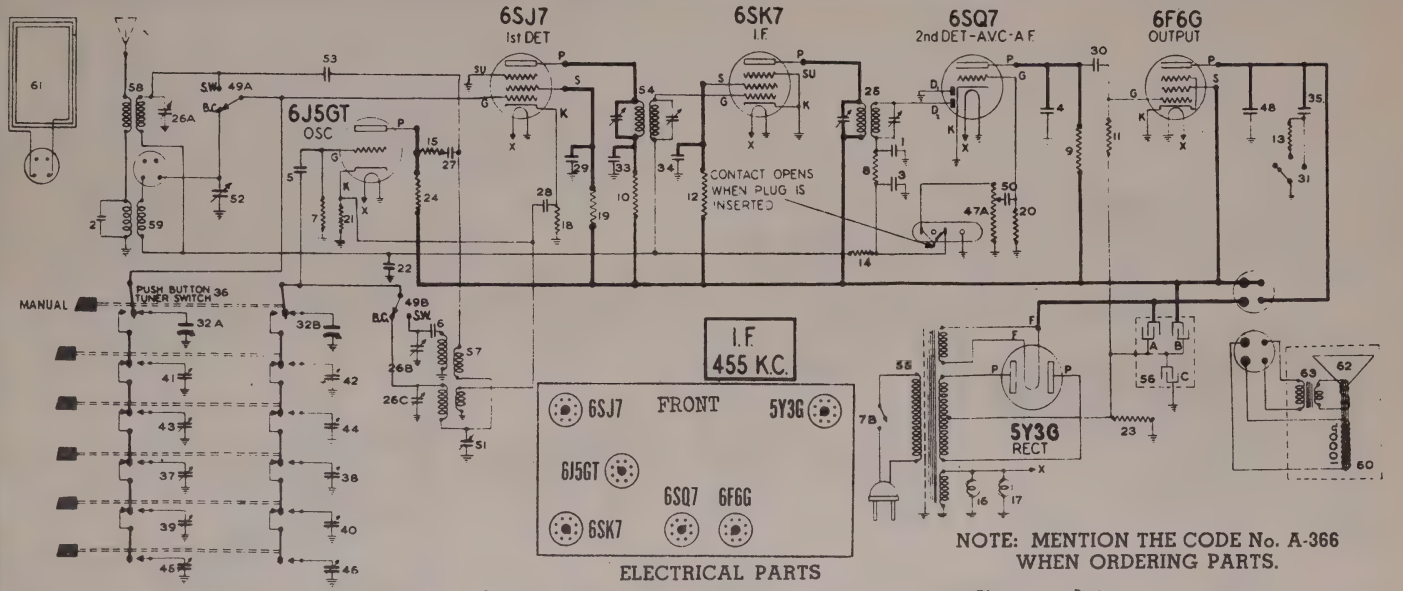


NOTE: MENTION THE CODE No. A-366 WHEN ORDERING PARTS.

ELECTRICAL PARTS

Diagram Number	Part Number	Description
1	83539	Condenser, mica 260 mmfd.
2-3-4	83783	Condenser, mica 110 mmfd.
5	85061	Condenser, mica 51 mmfd.
6	88587	Condenser, mica .0042 mfd.
7-8	110552	Resistor—carbon 47,000 ohms ¼ watt
9	110553	Resistor—carbon 220,000 ohms ¼ watt
10	110557	Resistor—carbon 4,700 ohms ¼ watt
11	110559	Resistor—carbon 470,000 ohms ¼ watt
12	110564	Resistor—carbon 100,000 ohms ¼ watt
13	110569	Resistor—carbon 10,000 ohms ¼ watt
14	110570	Resistor—carbon 2.2 meg. ¼ watt
15	110590	Resistor—carbon 180 ohms ¼ watt
16-17	110629	Dial light bulb—6.3 volt (Mazda No. 44)
18	112952	Resistor—carbon 3,300 ohms ¼ watt
19	112962	Resistor—carbon 150,000 ohms ¼ watt
20	112975	Resistor—carbon 10 meg. ¼ watt
21	116078	Resistor—560 ohms ¼ watt
22	116819	Condenser—.05 mfd. 600 volt
23	117075	Resistor 300 ohm 1 watt W.W.
24	118805	Resistor—carbon 10,000 ohms 1 watt
25	119024	Transformer—2nd I.F.
26A to 26C	119174	Condenser Trimmer 3 section
27 to 30	119193	Condenser .01 mfd. 600 volt
31	119289	Switch-tone
32A-32B	119291	Condenser—variable tuning
33 to 35	119414	Condenser—.02 mfd. 600 volt
36	119603	Push Button Switch
37 to 40	119663	Condenser—Push Button trimmer (750 to 1375 KC.)
41 to 44	119664	Condenser—Push Button trimmer (980 to 1600 KC.)
45 46	119753	Condenser Push Button trimmer (540 to 1000 KC.)
47A-47B	119779	Volume control ½ meg. (with switch)
48	119817	Condenser .004 mfd. 600 volt
49A-49B	119859	Switch band
50	119875	Condenser—.002 mfd. 600 volt
51	119934	Condenser—padder
52	160449	Condenser trimmer
53	161315	Condenser—twisted wire—5 mmfd.
54	500131	Transformer—1st I.F.
55	500137	Transformer—power (60 cycles)
	500202	Transformer power (25 cycles)
56A to 56C	500201	Condenser—electrolytic 20 mfd. 350 volt 10 mfd. 350 volt 20 mfd. 25 volt
57	500248	Coil—oscilator
58	500249	Coil—short wave antenna
59	500255	Coil—B.C. antenna loading
60	M-500280	Speaker—dynamic (6")
61	500295	Loop antenna & cabinet back
62	M-500303	Cone & Voice coil for M-500280 speaker
63	M-500302	Transformer output for M-500280 speaker

SOCKET VOLTAGES — ALL D.C. POTENTIAL MEASURED TO CHASSIS

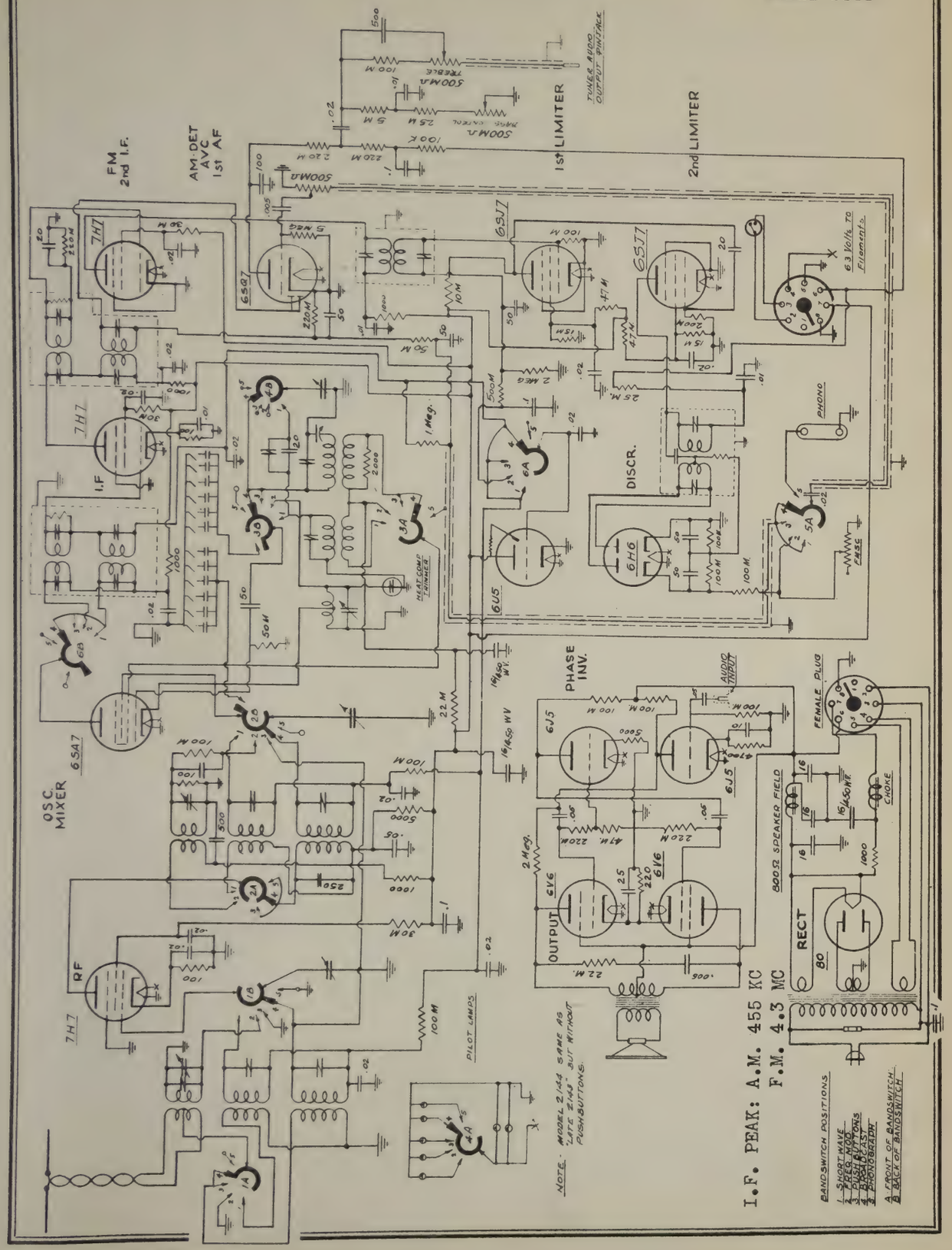
NO SIGNAL CONDITION — DIAL TUNED TO 540 KC.

TUBE	FUNCTION	H	K	G	S	SU	P	D_1	D_2
6SJ7	1st DET.	6.0 A.C.	6.5	O	140	0	215		
6J5GT	OSC.	6.0 A.C.	0	—3			160		
6SK7	I.F.	6.0 A.C.	0	O	60	0	225		
6SQ7	2nd DET. — A.V.C. & A.F.	6.0 A.C.	0	O			90	0	0
6F6G	OUTPUT	6.0 A.C.	0	Note A	225		215		
5Y3G	RECTIFIER	5.0 A.C.					Plates 350 V.A.C to C.T.		

NOTE A: The bias for this grid is —15 volts measured across resistor No. 23.
Use a high resistance voltmeter of at least 1000 ohms per volt.

ESPEY MFG. CO., INC.

MODEL 2143 late
MODEL 2144



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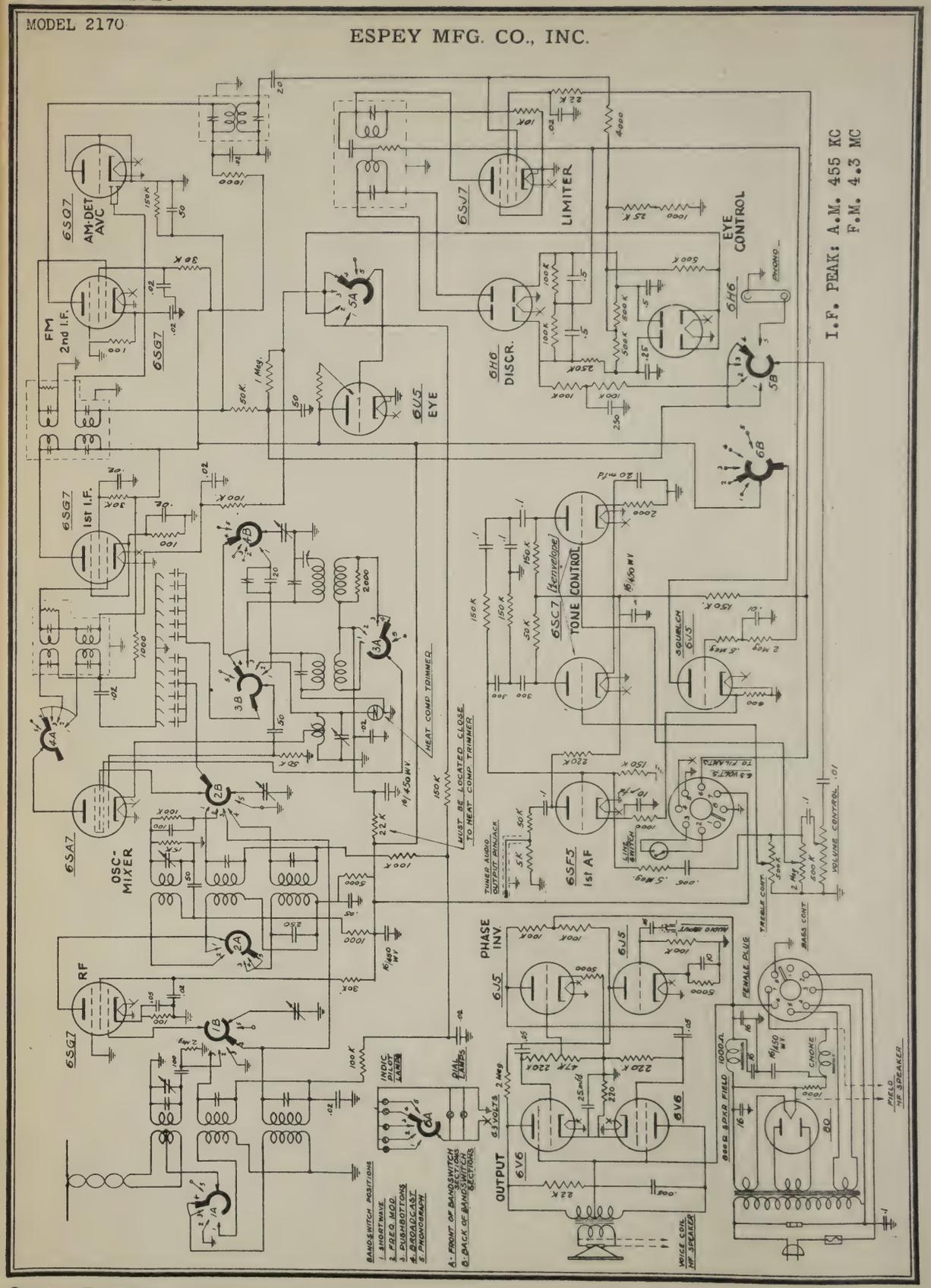
MODEL 2170

ESPEY MFG. CO., INC.



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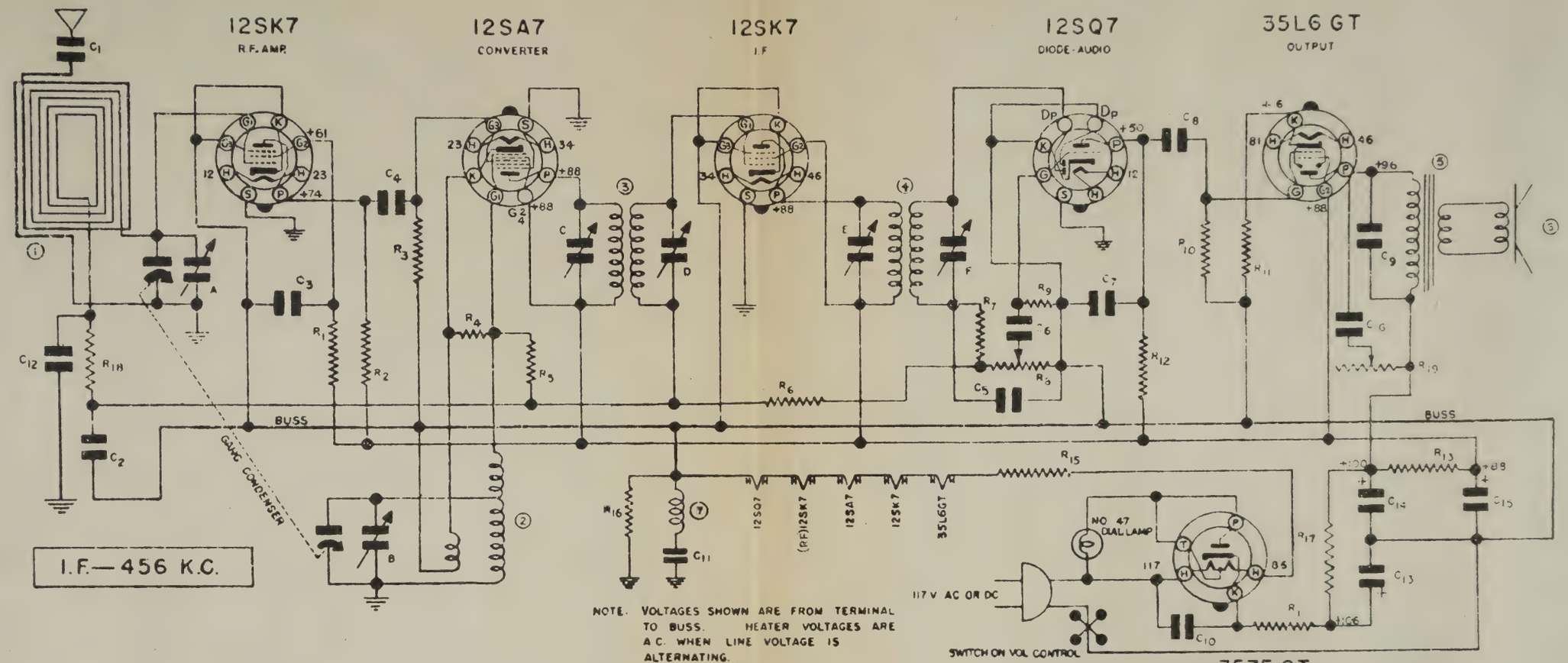
FIRESTONE TIRE & RUBBER CO.



NOTE. VOLTAGES SHOWN ARE FROM TERMINAL TO BUSS. HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING.

DIAG NO.	PART NO.	DESCRIPTION
C1	N-1344	.01 MFD 400 V 20%
C2	N-1345	.05 MFD. 200 V 20%
C3	N-1345	.05 MFD 200 V 20%
C4	N-2383	150 MMFD MICA 20%
C5	N-1374	100 MMFD MICA 20%
C6	N-1344	.01 MFD. 400 V 20%
C7	N-1447	.0005 MFD 400V. 20%
C8	N-1344	.01 MFD. 400 V. 20%
C9	N-1376	.02 MFD. 400 V. 20%
C10	N-1346	.05 MFD. 400 V 20%
C11	N-3080	.22 MFD. 200 V 10%
C12	N-134[illegible]	05 MFD 200 V. 20%
C13		40 MFD 150 V.
C14	N-400[illegible]	20 MFD 150 V. ELECTROLYTIC
C15		(30 MFD. 150 V.)
C16	N-1346	.05 MFD. 400 V. 20%
R1	N-1259	15,000 OHM .5 W. 20%
R2	N-4065	2200 OHM .5 W. 10%
R3	N-4063	47,000 OHM .5 W 20%
R4	N-4025	22,000 OHM .5 W 20%
R5	N-1263	10 MEGOHM .5 W. 20%
R6	N-4062	3.3 MEGOHM .5 W. 20%
R7	N-4064	33,000 OHM .5 W. 20%
R8	N-4071	0.5 MEGOHM VOLUME CONTROL
R9	N-4061	4.7 MEGOHM .5 W. 20%
R10	N-4027	470,000 OHM .5 W. 20%

DIAG NO.	PART NO.	DESCRIPTION
R11	N-4067	180 OHM 5 W 10%
R12	N-4036	220,000 OHM .5 W. 20%
R13	N-1066	470 OHM .5 W. 10%
R14	N-4068	33 OHM 1.0 W. 20%
R15	N-4068	33 OHM 1.0 W. 20%
R16	N-4026	220,000 OHM .5 W 20%
R17	N-1615	100 OHM .5 W. 10%
R18	N-1262	1 MEGOHM .5 W. 20%
R19	N-4033	25,000 OHM TONE CONTROL
1	N-4032	ANTENNA LOOP COIL
2	N-3298	OSCILLATOR COIL
3	N-4069	1ST. I.F. TRANSFORMER
4	N-4070	2ND. I.F. TRANSFORMER
5	N-4060	OUTPUT TRANSFORMER
6	N-4030	6" P.M. SPEAKER
7	——	CHOKE (WOUND ON C_{13})
	N-4031	2 GANG CONDENSER

6 TUBE A.C.–D.C.

SUPERHETERODYNE

SINGLE BAND

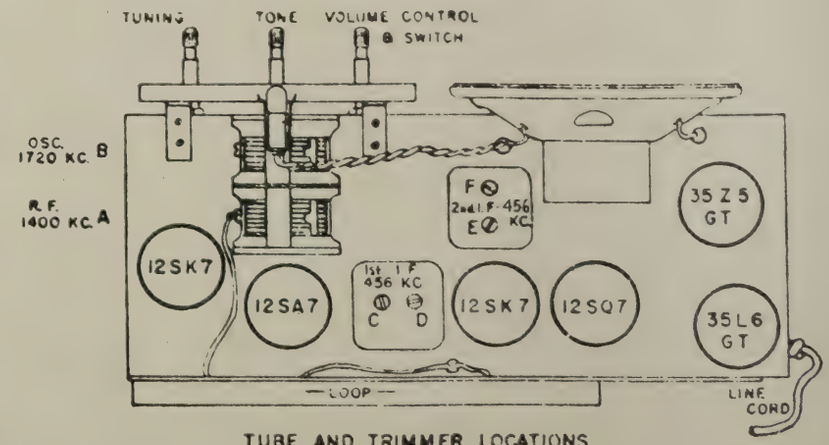
DRAWN H.H. APPROVED

JANUARY 31, 1941.

I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the ground buss, indicated in circuit diagram. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Remove the chassis from the cabinet and set on a bench, taking care that no metal is near the loop. Do not make this setup on a metal bench.

Connect the test oscillator to the antenna of the set through a 200 mmfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.



TUBE AND TRIMMER LOCATIONS

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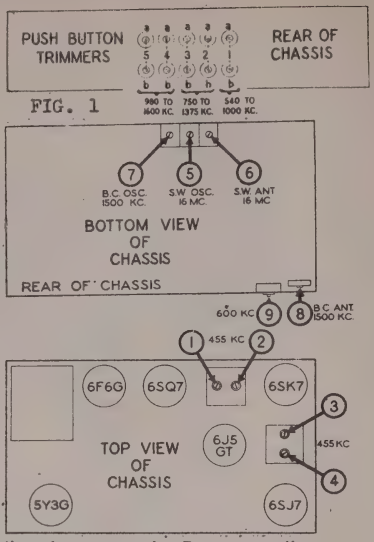
MODELS S-7398-5, S-7398-6 FIRESTONE TIRE & RUBBER CO. Code A-366

TO SET UP THE BUTTONS FOR AUTOMATIC TUNING:

1. Turn the set on and allow it to operate at least fifteen minutes before attempting to set up the buttons.
2. Make a list of the frequencies of five nearby stations to which you wish to set up the buttons. Be sure to select the most powerful nearby stations, since weak signals will not give as satisfactory results.
3. Turn the set around so that the back of the set is facing you. Through the ten holes in the back of the chassis will be seen ten adjusting screws. (See Fig. 1). These screws are used to tune in the stations that the buttons are to be set to.
4. Each of the push buttons can be made to tune in stations in a definite frequency range as shown in Fig. 1. It is imperative that in setting up the buttons you select stations whose frequency is in the indicated range of that button. ALWAYS TRY TO SELECT THE BUTTON WHICH CAN BE SET UP TO A STATION WHOSE FREQUENCY IS WELL WITHIN THE BUTTON'S OPERATING RANGE.
5. Turn the band switch to the "AM" position, push in the button labeled "MANUAL," then using the tuning knob (see Fig. 1) tune in the station you wish to set to button No. 1.
6. Push in button No. 1 and using a screwdriver turn adjusting screw No. 1a (the top one) until the station you had previously tuned in is again heard. If it is not heard, advance the volume control and adjust the screw again. Be sure to adjust screw No. 1a to the point where the program is heard with the deepest tone.
7. Insert the screwdriver in adjusting screw No. 1b (the one below 1a) and turn it until the program is heard with the deepest tone. Now again check the setting of screw No. 1a, making sure it is adjusted to give the deepest tone.
8. The set-up for button No. 1 is now complete.
9. To set up the remaining buttons use the same procedure; push in the "MANUAL" button; tune in the station, using the tuning knob; push in the button to be set up; adjust its associated "a" adjusting screw until the station is tuned in (screw 2a for button No. 2, etc., see Fig. 1); the associated "b" screw is then adjusted for deepest tone as before.



ALIGNMENT EQUIPMENT & PROCEDURE

1. Connect the output meter across the voice coil or from plate to the 6F6G output tube to chassis through a .1 mfd. condenser. (The more sensitive type should be connected across the voice coil.)

2. Connect the ground lead of the signal generator to the receiver chassis.

3. Turn the volume control to the maximum position and keep it in this position throughout the alignment procedure.

4. Push in the "Manual" button and keep it pushed in. Check the pointer to see that it is correctly set to 540 KC. with gang in full mesh.

5. The loop must be connected as indicated in circuit diagram at all times.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Lug on Front Section of Gang Cond.	455 KC	American	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then repeat Adjustment.
					3-4	1st I.F.	
400 OHM Carbon Resistor	Antenna Terminal (Blue Wire)	16 MC	Foreign	16 MC	5	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Antenna Terminal (Blue Wire)	16 MC	Foreign	Tune to 16 MC Generator Signal	6	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	1500 KC	American	1500 KC	7	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
Now replace the chassis and loop antenna in the cabinet before proceeding further.							
200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	1500 KC	American	Tune to 1500 KC Generator Signal	8	Broadcast Antenna	Adjust for Maximum Output.
200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	600 KC	American	Tune to 600 KC Generator Signal	9	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

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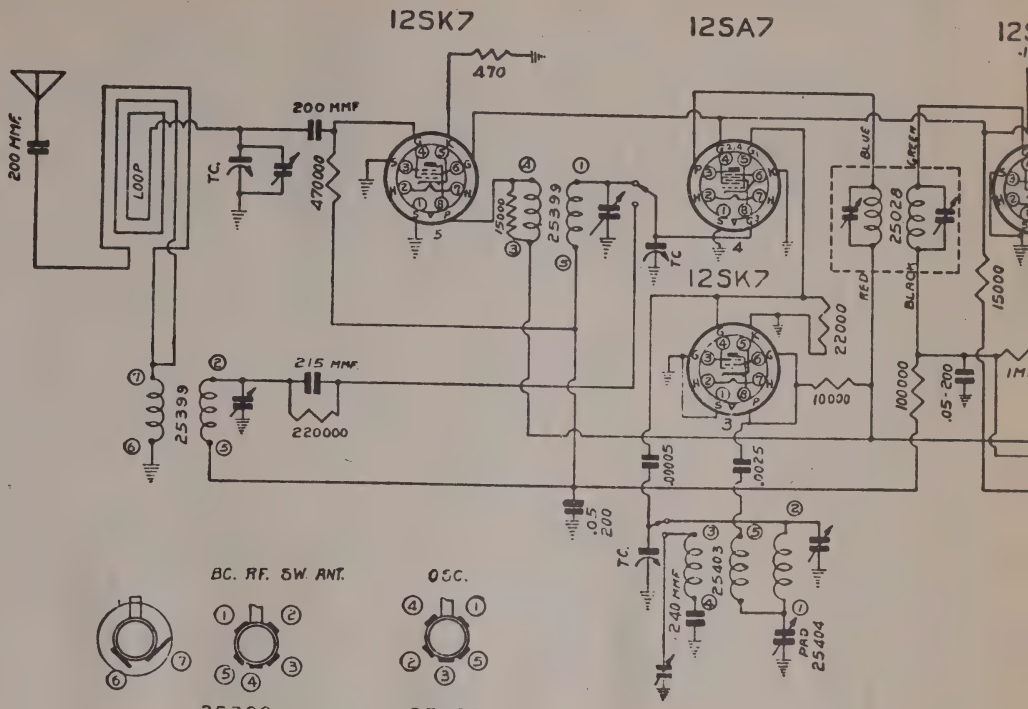
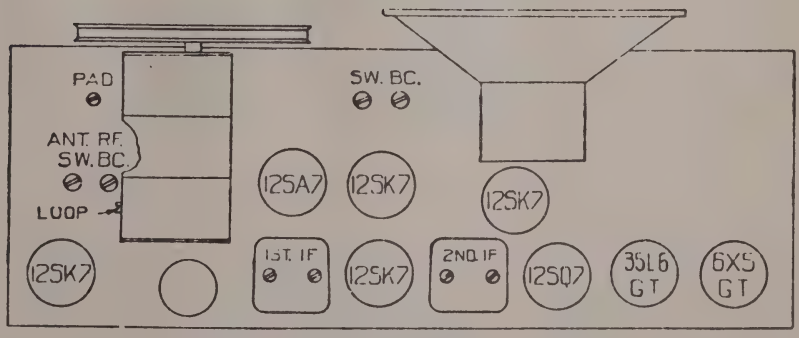
MODELS 1128, 1682

GAMBLE-SKO





TRIMMER LOCATIONS

SPECIF

Watts input at 117 V. line: 45 Watts output: 1.7 Undistorted 2.7 Maximum
Selectivity at 1000 times signal — 34kc band width Intermediate frequency 456kc
Speaker 5¼" Electrodynamic, 750 ohm field

I. F. 456kc at 12SA7 grid (Stator of middle section of variable condenser) 50 to 60 Microvolts.

Tube Functions: 12SK7 R. F., 12SA7 first detector, 12SK7 oscillator, 12SK7 IF amplifier, 12SK7 second detector, 12SQ7 first audio, 35L6GT power output. 6X5GT rectifier. Voltages will be found on circuit diagram.

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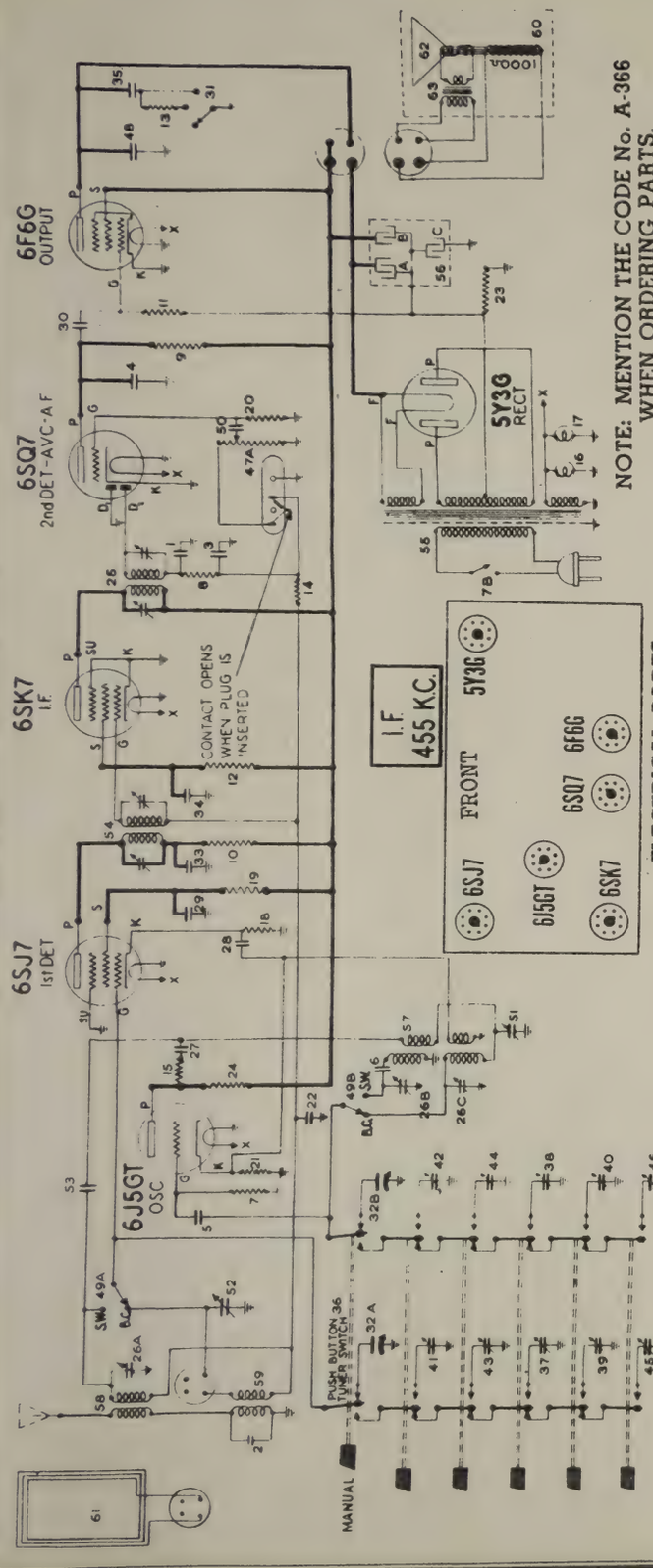
FIRESTONE TIRE & RUBBER CO.

MODELS S-7398-5, S-7398-6, Code A-366



NOTE: MENTION THE CODE No. A-366 WHEN ORDERING PARTS.

ELECTRICAL PARTS

Diagram Number	Part Number	Description
1	83539	Condenser, mica 260 mmfd.
2-3-4	83783	Condenser, mica 110 mmfd.
5	85061	Condenser, mica 51 mmfd.
6	88587	Condenser, mica .0042 mfd.
7-8	110552	Resistor—carbon 47,000 ohms ¼ watt
9	110553	Resistor—carbon 220,000 ohms ¼ watt
10	110557	Resistor—carbon 4,700 ohms ¼ watt
11	110559	Resistor—carbon 470,000 ohms ¼ watt
12	110564	Resistor—carbon 100,000 ohms ¼ watt
13	110569	Resistor—carbon 10,000 ohms ¼ watt
14	110570	Resistor—carbon 2.2 meg. ¼ watt
15	110590	Resistor—carbon 180 ohms ¼ watt
16-17	110629	Dial light bulb—6.3 volt (Mazda No. 44)
18	112952	Resistor—carbon 3,300 ohms ¼ watt
19	112962	Resistor—carbon 150,000 ohms ¼ watt
20	112975	Resistor—carbon 10 meg. ¼ watt
21	116078	Resistor—560 ohms ¼ watt
22	116819	Condenser—.05 mfd. 600 volt
23	117075	Resistor—300 ohm 1 watt W.W.
24	118805	Resistor—carbon 10,000 ohms 1 watt
25	119024	Transformer—2nd I.F.
26A to 26C	119174	Condenser—Trimmer 3 section
27 to 30	119193	Condenser—.01 mfd. 600 volt
31	119289	Switch-tone
32A-32B	119291	Condenser—variable tuning
33 to 35	119414	Condenser—.02 mfd. 600 volt
36	119603	Push Button Switch.
37 to 40	119663	Condenser—Push Button trimmer (750 to 1375 KC.)
41 to 44	119664	Condenser—Push Button trimmer (980 to 1600 KC.)
45-46	119753	Condenser—Push Button trimmer (540 to 1000 KC.)
47A-47B	119779	Condenser—electrolytic 20 mfd. 350 volt
48	119817	Condenser—.004 mfd. 600 volt
49A-49B	119859	Switch, band
50	119875	Condenser—.002 mfd. 600 volt
51	119934	Condenser—padder
52	160449	Condenser—trimmer
53	161315	Condenser—twisted wire
54	500131	Transformer—1st I.F.
55	500137	Transformer—power (60 cycles)
	500202	Transformer—power (25 cycles)
56A to 56C	500201	Condenser—electrolytic 20 mfd. 350 volt 10 mfd. 350 volt 20 mfd. 25 volt
57	500248	Coil—oscillator
58	500249	Coil—short wave antenna
59	500255	Coil—B.C. antenna loading
60	M-500280	Speaker—dynamic (6')
61	500295	Loop antenna & cabinet back
62	M-500303	Cone & Voice coil for M-500280 speaker
63	M-500302	Transformer—output for M-560280 speaker

SOCKET VOLTAGES — ALL D.C. POTENTIAL MEASURED TO CHASSIS

NO SIGNAL CONDITION — DIAL TUNED TO 540 KC.

TUBE	FUNCTION	H	K	G	S	SU	P	D_1	D_2
6SJ7	1st DET.	6.0 A.C.	6.5	O	140	0	215		
	OSC.	6.0 A.C.	0	—3			160		
	I.F.	6.0 A.C.	0	O	60	0	225		
6SQ7	2nd DET. — A.V.C. & A.F.	6.0 A.C.	0	O			90	0	0
6F6G	OUTPUT	6.0 A.C.	0	Note A	225		215		
5Y3G	RECTIFIER	5.0 A.C.					Plates 350 V.A.C to C.T.		

NOTE A: The bias for this grid is —15 volts measured across resistor No. 23. Use a high resistance voltmeter of at least 1000 ohms per volt.

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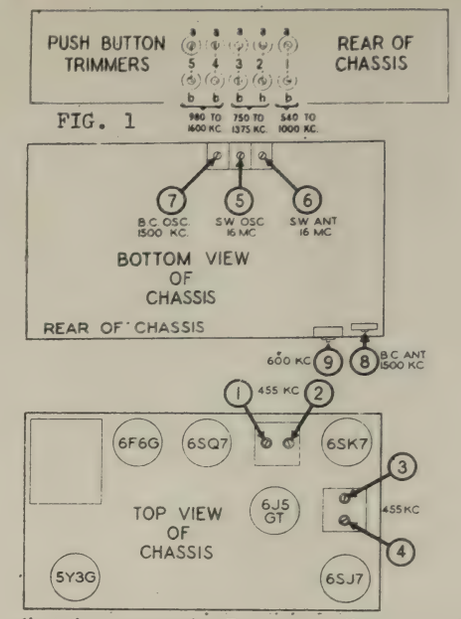
MODELS S-7398-5, S-7398-6 FIRESTONE TIRE & RUBBER CO. Code A-366

TO SET UP THE BUTTONS FOR AUTOMATIC TUNING:

1. Turn the set on and allow it to operate at least fifteen minutes before attempting to set up the buttons.
2. Make a list of the frequencies of five nearby stations to which you wish to set up the buttons. Be sure to select the most powerful nearby stations, since weak signals will not give as satisfactory results.
3. Turn the set around so that the back of the set is facing you. Through the ten holes in the back of the chassis will be seen ten adjusting screws. (See Fig. 1). These screws are used to tune in the stations that the buttons are to be set to.
4. Each of the push buttons can be made to tune in stations in a definite frequency range as shown in Fig. 1. It is imperative that in setting up the buttons you select stations whose frequency is in the indicated range of that button. ALWAYS TRY TO SELECT THE BUTTON WHICH CAN BE SET UP TO A STATION WHOSE FREQUENCY IS WELL WITHIN THE BUTTON'S OPERATING RANGE.
5. Turn the band switch to the "AM" position, push in the button labeled "MANUAL," then using the tuning knob (see Fig. 1) tune in the station you wish to set to button No. 1.
6. Push in button No. 1 and using a screwdriver turn adjusting screw No. 1a (the top one) until the station you had previously tuned in is again heard. If it is not heard, advance the volume control and adjust the screw again. Be sure to adjust screw No. 1a to the point where the program is heard with the deepest tone.
7. Insert the screwdriver in adjusting screw No. 1b (the one below 1a) and turn it until the program is heard with the deepest tone. Now again check the setting of screw No. 1a, making sure it is adjusted to give the deepest tone.
8. The set-up for button No. 1 is now complete.
9. To set up the remaining buttons use the same procedure; push in the "MANUAL" button; tune in the station using the tuning knob; push in the button to be set up; adjust its associated "a" adjusting screw until the station is tuned in (screw 2a for button No. 2, etc., see Fig. 1); the associated "b" screw is then adjusted for deepest tone as before.



ALIGNMENT EQUIPMENT & PROCEDURE

1. Connect the output meter across the voice coil or from plate to the 6F6G output tube to chassis through a .1 mfd. condenser. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the receiver chassis.
3. Turn the volume control to the maximum position and keep it in this position throughout the alignment procedure.
4. Push in the "Manual" button and keep it pushed in. Check the pointer to see that it is correctly set to 540 KC. with gang in full mesh.
5. The loop must be connected as indicated in circuit diagram at all times.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Lug on Front Section of Gang Cond.	455 KC	American	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then repeat Adjustment.
					3-4	1st I.F.	
400 OHM Carbon Resistor	Antenna Terminal (Blue Wire)	16 MC	Foreign	16 MC	5	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Antenna Terminal (Blue Wire)	16 MC	Foreign	Tune to 16 MC Generator Signal	6	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	1500 KC	American	1500 KC	7	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
Now replace the chassis and loop antenna in the cabinet before proceeding further.							
200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	1500 KC	American	Tune to 1500 KC Generator Signal	8	Broadcast Antenna	Adjust for Maximum Output.
200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	600 KC	American	Tune to 600 KC Generator Signal	9	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

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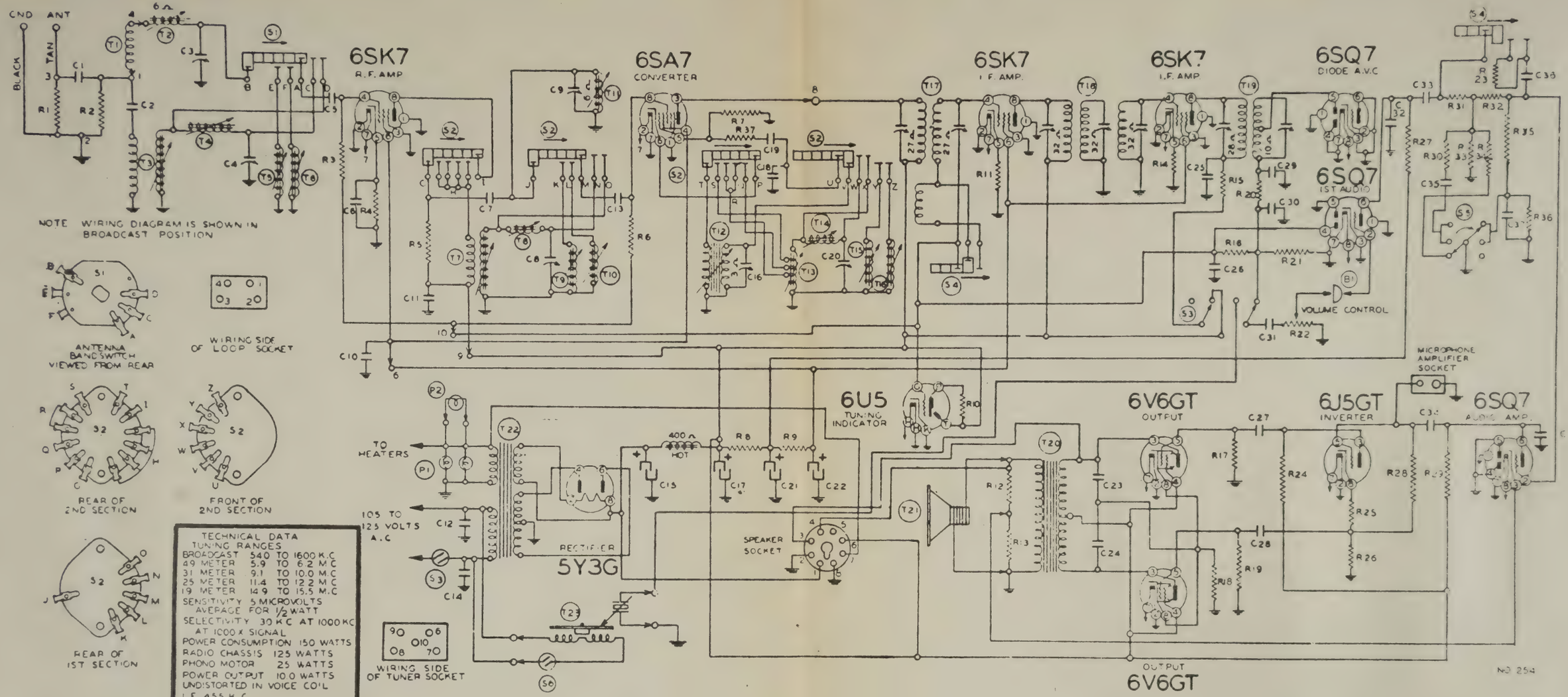


TECHNICAL DATA

TUNING RANGES

BROADCAST	540 TO 1600 K.C	
49 METER	5.9 TO 6.2 M.C	
31 METER	9.1 TO 10.0 M.C	
25 METER	11.4 TO 12.2 M.C	
19 METER	14.9 TO 15.5 M.C	

SENSITIVITY 5 MICROVOLTS AVERAGE FOR 1/2 WATT

SELECTIVITY 30 K.C AT 1000 KC AT 1000 X SIGNAL

POWER CONSUMPTION 150 WATTS

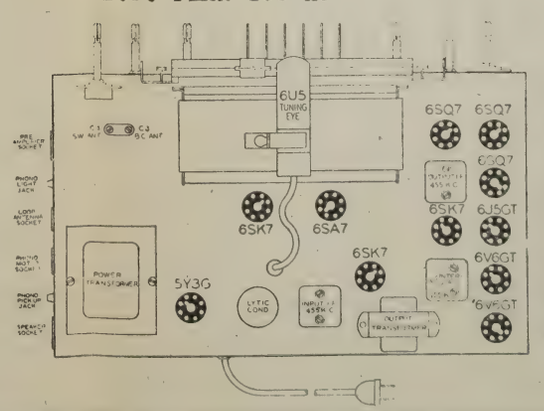
RADIO CHASSIS 125 WATTS

PHONO MOTOR 25 WATTS

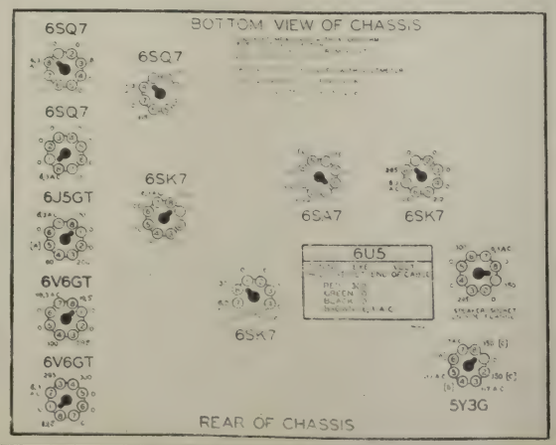
POWER OUTPUT 10.0 WATTS UNDISTORTED IN VOICE COIL

I.F. 455 K.C

I.F. PEAK 455 KC



FOR EITHER THE SEEBURG MODEL B OR OAK MODEL RC-1 RECORD CHANGER, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".



Code No.	Part No.	Description
		RESISTORS
R1	130232	25M ohm—1/3 w.
R2	130232	25M ohm—1/3 w.
R3	13019	1 megohm—1/3 w.
R4	130239	250 ohm—1/3 w.
R5	130218	5M ohm—1/3 w.
R6	13019	1 megohm—1/3 w.
R7	130232	25M ohm—1/3 w.
R8	130318	6M ohm—2 w.
R9	130319	10M ohm—2 w
R10		1 megohm in tuning indicator cable
R11	13070	500 ohm—1/3 w.
R12	13082	10M ohm—1/3 w.
R13	130235	1500 ohm—1/3 w.
R14	130192	2M ohm—1/3 w.
R15	130192	2M ohm—1/3 w.
R16	13019	1 megohm—1/3 w.
R17	1303	500M ohm—1/3 w.
R18	130317	250 ohm—2 w.
R19	1303	500M ohm—1/3 w.
R20	13094	50M ohm—1/3 w.
R21	130316	120M ohm—1/3 w.
R22	101229	500M ohm volume control
R23	130191	1.5 megohm—1/3 w.
R24	13094	50M ohm—1/3 w.
R25	130218	5M ohm—1/3 w.
R26	13094	50M ohm—1/3 w.
R27	130172	250M ohm—1/3 w.
R28	1303	500M ohm—1/3 w.
R29	130172	250M ohm—1/3 w.
R30	130232	25M ohm—1/3 w.
R31	13080	150M ohm—1/3 w
R32	130309	350M ohm—1/3 w.
R33	130266	200M ohm—1/3 w.
R34	13066	75M ohm—1/3 w.
R35	13080	150M ohm—1/3 w.
R36	130146	2 megohm—1/3 w.
R37	130174	50 ohm—1/3 w.
		CONDENSERS
C1	1292	.0005 mica
C2	10047	.002 x 600 v.
C3	124143	B.C. antenna trimmer
C4	124143	9 mc. antenna trimmer
C5	1292	.0005 mica
C6	10020	.1 x 200 v. tubular
C7	129168	.00001 mica
C8	124138	9 mc. R. F. trimmer
C9	124139	B.C. R.F. trimmer
C10	10074	.1 x 400 v.
C11	10074	.1 x 400 v.
C12	10061	.02 x 600 v.
C13	1292	.0005 mica
C14	10061	.02 x 600 v.
C15	119112	30.0 mfd. lytic
C16	124144	B.C. oscillator trimmer
C17	119112	30.0 mfd. lytic x 450 w.v.
C18	129167	.0002 silver mica
C19	129165	.00005 mica
C20	124145	9 mc. oscillator trimmer
C21	119112	10.0 mfd. lytic
C22	11969	16 mfd. x 350 w.v.
C23	10065	.015 x 600 v.
C24	10065	.015 x 600 v.
C25	1001	.1 x 400 v.
C26	10020	.1 x 200 v.
C27	10013	.05 x 400 v.
C28	1009	.05 x 200 v.
C29	1295	.0001 mica
C30	1295	.0001 mica
C31	10020	.1 x 200 v.
C32	12912	.00025 mica
C33	1001	.1 x 400 v.
C34	10013	.05 x 400 v.
C35	100118	.008 x 600 v.
C36	129185	.00009 mica
C37	10037	.003 x 600 v.
C38	12912	.00025 mica
		C3 and C4 in same unit
		C15, C17 and C21 in same unit
B1	11622	Bias cell 1.25 volt

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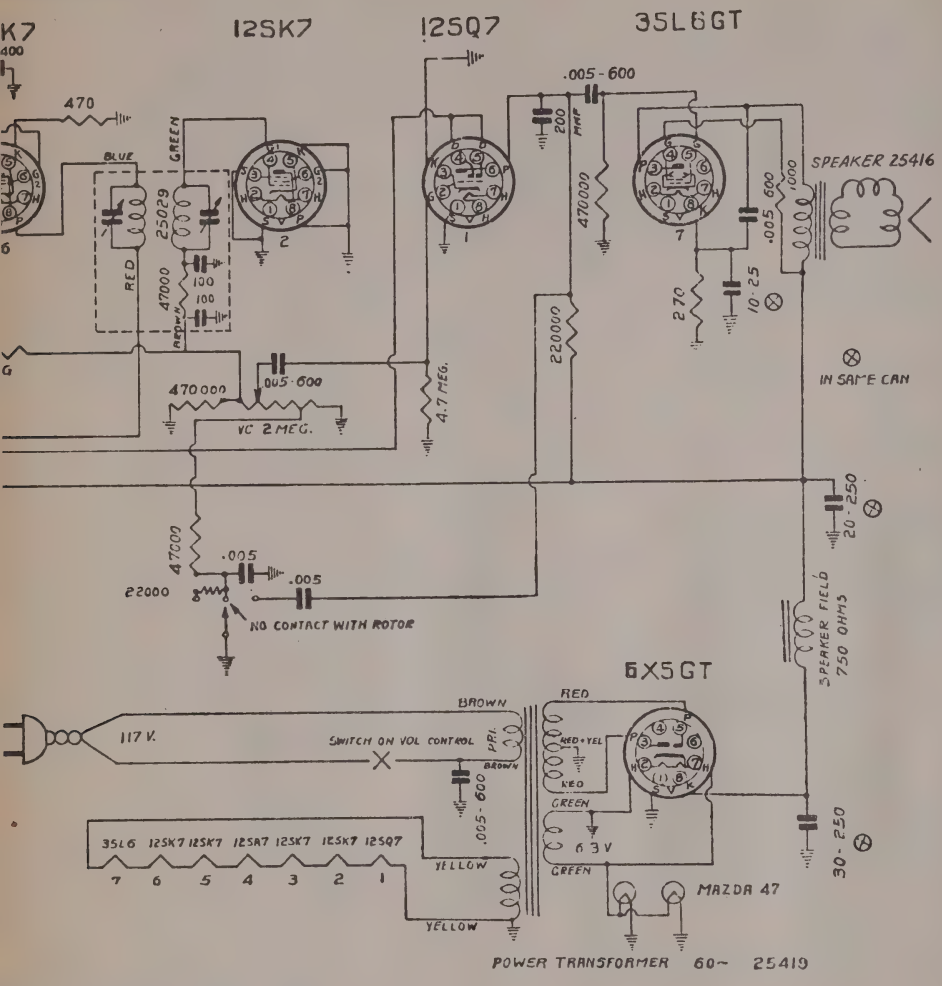

F. PEAK 456 KC

MODELS 1128 + 1682

CATIONS

Tuning Ranges:

Broadcast Band 540 to 1650 kc Short Wave Band 9.1 — 12.0 mc

Sensitivity: For .05 watt output:

(Loop)

Broadcast Band 15 to 20 Microvolts S W Band 40 to 60 "

MODEL 17FM41

GALVIN MFG. CO.

ALIGNMENT CHART

F.M. SECTION

Operations in Order	Gang Set at	Dummy Antenna	Generator Connected to	Tunetrimmer Number	Generator Modulated 400 C.P.S.	Generator Unmodulated	Generator Set at	Read Micrometer	Read Output Voltmeter	Band Switch Set at	See Note
1	Min.	1000 M.M.F. With 10,000 Ohms Shunted across output terminals of signal generator.	Grid V-2	1 to Min.	X		4.3 M.C.		X	F.M.	A
2	Min,		Grid V-2	2 to Max.	X		4.3 M.C.		X	F.M.	
3	Min.		Grid V-2	1 to valley of 2-Peaks	X		4.3 M.C.		X	F.M.	B
4	Min.		Grid V-3	3 to Min.		X	4.3 M.C.	X		F.M.	A
5	Min.		Grid V-3	4 to Max.		X	4.3 M.C.	X		F.M.	
6	Min.		Grid V-3	3 to Max.		X	4.3 M.C.	X		F.M.	
7	Min.		Grid V-4	5 to Min.		X	4.3 M.C.	X		F.M.	A
8	Min.		Grid V-4	6 to Max.		X	4.3 M.C.	X		F.M.	
9	Min.		Grid V-4	5 to Max.		X	4.3 M.C.	X		F.M.	
10	Min.		Grid V-5	7 to Min.		X	4.3 M.C.	X		F.M.	A
11	Min.		Grid V-5	8 to Max.		X	4.3 M.C.	X		F.M.	
12	Min.		Grid V-5	7 to Max.		X	4.3 M.C.	X		F.M.	
13	Min.		Grid V-6	9 to Min.		X	4.3 M.C.	X		F.M.	A
14	Min.		Grid V-6	10 to Max.		X	4.3 M.C.	X		F.M.	
15	Min.		Grid V-6	9 to Max.		X	4.3 M.C.	X		F.M.	
16	Min.	100 ohms	A & G	11 to Max.		X	50 M.C.	X		F.M.	C
17	48 M.C.	100 ohms	A & G	12 to Max.		X	48 M.C.	X		F.M.	C
18	48 M.C.	100 ohms	A & G	13 to Max.		X	48 M.C.	X		F.M.	C
19	42 M.C.	100 ohms	A & G	14 to Max.		X	42 M.C.	X		F.M.	C

A.M. SECTION

Operations in Order	Gang Set at	Dummy Antenna	Generator Connected to	Tune Trimmer Number	Generator Modulated 400 C.P.S.	Generator Unmodulated	Generator Set at	Read Micrometer	Read Output Voltmeter	Band Switch Set at	See Note
20	Min	1 Mfd.	V-10 Grid	19-20 21-22	X		455 K.C.		X	B.C.	
21	1720 K.C.	1 Mfd.	V-9 Grid	23	X		1720 K.C.		X	B.C.	
22	600 K.C.	1 Mfd.	A & G	25	X		600 K.C.		X	B.C.	
23	1400 K.C.	1 Mfd.	V-9 Grid	24	X		1400 K.C.		X	B.C.	
24	5.7 M.C.	400 Ohms.	V-9 Grid	26	X		5.7 M.C.		X	P01	
25	5.5 M.C.	400 Ohms.	A & G	27	X		5.5 M.C.		X	P01	
26	12.2 M.C.	400 Ohms.	V-9 Grid	28	X		12.2 M.C.		X	S.W.	
27	11.0 M.C.	400 Ohms.	A & G	29	X		11.0 M.C.		X	S.W.	
28	11.0 M.C.	400 Ohms.	A & G	30	X		11.0 M.C.		X	S.W.	

NOTE A: Detune by reducing trimmer capacity. Rotate trimmer adjusting screw counterclockwise one turn. NOTE B: Two peaks will be present; tune to the valley between them. NOTE C: If receiver does not cover frequency range, readjust all trimmers bearing Note C.

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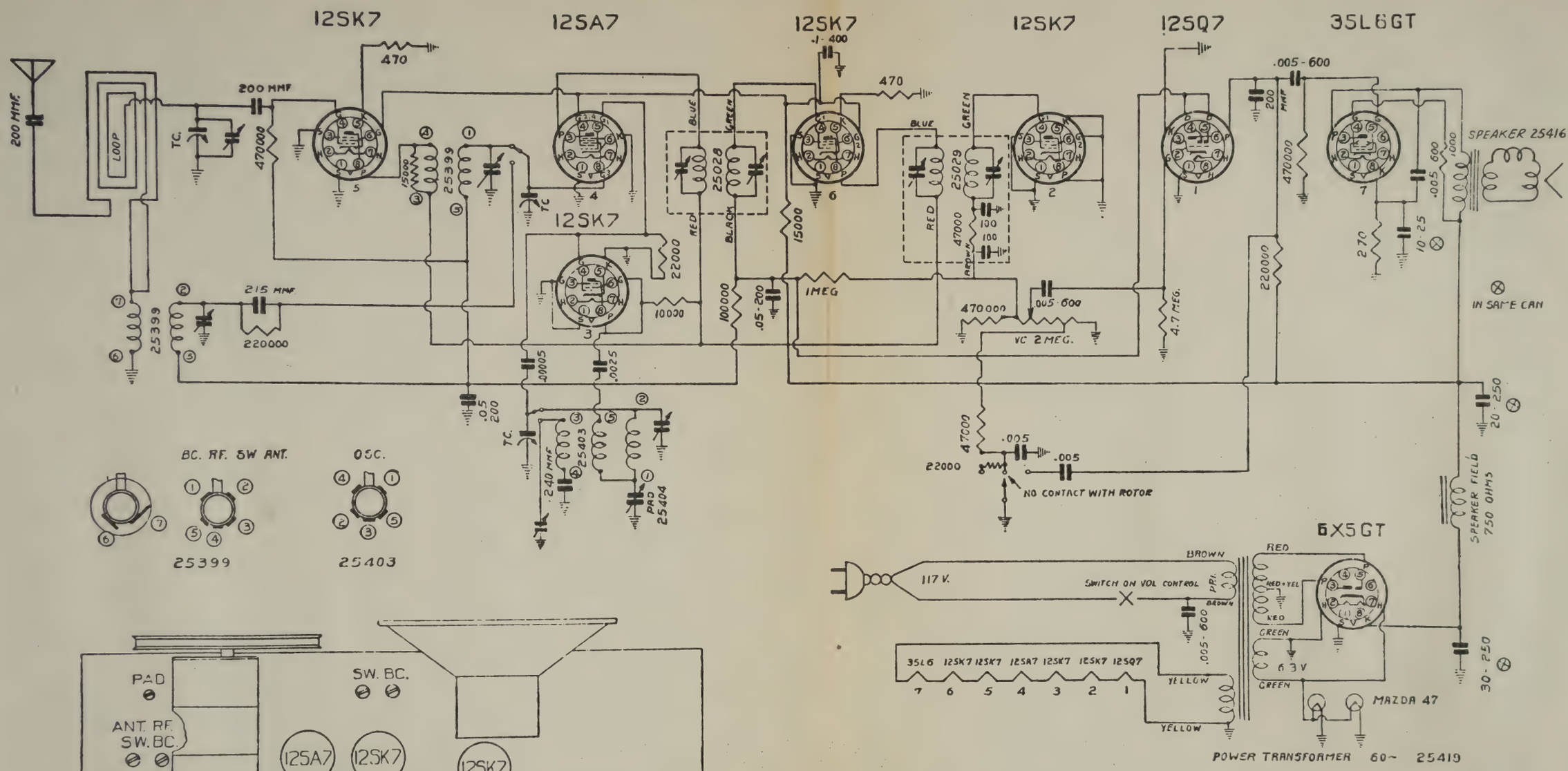
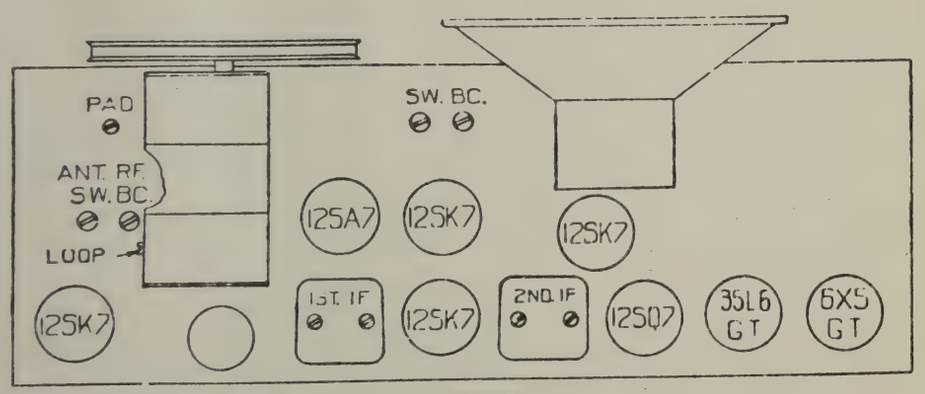
MODELS 1128, 1682

GAMBLE-SKOGMO, INC.





TRIMMER LOCATIONS

I.F. PEAK 456 KC

MODELS 1128 + 1682

SPECIFICATIONS

Watts input at 117 V. line: 45 Watts output: 1.7 Undistorted 2.7 Maximum
Selectivity at 1000 times signal — 34kc band width Intermediate frequency 456kc
Speaker 5¼" Electrodynamic, 750 ohm field

I. F. 456kc at 12SA7 grid (Stator of middle section of variable condenser) 50 to 60 Microvolts.

Tube Functions: 12SK7 R. F., 12SA7 first detector, 12SK7 oscillator, 12SK7 IF amplifier, 12SK7 second detector, 12SQ7 first audio, 35L6GT power output. 6X5GT rectifier. Voltages will be found on circuit diagram.

Tuning Ranges:
Broadcast Band 540 to 1650 kc Short Wave Band 9.1 — 12.0 mc
Sensitivity: For .05 watt output:
(Loop)
Broadcast Band 15 to 20 Microvolts S W Band 40 to 60 "

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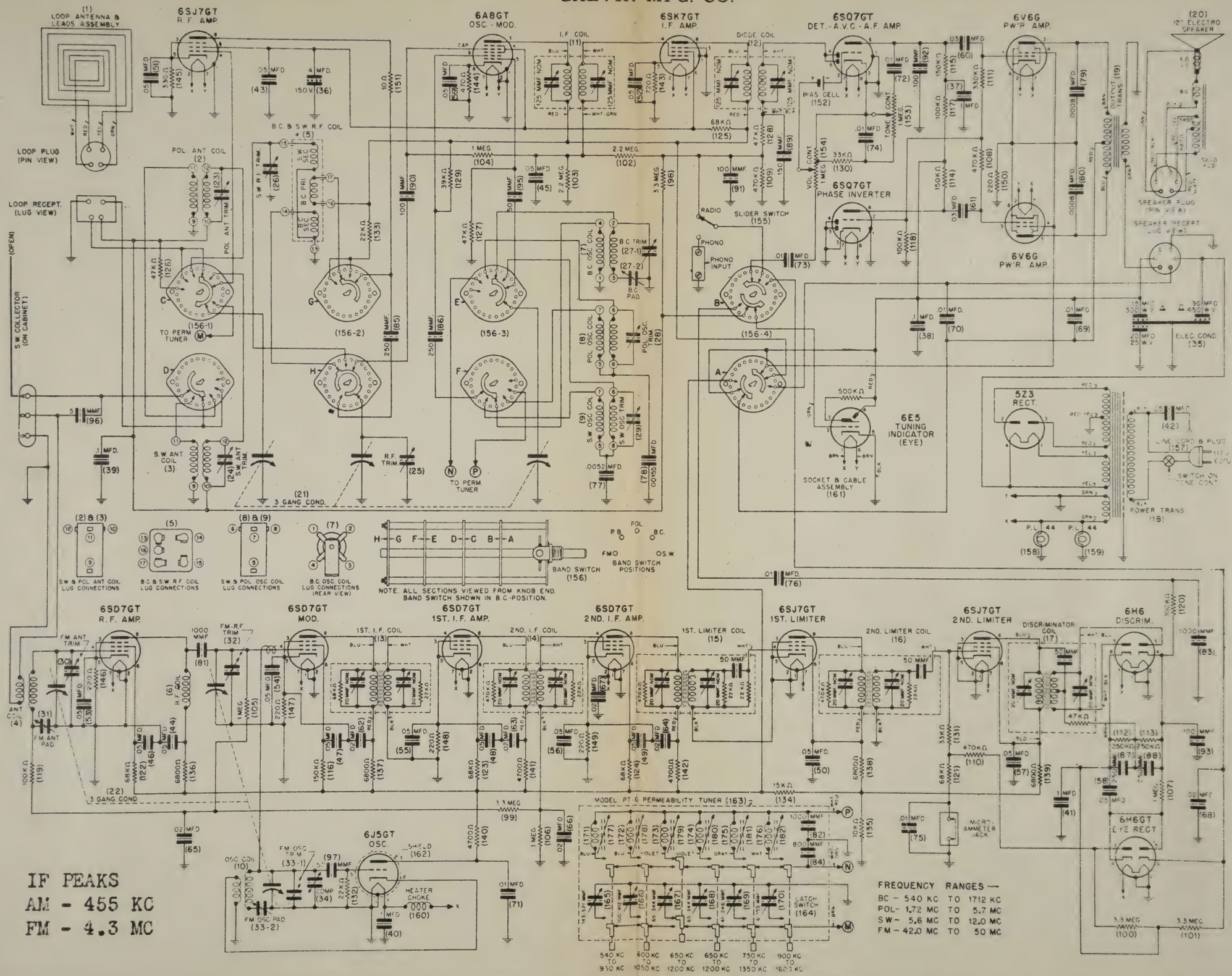

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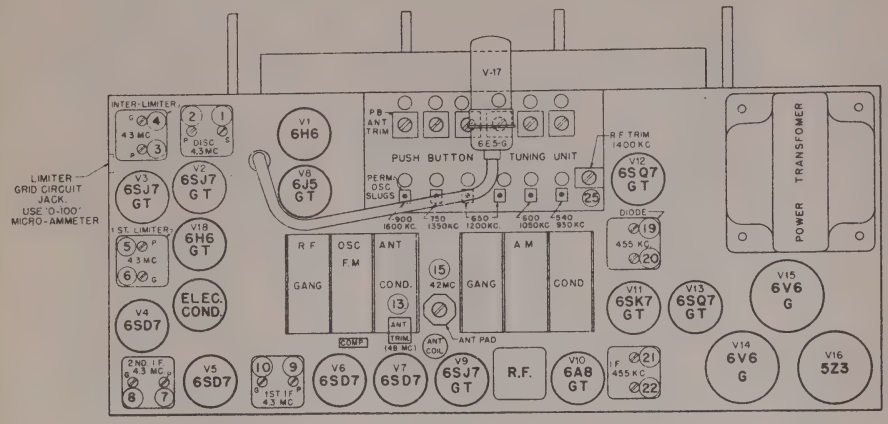
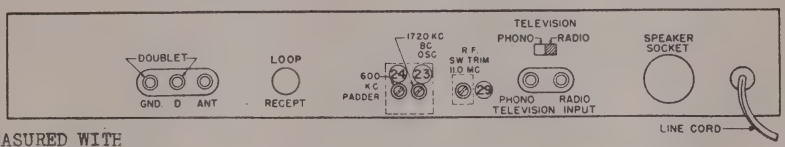
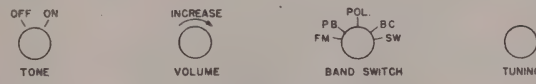
MODEL 17FM41

GALVIN MFG. CO.





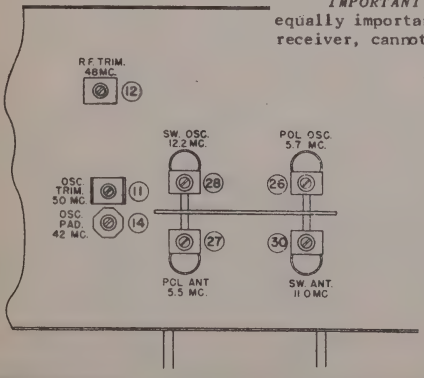
SENSITIVITY MEASURED WITH VOLUME CONTROL SET AT MAXIMUM. OUPUT METER CONNECTED ACROSS VOICE COIL. .38 VOLTS CORRESPONDS WITH .05 WATT.



TRIMMER DETAIL

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading
3250	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	.38
55	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
60	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
9	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	.38
8	600 K.C.	Ant.Terminal	200 Mmf.	None	.38



IMPORTANT: The following precautions must be taken; each is equally important, and perfect alignment which is a necessity in an FM receiver, cannot be accomplished unless you follow these instructions:

1. The adjusting screw driver cannot have a metal tip, no matter how small.
2. The chassis should be insulated from ground during alignment.
3. The ground lead of the signal generator must be connected to the cathode return lead of the same tube to which the generator is connected.
4. Clips should not be used on the shielded lead of the generator. It is recommended that the leads be soldered to the tube socket and cathode return.
5. Volume control is set at maximum. Reduce output with signal generator attenuator.

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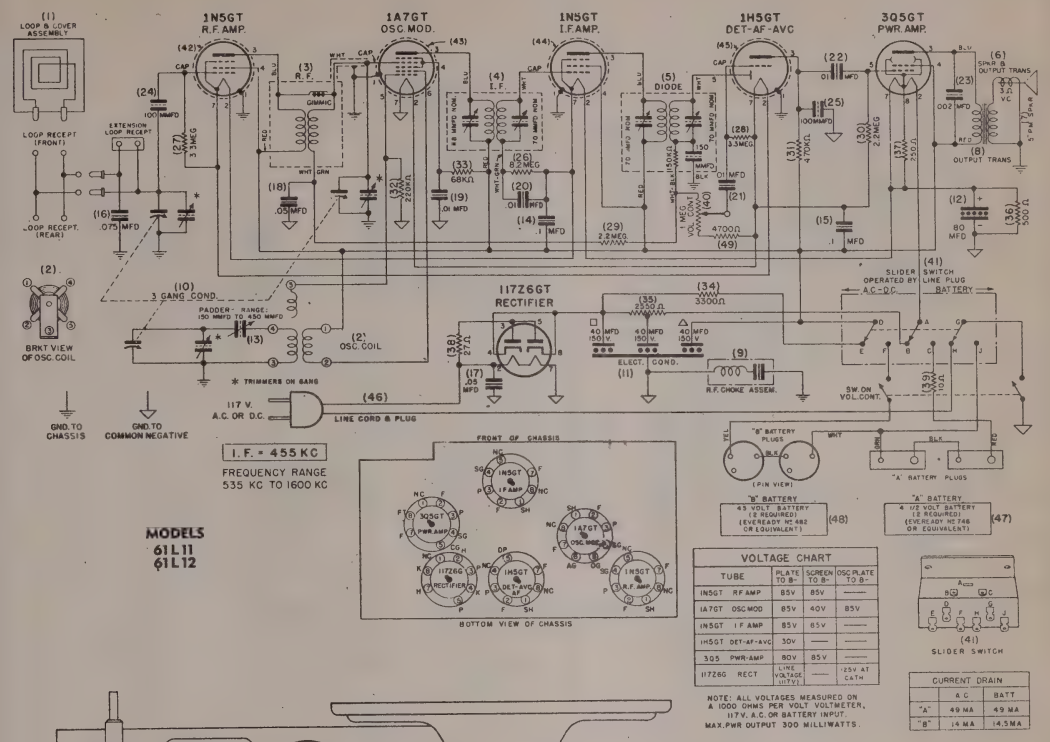
GALVIN MFG. CO.

MODELS 61L11, 61L12

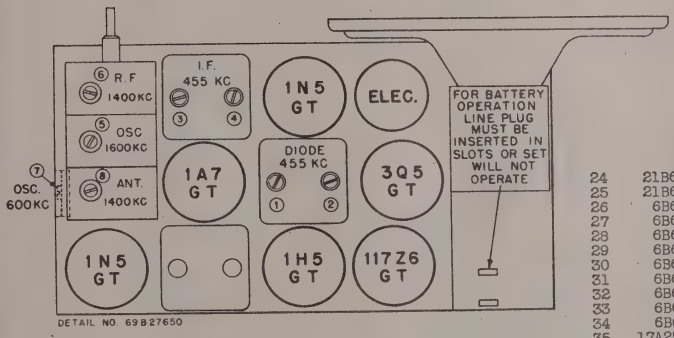

1N5GT R.F. AMP.
1A7GT OSC. MOD.
1N5GT I.F. AMP.
1H5GT DET-AF-AVC
3Q5GT PWR. AMP.
117Z6GT RECTIFIER
LOOP & LOVER ASSEMBLY
LOOP RECEPT (FRONT)
LOOP RECEPT. (REAR)
EXTENSION LOOP RECEPT
BRKT VIEW OF OSC. COIL
3 GANG COND.
PADDER - RANGE: 150 MMFD TO 450 MMFD
OSC. COIL
* TRIMMERS ON GANG
117 V. A.C. OR D.C.
LINE CORD & PLUG
GND. TO CHASSIS
GND. TO COMMON NEGATIVE
OUTPUT TRANS.
SPKR. & OUTPUT TRANS.
SLIDER SWITCH OPERATED BY LINE PLUG A.C.-D.C. BATTERY
SW. ON VOL. CONT.
R.F. CHOKE ASSEM.
ELECT. COND.
"B" BATTERY PLUGS
"A" BATTERY PLUGS
(PIN VIEW)
"B" BATTERY 45 VOLT BATTERY (2 REQUIRED) (EVEREADY NO. 482 OR EQUIVALENT)
"A" BATTERY 4 1/2 VOLT BATTERY (2 REQUIRED) (EVEREADY NO. 746 OR EQUIVALENT)
I. F. = 455 KC
FREQUENCY RANGE 535 KC TO 1600 KC
FRONT OF CHASSIS
BOTTOM VIEW OF CHASSIS
SLIDER SWITCH

MODELS 61L11 61L12

VOLTAGE CHART			
TUBE	PLATE TO B-	SCREEN TO B-	OSC. PLATE TO B-
1N5GT R.F. AMP	85V	85V	——
1A7GT OSC. MOD	85V	40V	85V
1N5GT I.F. AMP	85V	85V	——
1H5GT DET-AF-AVC	30V	——	——
3Q5 PWR-AMP	80V	85V	——
117Z6G RECT	LINE VOLTAGE (117V.)	——	125V. AT CATH

NOTE: ALL VOLTAGES MEASURED ON A 1000 OHMS PER VOLT VOLTMETER, 117V. A.C. OR BATTERY INPUT. MAX. PWR OUTPUT 300 MILLIWATTS.

CURRENT DRAIN		
	A.C.	BATT.
"A"	49 MA	49 MA
"B"	14 MA	14.5 MA



DETAIL NO. 69B27650

Models 61L11 & 61L12

1	24X27467	Front Cover & Loop (Model 61L12)
	24X25946	Front Cover & Loop (Model 61L11)
2	24A25936	Oscillator Coil
3	1X25906	R.F. Coil & Shield Assembly
4	1X25904	I.F. Coil & Shield Assembly
5	1X25902	Diode Coil & Shield Assembly
6	50B25891	Speaker & Output Transformer
7		50K25892 Speaker (5" P.M.) Only
8		25K25893 Output Transformer Only
9	1A25935	R.F. Choke Assembly
10	19B25923	Variable Condenser (3 Gang)
11	23A25889	Elect. Condenser (40-40 MFD/150V)
12	23A25888	Elect. Condenser & Strap (80 MFD-25V)
13	20A25899	Padder Condenser (Range 150 MMFD To 450 MMFD)
14	8S9806	Tubular Condenser (.1-200V)
15	8S9806	Tubular Condenser (.1-200V)
16	8A25559	Tubular Condenser (.075-200V)
17	8S9816	Tubular Condenser (.05-400V)
18	8S9805	Tubular Condenser (.05-100V)
19	8S9825	Tubular Condenser (.01-200V)
20	8A25939	Tubular Condenser (.01-100V)
21	8S9801	Tubular Condenser (.01-100V)
22	8S9801	Tubular Condenser (.01-100V)
23	8S9824	Tubular Condenser (.002-400V)
24	21B6511	Molded Mica Cond. (100 MMFD) 20%
25	21B6511	Molded Mica Cond. (100 MMFD) 20%
26	6B6310	Carbon Resistor (8.2 Meg-1/3-20) Ins.
27	6B6201	Carbon Resistor (3.3 Meg-1/3-20) Ins.
28	6B6201	Carbon Resistor (3.3 Meg-1/3-20) Ins.
29	6B6202	Carbon Resistor (2.2 Meg-1/3-20) Ins.
30	6B6202	Carbon Resistor (2.2 Meg-1/3-20) Ins.
31	6B6160	Carbon Resistor (470,000-1/3-20) Ins.
32	6B6349	Carbon Resistor (220,000-1/3-10) Ins.
33	6B6256	Carbon Resistor (68,000-1/3-20) Ins.
34	6B6084	Carbon Resistor (3,300-1/3-20) N.I.
35	17A25877	W.W. Resistor (2550-5-5)
36	6B6461	Carbon Resistor (500-1/3-10) Ins.
37	6B6404	Carbon Resistor (250-1/3-10) Ins.
38	6B6241	Carbon Resistor (27-1/2-10) N.I.
39	6B6418	Carbon Resistor (10-1/3-10) Ins.
40	18A25882	Vol. Control & Switch (1 Meg)
41	40A27114	Slider Switch & Bracket
42	26A14760	Tube Shield (Bantam)
43	26A14760	Tube Shield (Bantam)
44	26A14760	Tube Shield (Bantam)
45	26A14760	Tube Shield (Bantam)
46	30B20329	Line Cord & Plug (6 Ft.)
47	48X20379	"A" Battery (4-1/2 Volt) (2 Required) (Eveready #746 or Equivalent)
48	48X16844	"B" Battery (45 Volt) (2 Required) (Eveready #482 or Equivalent)
49	6B6203	Carbon Resistor (4,700-1/3-20) Ins.

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MODEL 17FM41

GALVIN MFG. CO.

ALIGNMENT CHART

F.M. SECTION

Operations in Order	Gang Set at	Dummy Antenna	Generator Connected to	Tunetrimmer Number	Generator Modulated 400 C.P.S.	Generator Unmodulated	Generator Set at	Read Microammeter	Read Output Voltmeter	Band Switch Set at	See Note
1	Min.	1000 M.M.F. With 10,000 Ohms Shunted across output terminals of signal generator.	Grid V-2	1 to Min.	X		4.3 M.C.		X	F.M.	A
2	Min,		Grid V-2	2 to Max.	X		4.3 M.C.		X	F.M.	
3	Min.		Grid V-2	1 to valley of 2-Peaks	X		4.3 M.C.		X	F.M.	B
4	Min.		Grid V-3	3 to Min.		X	4.3 M.C.	X		F.M.	A
5	Min.		Grid V-3	4 to Max.		X	4.3 M.C.	X		F.M.	
6	Min.		Grid V-3	3 to Max.		X	4.3 M.C.	X		F.M.	
7	Min.		Grid V-4	5 to Min.		X	4.3 M.C.	X		F.M.	A
8	Min.		Grid V-4	6 to Max.		X	4.3 M.C.	X		F.M.	
9	Min.		Grid V-4	5 to Max.		X	4.3 M.C.	X		F.M.	
10	Min.		Grid V-5	7 to Min.		X	4.3 M.C.	X		F.M.	A
11	Min.		Grid V-5	8 to Max.		X	4.3 M.C.	X		F.M.	
12	Min.		Grid V-5	7 to Max.		X	4.3 M.C.	X		F.M.	
13	Min.		Grid V-6	9 to Min.		X	4.3 M.C.	X		F.M.	A
14	Min.		Grid V-6	10 to Max.		X	4.3 M.C.	X		F.M.	
15	Min.		Grid V-6	9 to Max.		X	4.3 M.C.	X		F.M.	
16	Min.	100 ohms	A & G	11 to Max.		X	50 M.C.	X		F.M.	C
17	48 M.C.	100 ohms	A & G	12 to Max.		X	48 M.C.	X		F.M.	C
18	48 M.C.	100 ohms	A & G	13 to Max.		X	48 M.C.	X		F.M.	C
19	42 M.C.	100 ohms	A & G	14 to Max.		X	42 M.C.	X		F.M.	C

A.M. SECTION

Operations in Order	Gang Set at	Dummy Antenna	Generator Connected to	Tune Trimmer Number	Generator Modulated 400 C.P.S.	Generator Unmodulated	Generator Set at	Read Microammeter	Read Output Voltmeter	Band Switch Set at	See Note
20	Min	1 Mfd.	V-10 Grid	19-20 21-22	X		455 K.C.		X	B.C.	
21	1720 K.C.	1 Mfd.	V-9 Grid	23	X		1720 K.C.		X	B.C.	
22	600 K.C.	1 Mfd.	A & G	25	X		600 K.C.		X	B.C.	
23	1400 K.C.	1 Mfd.	V-9 Grid	24	X		1400 K.C.		X	B.C.	
24	5.7 M.C.	400 Ohms.	V-9 Grid	26	X		5.7 M.C.		X	P01	
25	5.5 M.C.	400 Ohms.	A & G	27	X		5.5 M.C.		X	P01	
26	12.2 M.C.	400 Ohms.	V-9 Grid	28	X		12.2 M.C.		X	S.W.	
27	11.0 M.C.	400 Ohms.	A & G	29	X		11.0 M.C.		X	S.W.	
28	11.0 M.C.	400 Ohms.	A & G	30	X		11.0 M.C.		X	S.W.	

NOTE A: Detune by reducing trimmer capacity. Rotate trimmer adjusting screw counterclockwise one turn. NOTE B: Two peaks will be present; tune to the valley between them. NOTE C: If receiver does not cover frequency range, readjust all trimmers bearing Note C.

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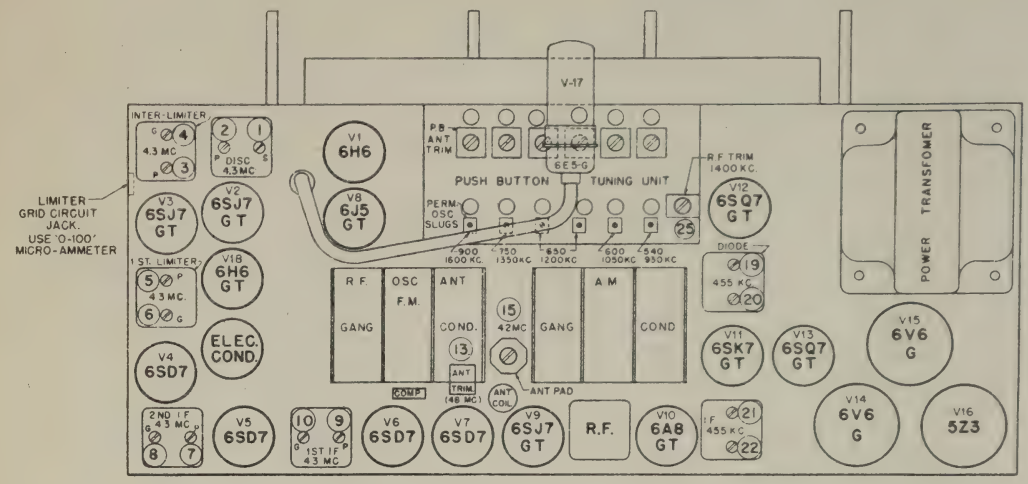
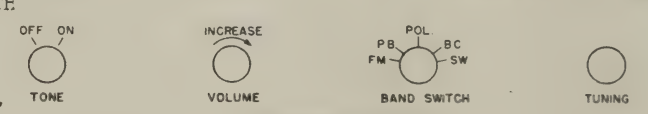
MODEL 17FM41

GALVIN MFG. CO.



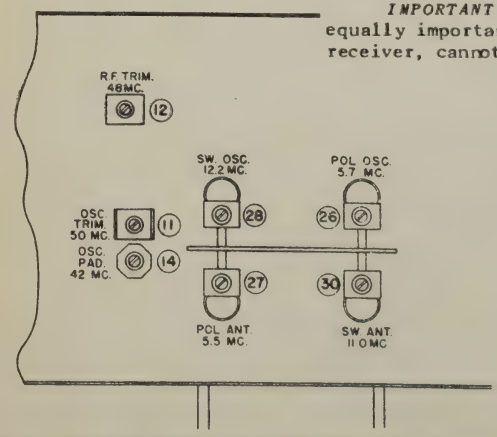
SENSITIVITY MEASURED WITH VOLUME CONTROL SET AT MAXIMUM. OUPUT METER CONNECTED ACROSS VOICE COIL. .38 VOLTS CORRESPONDS WITH .05 WATT.



TRIMMER DETAIL

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading
3250	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	.38
55	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
60	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
9	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	.38
8	600 K.C.	Ant.Terminal	200 Mmf.	None	.38



IMPORTANT: The following precautions must be taken; each is equally important, and perfect alignment which is a necessity in an FM receiver, cannot be accomplished unless you follow these instructions:

1. The adjusting screw driver cannot have a metal tip, no matter how small.
2. The chassis should be insulated from ground during alignment.
3. The ground lead of the signal generator must be connected to the cathode return lead of the same tube to which the generator is connected.
4. Clips should not be used on the shielded lead of the generator. It is recommended that the leads be soldered to the tube socket and cathode return.
5. Volume control is set at maximum. Reduce output with signal generator attenuator.

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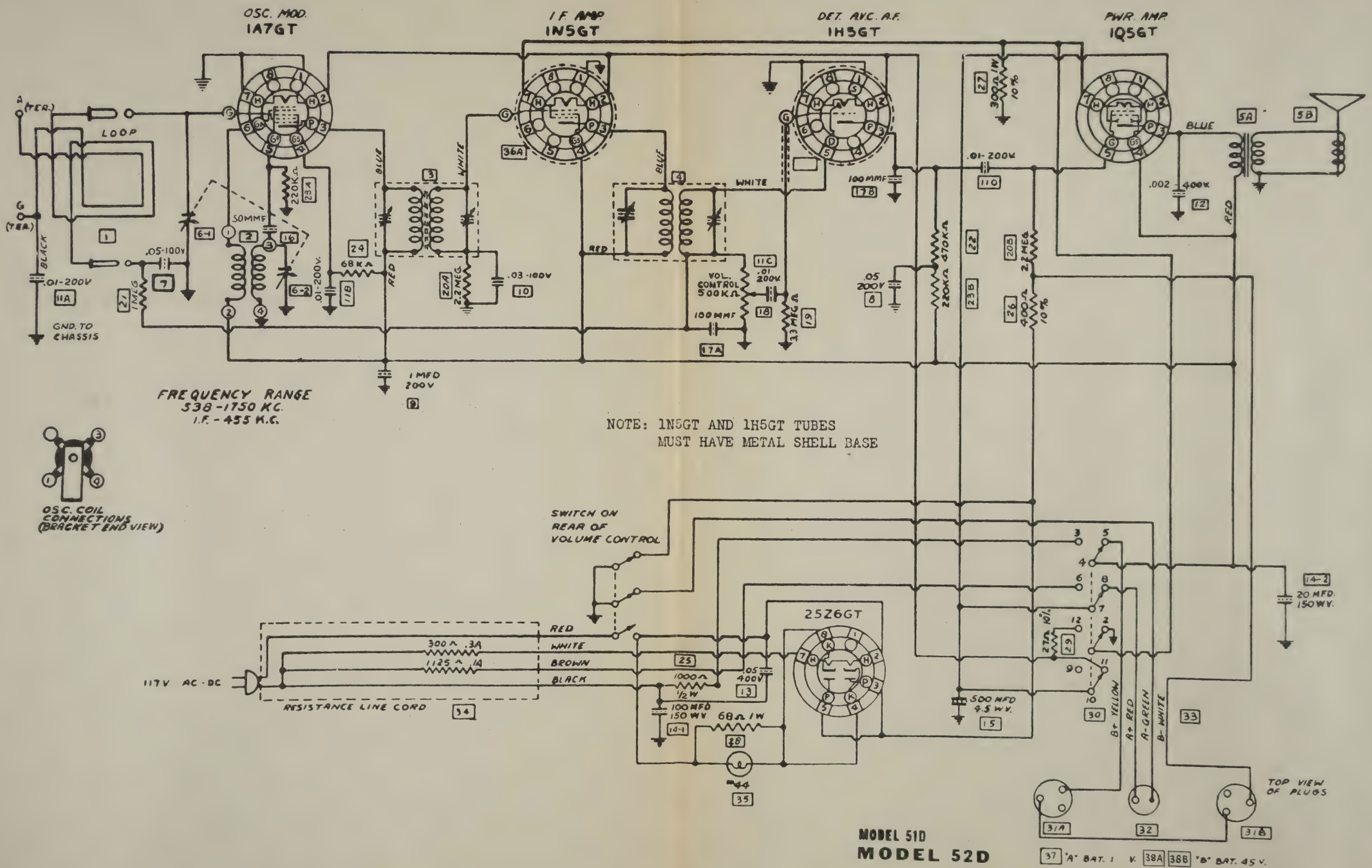

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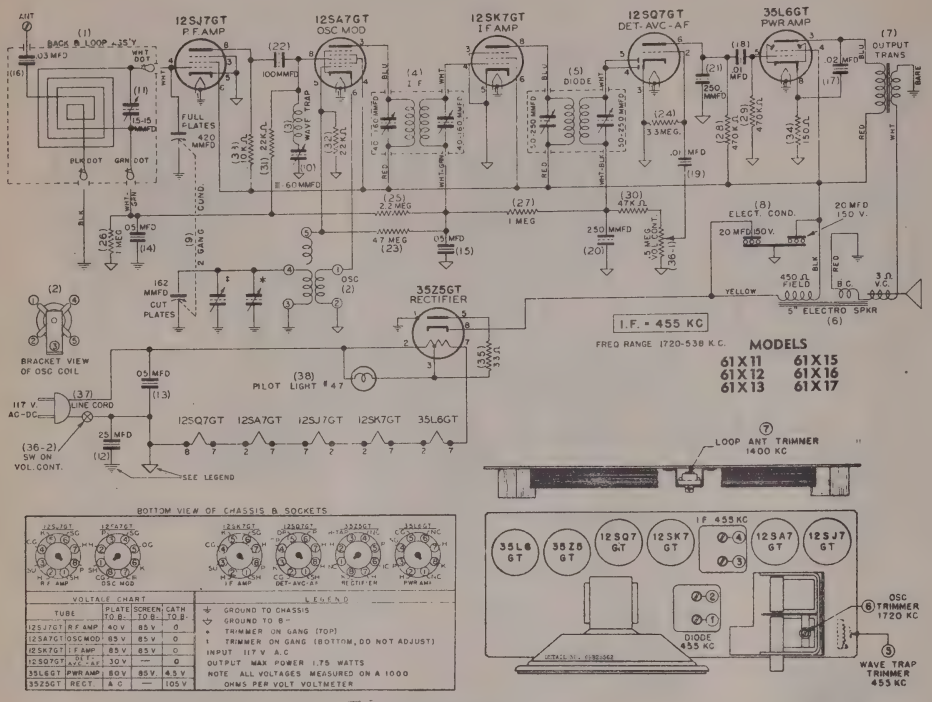
MODELS 61X11, 61X12, 61X13
61X15, 61X16, 61X17

GALVIN MFG. CO.



VOLTAGE CHART				
TUBE		PLATE TO B-	SCREEN TO B-	CATH TO B-
12SJ7GT	R.F. AMP	40 V	85 V	0
12SA7GT	OSC MOD	85 V	85 V	0
12SK7GT	I.F. AMP	85 V	85 V	0
12SQ7GT	DET. AVC - AF	30 V	—	0
35L6GT	PWR AMP	80 V	85 V	45 V
35Z5GT	RECT.	A.C	—	105 V

LEGEND
- GROUND TO CHASSIS
- GROUND TO B-
- TRIMMER ON GANG (TOP)
- TRIMMER ON GANG (BOTTOM, DO NOT ADJUST)

INPUT 117 V A.C
OUTPUT MAX POWER 1.75 WATTS
NOTE ALL VOLTAGES MEASURED ON A 1000 OHMS PER VOLT VOLTMETER

POINTER AND GANG DRIVE CORD RESTRINGING INSTRUCTIONS

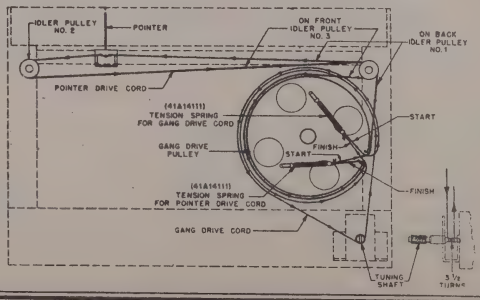
GANG DRIVE CORD

1. Remove the chassis from cabinet.
2. Remove broken string.
3. Turn gang to fully meshed position.
4. Cut a 35" length of 30 lb. silk fish cord.
5. Tie one end of cord to tension spring (Part No.41A14111).
6. Hook other end of spring to gang drive pulley
7. Pass cord through slot in gang drive pulley and wind, in a counter-clockwise direction, around and down to tuning shaft.
8. Wind cord 3-1/2 turns counter-clockwise around tuning shaft exactly as shown in Fig. 2.
9. Route cord up and wind one full turn around gang drive pulley, in a counter clockwise direction, to slot.
10. Pass cord through slot and tie cord to spring.
    NOTE: *Before tying cord, adjust length so that spring will exert a light pull on cord.*
11. Place a drop of shellac on cord knot.

POINTER DRIVE CORD

1. Remove the chassis from cabinet.
2. Remove broken string.
3. Turn gang to fully meshed position.
4. Cut a 40" length of 30 lb. silk fish cord.
5. Tie one end of cord to tension spring (Part No.41A14111).
6. Hook other end of spring to gang drive pulley
7. Pass cord through slot in gang drive pulley and route cord upward to idler pulley No. 1 (Back pulley).
8. Route cord in a counter-clockwise direction around idler pulley No. 1 and across chassis to idler pulley No. 2.
9. Continue in a counter-clockwise direction around idler pulley No. 2 and back across chassis to idler pulley No. 3 (Front Pulley).
10. Continue in a counter-clockwise direction around idler pulley No. 3 and in a counter-clockwise direction around gang drive pulley to slot.
11. Pass cord through slot and tie to spring.
    NOTE: *Before tying cord, adjust length so that spring will exert a light pull on cord.*
12. Replace pointer on cord. To calibrate, tune in a station of known frequency and adjust pointer on cord to indicate station frequency. Fasten to cord with a drop of shellac.
13. Place a drop of shellac on cord knot.

MODELS
51 F 12
61 x 11
61 x 12
61 x 13



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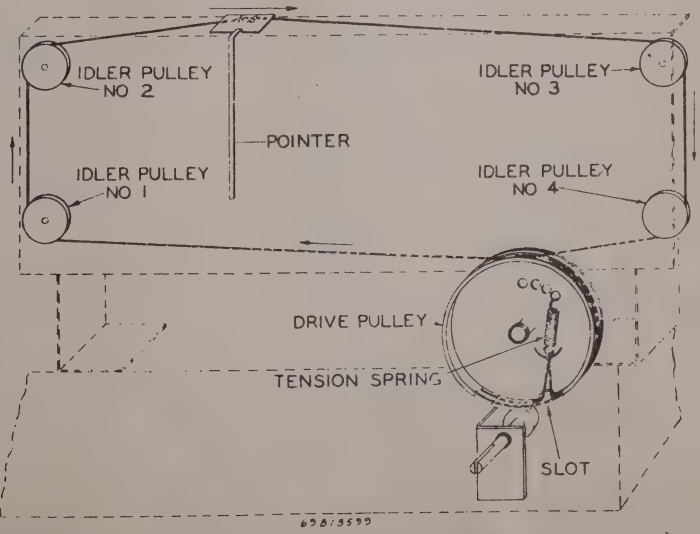
MODEL 72-C SCHEMATIC DIAGRAM PARTS LIST

Diag. No.	Part No.	Description	Diag. No.	Part No.	Description
1	1B16743	Loop Antenna Assembly	26	8S9808	Tubular Condenser (.005-1000V.)
2	24A16787	Police Ant. Coil ("C" Band)	27	8S9801	Tubular Condenser (.01-100V.)
3	24A16788	S. W. Ant. Coil ("D" Band)	28	21B6503	Molded Mica Cond. (50 mmf) 20%
4	24K17049	B. C. Osc. Coil (Vio-Brn)	29	21B6511	Molded Mica Cond. (100 mmf) 20%
5	24A16789	Police Osc. Coil ("C" Band)	30	21B6500	Molded Mica Cond. (500 mmf) 20%
6	24A16790	S. W. Osc. Coil ("D" Band)	31	6B6252	Carbon Res. (1 meg-1/3-10) N.I.
7	1X17492	I. F. Coil & Shield Assembly	32	6B6071	Carbon Res. (1 meg-1/3-20) N.I.
8	1X17493	Diode Coil & Shield Assembly	33	6B6245	Carbon Res. (820,000-1/3-10) N.I.
9	25A17674	Output Transformer	34	6B6246	Carbon Res. (470,000-1/3-10) N.I.
10	50C17711	Speaker (10" P.M.)	35	6B6130	Carbon Res. (150,000-1/3-10) N.I.
11	1X14887	Tuner, Gang & Pulley	36	6B6030	Carbon Res. (100,000-1/3-10) N.I.
12	25B17423	Power Transformer	37	6B6068	Carbon Res. (47,000-1/3-10) N.I.
13	20K16825	Trimmer & L Brkt. (2-22) L.H.	38	6B6037	Carbon Res. (33,000-1/3-10) N.I.
14	20K10996	B. C. Trimmer & Padder	39	6B6248	Carbon Res. (25,000-1/2-10) N.I.
15	20K17439	S. W. Padder (4200 mmf)	40	6B6251	Carbon Res. (22,000-1/3-10) N.I.
16	20A17438	Police Padder (2500 mmf)	41	6B6250	Carbon Res. (3900-3-10) N.I.
17	23A17422	Electrolytic Condenser (FP)	42	6B6253	Carbon Res. (150-1-10) N.I.
18	20A11047	Compensating Condenser	43	6B6247	Carbon Res. (150-1/3-10) N.I.
19	8S9829	Tubular Condenser (.2-100V.)	44	6B6227	Carbon Res. (10-1/3-10) N.I.
20	8S9814	Tubular Condenser (.1-100V.)	45	18A17425	Vol. Cont. & Switch (2 meg)
21	8S9805	Tubular Condenser (.05-100V.)	46	18A16083	Tone Control (1 meg)
22	8S9821	Tubular Condenser (.05-200V.)	47	40A17424	Band Switch Section (Ant.)
23	8S9807	Tubular Condenser (.1-400V.)	48	40K16797	Band Switch Section (Osc.)
24	8S9804	Tubular Condenser (.03-400V.)	49	48X10089	Bias Cell (1½V)
25	8S9825	Tubular Condenser (.01-200V.)	50	65X17689	Bulb (6.3V-.15A Tub.Bay.) White #47W
			51	30A151	Line Cord & Plug (6 feet)

MODEL 72-C - DIAL CORD INSTRUCTIONS

1. Cut a length of 24 lb. test dial drive cord 44 inches long.
2. Turn gang to fully meshed position.
3. Push dial drive shaft down.
4. Thread end of cord thru slot in drive pulley. See Fig. 24
5. With an ordinary paper clip fasten cord to drive shaft bracket.
6. Wind cord in a counter-clockwise direction one and one half turns around drive pulley and across chassis to idler pulley No.1.
7. Route cord around idler pulley No.1 and up to idler pulley No.2 as shown in diagram.
8. Continue cord across chassis and over to idler pulley No.3.
9. Continue cord down to idler pulley No.4 and around it in a clockwise direction to drive pulley and around it in a counter-clockwise direction to slot.
10. Knot both ends of cord securely together inside the slot.
11. Tie in one end of tension spring.
12. Hook the other end of tension spring into hole in drive pulley.
13. Lace in the dial pointer.
14. To set pointer to correct frequency, tune in a station of known frequency and adjust position of pointer on string.
15. Secure pointer to string with a drop of shellac or good household cement.



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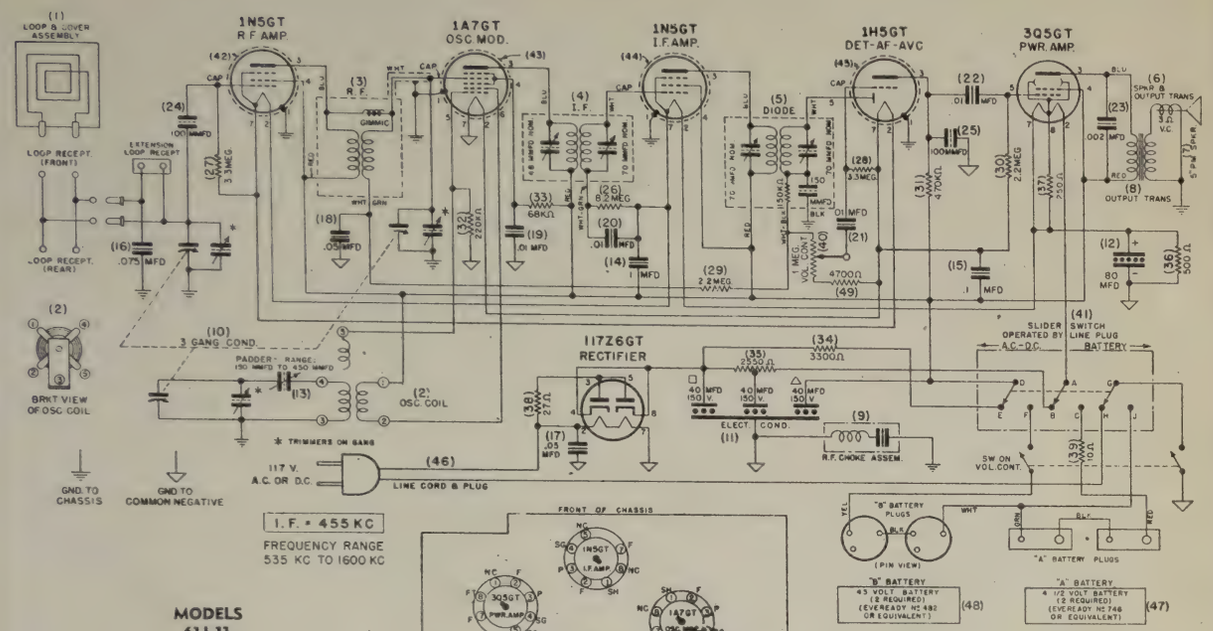
GALVIN MFG. CO.

MODELS 61L11, 61L12



"B" BATTERY
45 VOLT BATTERY (2 REQUIRED) (EVEREADY NO.482 OR EQUIVALENT) (48)

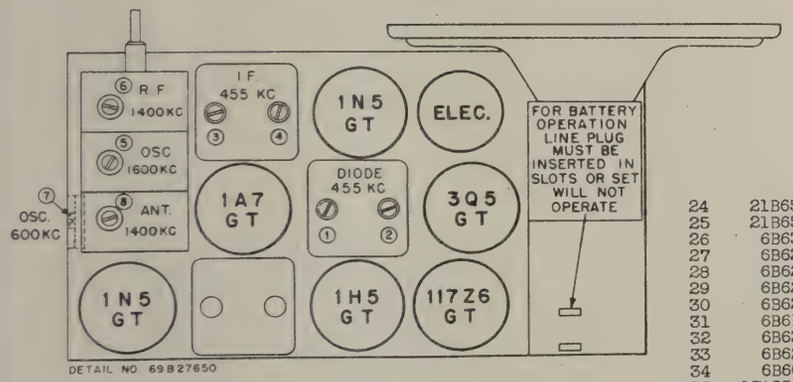
"A" BATTERY
4 1/2 VOLT BATTERY (2 REQUIRED) (EVEREADY NO.746 OR EQUIVALENT) (47)

MODELS
61L11
61L12

VOLTAGE CHART			
TUBE	PLATE TO B-	SCREEN TO B-	OSC. PLATE TO B-
1N5GT R.F. AMP	85V	85V	——
1A7GT OSC. MOD	85V	40V	85V
1N5GT I.F. AMP	85V	85V	——
1H5GT DET-AF-AVC	30V	——	——
3Q5 PWR-AMP	80V	85V	——
117Z6G RECT.	——	LINE VOLTAGE (117V.)	125V. AT CATH

NOTE: ALL VOLTAGES MEASURED ON A 1000 OHMS PER VOLT VOLTMETER, 117V. A.C. OR BATTERY INPUT. MAX. PWR. OUTPUT 300 MILLIWATTS.

CURRENT DRAIN		
	A.C.	BATT
"A"	49 MA	49 MA
"B"	14 MA	14.5 MA



Models 61L11 & 61L12

1	24X27467	Front Cover & Loop (Model 61L12)
	24X25946	Front Cover & Loop (Model 61L11)
2	24A25936	Oscillator Coil
3	1X25906	R.F. Coil & Shield Assembly
4	1X25904	I.F. Coil & Shield Assembly
5	1X25902	Diode Coil & Shield Assembly
6	50B25891	Speaker & Output Transformer
7		50K25892 Speaker (5" P.M.) Only
8		25K25893 Output Transformer Only
9	1A25935	R.F. Choke Assembly
10	19B25923	Variable Condenser (3 Gang)
11	23A25889	Elect. Condenser (40-40 MFD/150V)
12	23A25888	Elect. Condenser & Strap (80 MFD-25V)
13	20A25899	Padder Condenser (Range 150 MMFD To 450 MMFD)
14	8S9806	Tubular Condenser (.1-200V)
15	8S9806	Tubular Condenser (.1-200V)
16	8A25559	Tubular Condenser (.075-200V)
17	8S9816	Tubular Condenser (.05-400V)
18	8S9805	Tubular Condenser (.05-100V)
19	8S9825	Tubular Condenser (.01-200V)
20	8A25939	Tubular Condenser (.01-100V)
21	8S9801	Tubular Condenser (.01-100V)
22	8S9801	Tubular Condenser (.01-100V)
23	8S9824	Tubular Condenser (.002-400V)
24	21B6511	Molded Mica Cond. (100 MMFD) 20%
25	21B6511	Molded Mica Cond. (100 MMFD) 20%
26	6B6310	Carbon Resistor (8.2 Meg-1/3-20) Ins.
27	6B6201	Carbon Resistor (3.3 Meg-1/3-20) Ins.
28	6B6201	Carbon Resistor (3.3 Meg-1/3-20) Ins.
29	6B6202	Carbon Resistor (2.2 Meg-1/3-20) Ins.
30	6B6202	Carbon Resistor (2.2 Meg-1/3-20) Ins.
31	6B6160	Carbon Resistor (470,000-1/3-20) Ins.
32	6B6349	Carbon Resistor (220,000-1/3-10) Ins.
33	6B6256	Carbon Resistor (68,000-1/3-20) Ins.
34	6B6084	Carbon Resistor (3,300-1/3-20) N.I.
35	17A25877	W.W. Resistor (2550-5-5)
36	6B6461	Carbon Resistor (500-1/3-10) Ins.
37	6B6404	Carbon Resistor (250-1/3-10) Ins.
38	6B6241	Carbon Resistor (27-1/2-10) N.I.
39	6B6418	Carbon Resistor (10-1/3-10) Ins.
40	18A25882	Vol. Control & Switch (1 Meg)
41	40A27114	Slider Switch & Bracket
42	26A14760	Tube Shield (Bantam)
43	26A14760	Tube Shield (Bantam)
44	26A14760	Tube Shield (Bantam)
45	26A14760	Tube Shield (Bantam)
46	30B20329	Line Cord & Plug (6 Ft.)
47	48X20379	"A" Battery (4-1/2 Volt) (2 Required) (Eveready #746 or Equivalent)
48	48X16844	"B" Battery (45 Volt) (2 Required) (Eveready #482 or Equivalent)
49	6B6203	Carbon Resistor (4,700-1/3-20) Ins.

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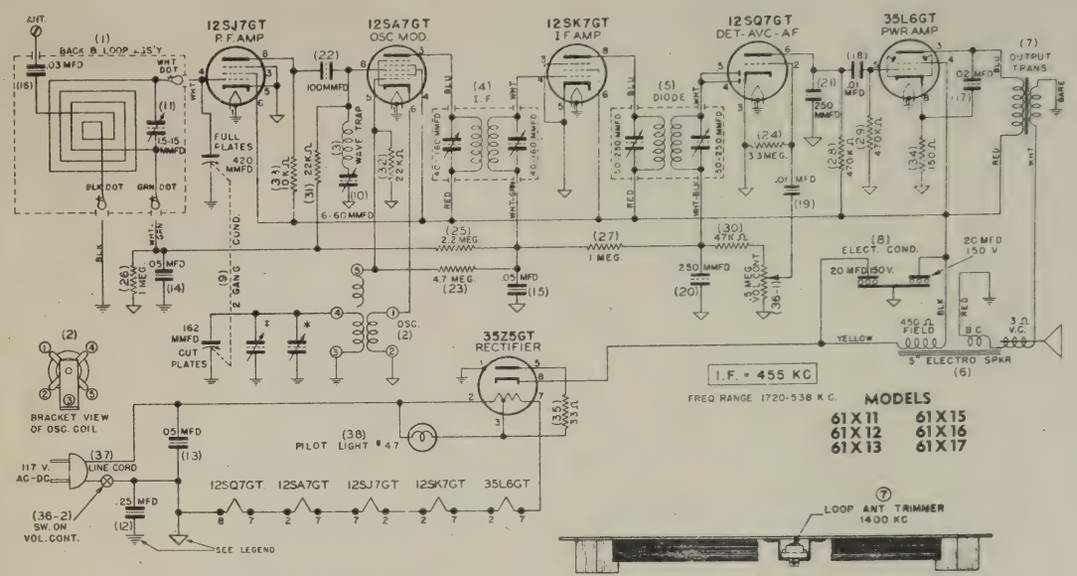
MODELS 61X11, 61X12, 61X13
61X15, 61X16, 61X17

GALVIN MFG. CO.



MODELS
61X11 61X15
61X12 61X16
61X13 61X17

VOLTAGE CHART				
TUBE	PLATE TO B-	SCREEN TO B-	CATH. TO B-	
12SJ7GT R.F. AMP.	40 V	85 V	0	
12SA7GT OSC. MOD	85 V	85 V	0	
12SK7GT I.F. AMP	85 V	85 V	0	
12SQ7GT DET.-AVC-AF	30 V	—	0	
35L6GT PWR. AMP	80 V	85 V	4.5 V.	
35Z5GT RECT.	A.C.	—	105 V	

LEGEND
⏚ GROUND TO CHASSIS
⏚ GROUND TO B-
* TRIMMER ON GANG (TOP)
‡ TRIMMER ON GANG (BOTTOM, DO NOT ADJUST)
INPUT 117 V. A.C
OUTPUT MAX POWER 1.75 WATTS
NOTE. ALL VOLTAGES MEASURED ON A 1000 OHMS PER VOLT VOLTMETER

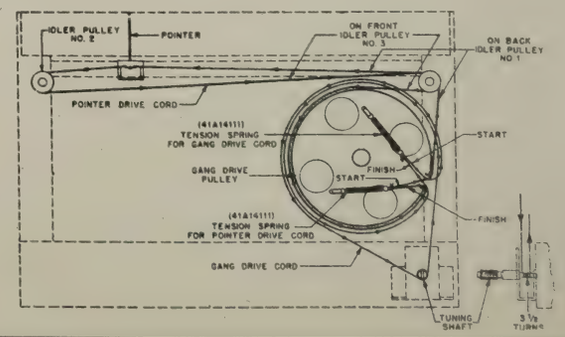
POINTER AND GANG DRIVE CORD RESTRINGING INSTRUCTIONS GANG DRIVE CORD

1. Remove the chassis from cabinet.
2. Remove broken string.
3. Turn gang to fully meshed position.
4. Cut a 35" length of 30 lb. silk fish cord.
5. Tie one end of cord to tension spring (Part No.41A14111).
6. Hook other end of spring to gang drive pulley
7. Pass cord through slot in gang drive pulley and wind, in a counter-clockwise direction, around and down to tuning shaft.
8. Wind cord 3-1/2 turns counter-clockwise around tuning shaft exactly as shown in Fig. 2.
9. Route cord up and wind one full turn around gang drive pulley, in a counter clockwise direction, to slot.
10. Pass cord through slot and tie cord to spring.
    NOTE: *Before tying cord, adjust length so that spring will exert a light pull on cord.*
11. Place a drop of shellac on cord knot.

POINTER DRIVE CORD

1. Remove the chassis from cabinet.
2. Remove broken string.
3. Turn gang to fully meshed position.
4. Cut a 40" length of 30 lb. silk fish cord.
5. Tie one end of cord to tension spring (Part No.41A14111).
6. Hook other end of spring to gang drive pulley
7. Pass cord through slot in gang drive pulley and route cord upward to idler pulley No. 1 (Back pulley).
8. Route cord in a counter-clockwise direction around idler pulley No. 1 and across chassis to idler pulley No. 2.
9. Continue in a counter-clockwise direction around idler pulley No. 2 and back across chassis to idler pulley No. 3 (Front Pulley).
10. Continue in a clockwise direction around idler pulley No. 3 and in a counter-clockwise direction around gang drive pulley to slot.
11. Pass cord through slot and tie to spring.
    NOTE: *Before tying cord, adjust length so that spring will exert a light pull on cord.*
12. Replace pointer on cord. To calibrate, tune in a station of known frequency and adjust pointer on cord to indicate station frequency. Fasten to cord with a drop of shellac.
13. Place a drop of shellac on cord knot.

MODELS
51 F 12
61 x 11
61 x 12
61 x 13



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MODEL 72C

GALVIN MFG. CO.

Motorola

MODEL 72C

6A8GT OSC MOD.

6K7GT I.F. AMP.

6SQ7GT DET·AVC-AF

6SQ7GT PHASE INV

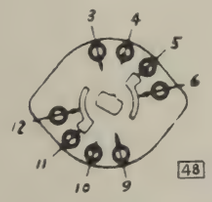
6V6G POWER AMP

6V6G POWER AMP

5W4GT RECTIFIER

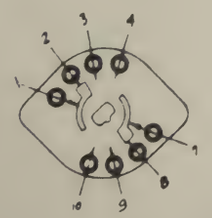
I.F. PEAK 455 KC

COILS SHOWN WITH SPRING LUGS AT TOP



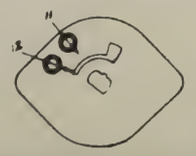
BAND SWITCH REAR SECTION (LUG VIEW) IN B.C. POSITION

48



BAND SWITCH FRONT SECTION FRONT VIEW BROADCAST POSITION

47



BANDSWITCH FRONT SECTION REAR VIEW BROADCAST POSITION

POLICE ANT COIL CONNECTIONS #1 LUG IS PLACED UNDER #3 LUG

2

S.W. ANT. COIL CONNECTIONS (PRI VIEW) #1 LUG IS PLACED UNDER #3 LUG

3

B.C. OSC. COIL CONNECTIONS (BRACKET VIEW)

4

POLICE OSC. COIL CONNECTIONS (SEC. VIEW) #1 LUG IS PLACED UNDER #3 LUG

5

S.W. OSC. COIL CONNECTIONS (PRI. VIEW) #1 LUG IS PLACED UNDER #3 LUG

6

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MODEL FM82

GALVIN MFG. CO.

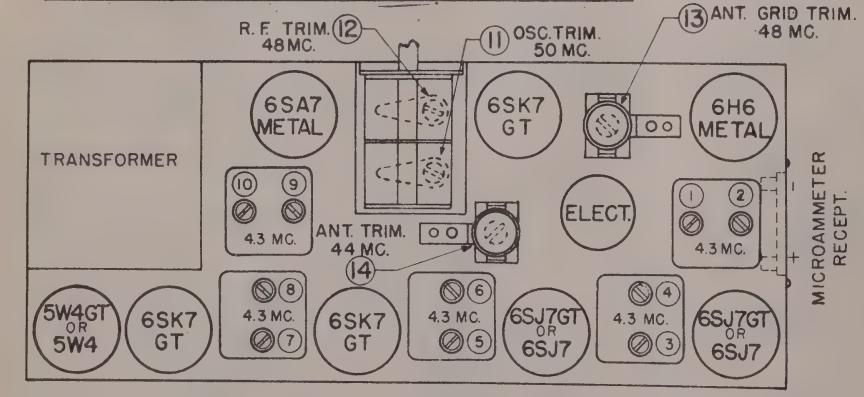
	Operations In Order	Gang Set at	Dummy Antenna	Generator Connected to	Tune Trimmer Number	Generator Modulated 400 C.P.S.	Generator Unmodulated	Generator Set at	Read Micrometer	Read Output Voltmeter	See Note
1	Min.	1000 M.M.F. With 10,000 Ohms Shunted across output terminals of signal generator.		2nd Limiter Grid	2 to Min.	X		4.3 M.C.		X	A
2	Min.			2nd Limiter Grid	1 to Max.	X		4.3 M.C.		X	
3	Min.			2nd Limiter Grid	2 to Min.	X		4.3 M.C.		X	
4	Min.			Ant. Terminal	3 to Max.		X	4.3 M.C.	X		
5	Min.			Ant. Terminal	4 to Max.		X	4.3 M.C.	X		
6	Min.			Ant. Terminal	5 to Max.		X	4.3 M.C.	X		
7	Min.			Ant. Terminal	6 to Max.		X	4.3 M.C.	X		
8	Min.			Ant. Terminal	7 to Max.		X	4.3 M.C.	X		
9	Min.			Ant. Terminal	8 to Max.		X	4.3 M.C.	X		
10	Min.			Ant. Terminal	9 to Max.		X	4.3 M.C.	X		
11	Min.			Ant. Terminal	10 to Max.		X	4.3 M.C.	X		
12	Min.		100 Ohms	Ant. Terminal	11 to Max.		X	50.4 M.C.	X		
13			100 Ohms	Ant. Terminal	12 to Max.		X	48 M.C.	X		
14			100 Ohms	Ant. Terminal	14 to Min.		X	48 M.C.	X		A
15			100 Ohms	Ant. Terminal	13 to Max.		X	48 M.C.	X		
16			100 Ohms	Ant. Terminal	14 to Max.		X	44 M.C.	X		

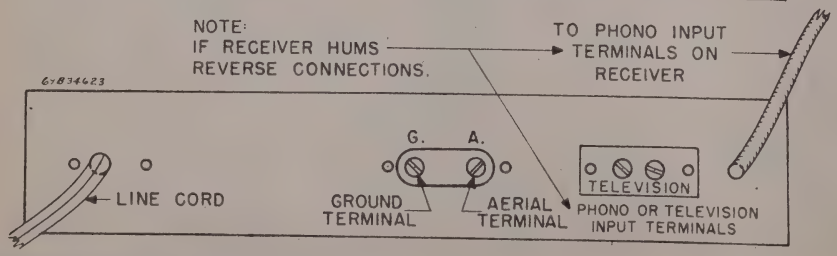
ALIGNMENT

CONNECT AN AMPLIFIER TO THIS UNIT WHEN ALIGNING USE A 0-100 MICROAMMETER

NOTE A

DETUNE BY REDUCING THE TRIMMER CAPACITY. ROTATE THE TRIMMER ADJUSTING SCREW COUNTERCLOCKWISE ONE TURN





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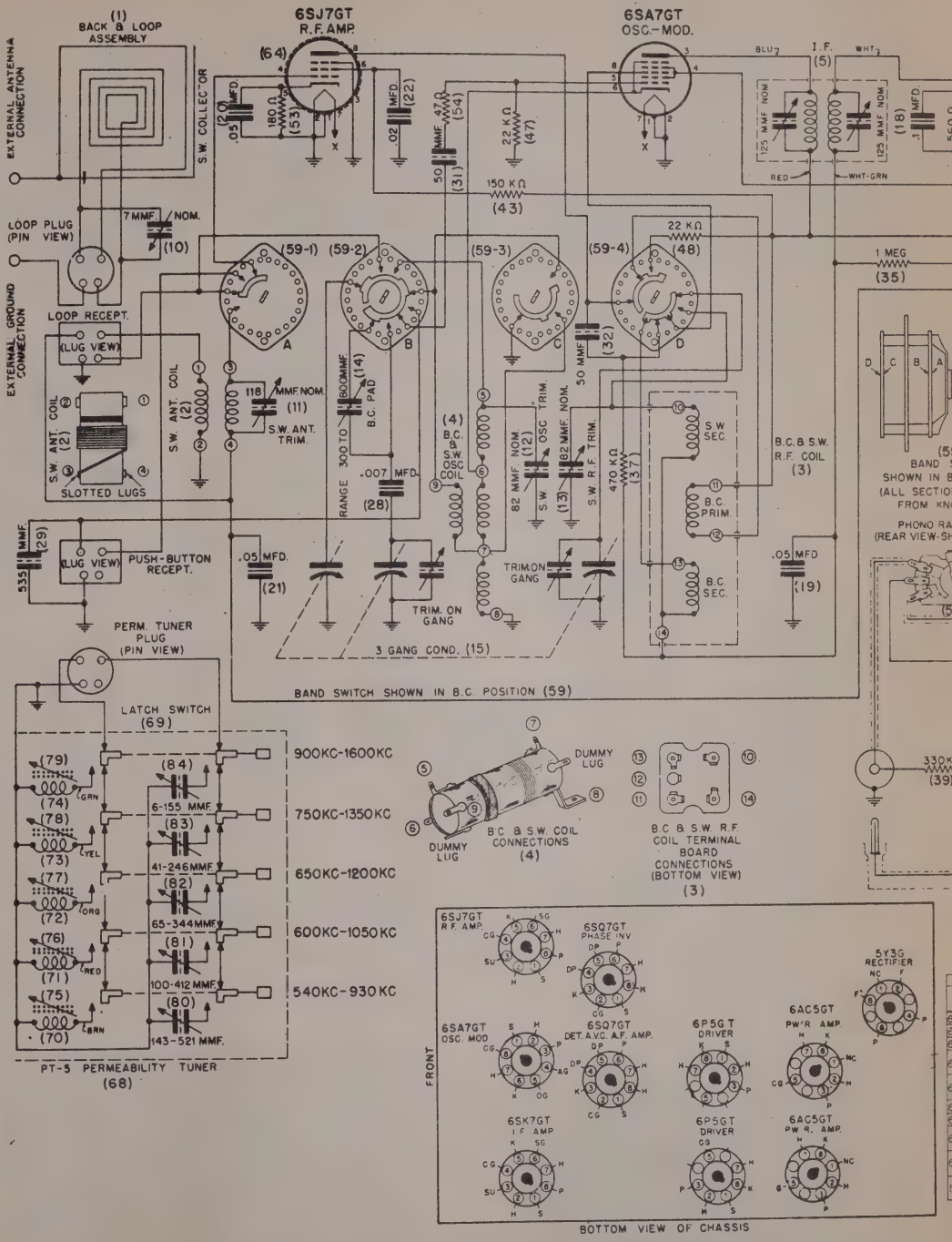
MODELS 101F21, 101F22

GALVIN



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MODEL 72C

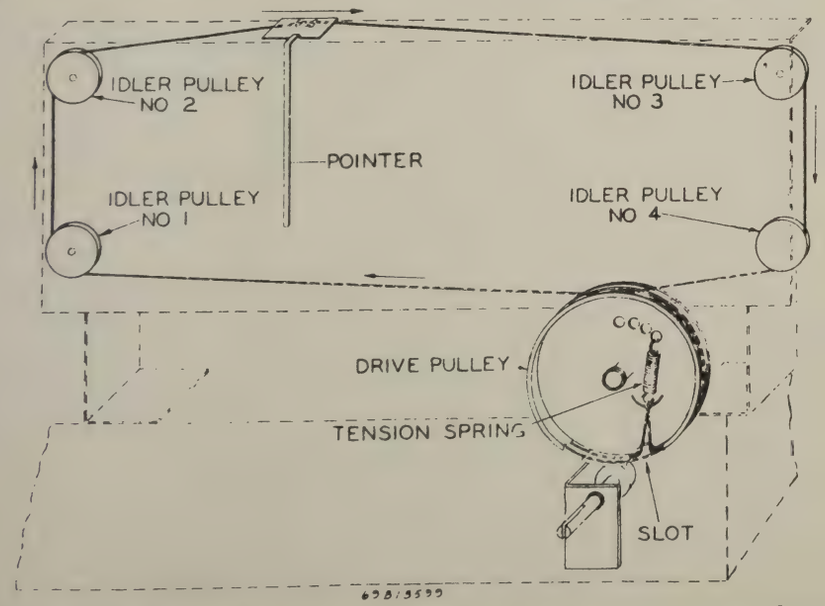
GALVIN MFG. CO.

MODEL 72-C SCHEMATIC DIAGRAM PARTS LIST

Diag. No.	Part No.	Description	Diag. No.	Part No.	Description
1	1B16743	Loop Antenna Assembly	26	8S9808	Tubular Condenser (.005-1000V.)
2	24A16787	Police Ant. Coil ("C" Band)	27	8S9801	Tubular Condenser (.01-100V.)
3	24A16788	S. W. Ant. Coil ("D" Band)	28	21B6503	Molded Mica Cond. (50 mmf) 20%
4	24K17049	B. C. Osc. Coil (Vio-Brn)	29	21B6511	Molded Mica Cond. (100 mmf) 20%
5	24A16789	Police Osc. Coil ("C" Band)	30	21B6500	Molded Mica Cond. (500 mmf) 20%
6	24A16790	S. W. Osc. Coil ("D" Band)	31	6B6252	Carbon Res. (1 meg-1/3-10) N.I.
7	1X17492	I. F. Coil & Shield Assembly	32	6B6071	Carbon Res. (1 meg-1/3-20) N.I.
8	1X17493	Diode Coil & Shield Assembly	33	6B6245	Carbon Res. (820,000-1/3-10) N.I.
9	25A17674	Output Transformer	34	6B6246	Carbon Res. (470,000-1/3-10) N.I.
10	50C17711	Speaker (10" P.M.)	35	6B6130	Carbon Res. (150,000-1/3-10) N.I.
11	1X14887	Tuner, Gang & Pulley	36	6B6030	Carbon Res. (100,000-1/3-10) N.I.
12	25B17423	Power Transformer	37	6B6068	Carbon Res. (47,000-1/3-10) N.I.
13	20K16825	Trimmer & L Brkt. (2-22) L.H.	38	6B6037	Carbon Res. (33,000-1/3-10) N.I.
14	20K10996	B. C. Trimmer & Padder	39	6B6248	Carbon Res. (25,000-1/2-10) N.I.
15	20K17439	S. W. Padder (4200 mmf)	40	6B6251	Carbon Res. (22,000-1/3-10) N.I.
16	20A17438	Police Padder (2500 mmf)	41	6B6250	Carbon Res. (3900-3-10) N.I.
17	23A17422	Electrolytic Condenser (FP)	42	6B6253	Carbon Res. (150-1-10) N.I.
18	20A11047	Compensating Condenser	43	6B6247	Carbon Res. (150-1/3-10) N.I.
19	8S9829	Tubular Condenser (.2-100V.)	44	6B6227	Carbon Res. (10-1/3-10) N.I.
20	8S9814	Tubular Condenser (.1-100V.)	45	18A17425	Vol. Cont. & Switch (2 meg)
21	8S9805	Tubular Condenser (.05-100V.)	46	18A16083	Tone Control (1 meg)
22	8S9821	Tubular Condenser (.05-200V.)	47	40A17424	Band Switch Section (Ant.)
23	8S9807	Tubular Condenser (.1-400V.)	48	40K16797	Band Switch Section (Osc.)
24	8S9804	Tubular Condenser (.03-400V.)	49	48X10089	Bias Cell (1½V)
25	8S9825	Tubular Condenser (.01-200V.)	50	65X17689	Bulb (6.3V-.15A Tub.Bay.) White #47W
			51	30A151	Line Cord & Plug (6 feet)

MODEL 72-C - DIAL CORD INSTRUCTIONS

1. Cut a length of 24 lb. test dial drive cord 44 inches long.
2. Turn gang to fully meshed position.
3. Push dial drive shaft down.
4. Thread end of cord thru slot in drive pulley. See Fig. 24
5. With an ordinary paper clip fasten cord to drive shaft bracket.
6. Wind cord in a counter-clockwise direction one and one half turns around drive pulley and across chassis to idler pulley No.1.
7. Route cord around idler pulley No.1 and up to idler pulley No.2 as shown in diagram.
8. Continue cord across chassis and over to idler pulley No.3.
9. Continue cord down to idler pulley No.4 and around it in a clockwise direction to drive pulley and around it in a counter-clockwise direction to slot.
10. Knot both ends of cord securely together inside the slot.
11. Tie in one end of tension spring.
12. Hook the other end of tension spring into hole in drive pulley.
13. Lace in the dial pointer.
14. To set pointer to correct frequency, tune in a station of known frequency and adjust position of pointer on string.
15. Secure pointer to string with a drop of shellac or good household cement.



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MODEL FM82

GALVIN MFG. CO.

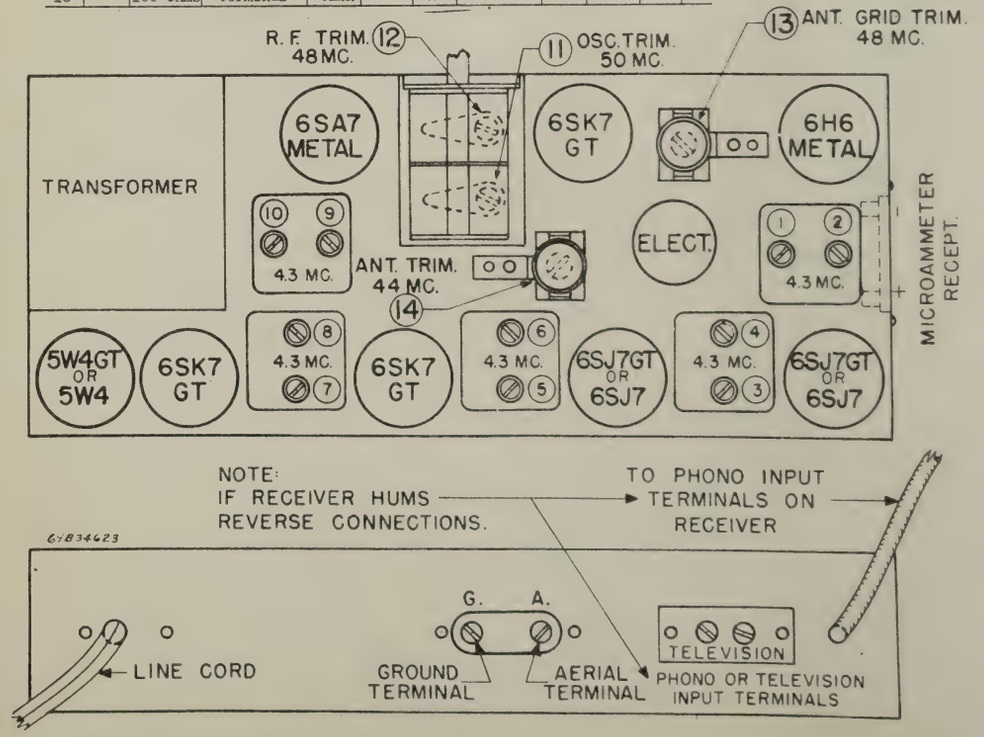
Operations in Order	Gang Set at	Dummy Antenna	Generator Connected to	Tune Trimmer Number	Generator Modulated 400 C.P.S.	Generator Unmodulated	Generator Set at	Read Microammeter	Read Output Voltmeter	See Note
1	Min.	1000 M.M.F. With 10,000 Ohms Shunted across output terminals of signal generator.	2nd Limiter Grid	2 to Min.	X		4.3 M.C.		X	A
2	Min.		2nd Limiter Grid	1 to Max.	X		4.3 M.C.		X	
3	Min.		2nd Limiter Grid	2 to Min.	X		4.3 M.C.		X	
4	Min.		Ant. Terminal	3 to Max.		X	4.3 M.C.	X		
5	Min.		Ant. Terminal	4 to Max.		X	4.3 M.C.	X		
6	Min.		Ant. Terminal	5 to Max.		X	4.3 M.C.	X		
7	Min.		Ant. Terminal	6 to Max.		X	4.3 M.C.	X		
8	Min.		Ant. Terminal	7 to Max.		X	4.3 M.C.	X		
9	Min.		Ant. Terminal	8 to Max.		X	4.3 M.C.	X		
10	Min.		Ant. Terminal	9 to Max.		X	4.3 M.C.	X		
11	Min.		Ant. Terminal	10 to Max.		X	4.3 M.C.	X		
12	Min.	100 Ohms	Ant. Terminal	11 to Max.		X	50.4 M.C.	X		
13		100 Ohms	Ant. Terminal	12 to Max.		X	48 M.C.	X		
14		100 Ohms	Ant. Terminal	14 to Min.		X	48 M.C.	X		A
15		100 Ohms	Ant. Terminal	13 to Max.		X	48 M.C.	X		
16		100 Ohms	Ant. Terminal	14 to Max.		X	44 M.C.	X		

ALIGNMENT

CONNECT AN AMPLIFIER TO THIS UNIT WHEN ALIGNING USE A 0-100 MICROAMMETER

NOTE A

DETUNE BY REDUCING THE TRIMMER CAPACITY. ROTATE THE TRIMMER ADJUSTING SCREW COUNTERCLOCKWISE ONE TURN



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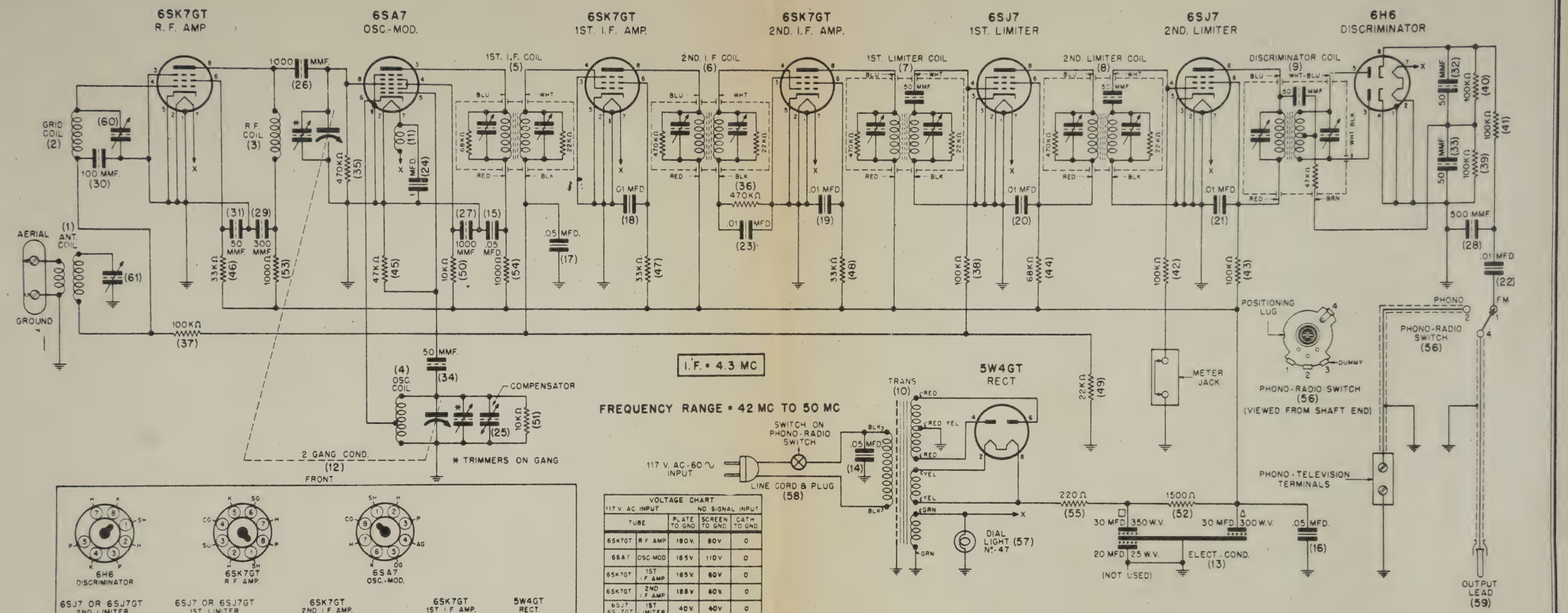
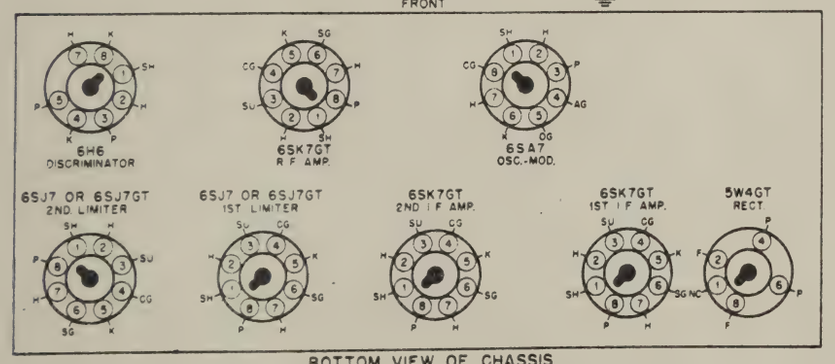
MODEL FM-82

GALVIN MFG. CO.





VOLTAGE CHART

117 V. AC INPUT			NO SIGNAL INPUT		
TUBE			PLATE TO GND	SCREEN TO GND	CATH TO GND
6SK7GT	R.F. AMP		180 V.	80 V	0
6SA7	OSC-MOD		185 V.	110 V	0
6SK7GT	1ST I.F. AMP		185 V	80 V	0
6SK7GT	2ND I.F. AMP		185 V	80 V	0
6SJ7 6SJ7GT	1ST LIMITER		40 V	40 V	0
6SJ7 6SJ7GT	2ND LIMITER		35 V.	35 V	0
6H6	DISCRIM.			—	
5W4GT	RECT	AC		—	(FROM F) 300 V

NOTE - ALL VOLTAGES MEASURED WITH A 20,000 OHM PER VOLT VOLTMETER

1	24A31269	Antenna Coil
2	24A31270	Grid Coil
3	24A31268	R.F. Coil
4	24A31267	Oscillator Coil
5	1X31305	1st I.F. Coil & Shield Assembly
6	1X31307	2nd I.F. Coil & Shield Assembly
7	1X31311	1st Limiter Coil & Shield Assembly
8	1X31313	2nd Limiter Coil & Shield Assembly
9	1X31315	Discriminator Coil & Shield Assembly
10	25B21248	Power Transformer
11	24X28467	Heater Choke
12	1X31337	Gang & Pulley Assembly (2 Gang)
13	23A27718	Elect. Cond. (30 MFD/350W.V.-30 MFD/300W.V. 20 MFD/25W.V.) (25 MFD Section Not Used)
14	8A28966	Tubular Condenser (.05 MFD-600W.V.)
15	8S9816	Tubular Condenser (.05 MFD-400W.V.)
16	8S9816	Tubular Condenser (.05 MFD-400W.V.)
17	8S9805	Tubular Condenser (.05 MFD-100W.V.)
18	8S9809	Tubular Condenser (.01 MFD-400W.V.)
19	8S9809	Tubular Condenser (.01 MFD-400W.V.)
20	8S9809	Tubular Condenser (.01 MFD-400W.V.)
21	8S9809	Tubular Condenser (.01 MFD-400W.V.)
22	8S9809	Tubular Condenser (.01 MFD-400W.V.)
23	8A25939	Tubular Condenser (.01 MFD-100W.V.)
24	8S9814	Tubular Condenser (.1 MFD-100W.V.)
25	20A31711	Compensating Condenser
26	21B6595	Molded Mica Cond. (1000MMF-10%-300W.V.
27	21B6595	Molded Mica Cond. (1000MMF-10%-300W.V.
28	21B6531	Molded Mica Cond. (500MMF-20%-400W.V.)
29	21B6608	Molded Mica Cond. (300MMF-10%-400W.V.)
30	21B6511	Molded Mica Cond. (100MMF-20%-400W.V.)
31	21B6588	Molded Mica Cond. (50 MMF-20%-400W.V.)
32	21B6588	Molded Mica Cond. (50 MMF-20%-400W.V.)
33	21B6588	Molded Mica Cond. (50 MMF-20%-400W.V.)
34	21A26226	Ceramic Tubular Condenser (50 MMF)
35	6B6160	Carbon Resistor (470,000Ω-1/3 Watt-20%) Ins.
36	6B6160	Carbon Resistor (470,000Ω-1/3 Watt-20%) Ins.
37	6B6165	Carbon Resistor (100,000Ω-1/3 Watt-20%) Ins.
38	6B6165	Carbon Resistor (100,000Ω-1/3 Watt-20%) Ins.
39	6B6165	Carbon Resistor (100,000Ω-1/3 Watt-20%) Ins.
40	6B6165	Carbon Resistor (100,000Ω-1/3 Watt-20%) Ins.
41	6B6165	Carbon Resistor (100,000Ω-1/3 Watt-20%) Ins.
42	6B6369	Carbon Resistor (100,000Ω-1/3 Watt-10%) Ins.
43	6B6030	Carbon Resistor (100,000Ω-1/3 Watt-10%) N.I.
44	6B6079	Carbon Resistor (68,000Ω-1/3 Watt-10%) N.I.
45	6B6321	Carbon Resistor (47,000Ω-1/3 Watt-20%) Ins.
46	6B6037	Carbon Resistor (33,000Ω-1/3 Watt-20%) N.I.
47	6B6037	Carbon Resistor (33,000Ω-1/3 Watt-20%) N.I.
48	6B6037	Carbon Resistor (33,000Ω-1/3 Watt-20%) N.I.
49	6B6212	Carbon Resistor (22,000Ω-1/3 Watt-20%) Ins.
50	6B6106	Carbon Resistor (10,000Ω-1 Watt-20%) N.I.
51	6B6255	Carbon Resistor (10,000Ω-1/3 Watt-20%) Ins.
52	17A31304	W.W. Resistor (1500Ω-10 Watt-10%)
53	6B6053	Carbon Resistor (1000Ω-1/3 Watt-20%) N.I.
54	6B6053	Carbon Resistor (1000Ω-1/3 Watt-20%) N.I.
55	6B6152	Carbon Resistor (220Ω-1 Watt-20%) N.I.
56	40A31303	Phono-Radio Switch (2 Position)
57	65X11854	Bulb (6.3V.-.15 Amp. Tub. Bay.) Clear #47
58	30A151	Line Cord & Plug (6 Ft.)
59	1X31329	Output Lead Assembly (6 Ft.)
60	20A31302	Trimmer & "Z" Bracket (15 MMF Nom.)
61	20A31302	Trimmer & "Z" Bracket (15 MMF Nom.)

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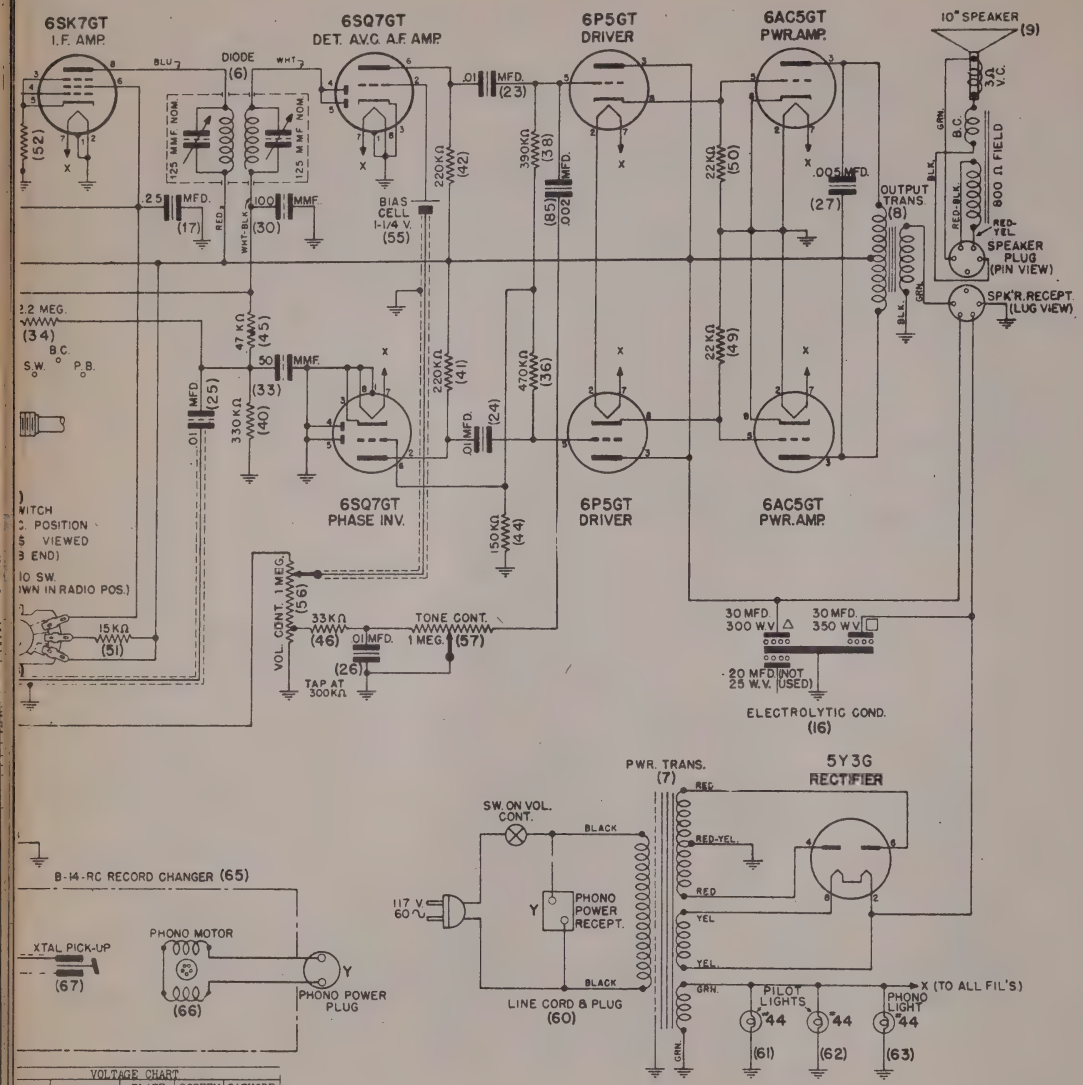


VOLTAGE CHART				
UBE	FUNCTION	PLATE TO GND.	SCREEN TO GND.	CATHODE TO GND.
J7GT	R.F.AMP.	235 V.	85 V.	1 V.
A7GT	OSC.MOD.	235 V.	100 V.	0
K7GT	I.F.AMP.	235 V.	100 V.	4.75 V.
Q7GT	DET.A.V.C. A.F.AMP.	140 V.	——	0
Q7GT	PHASE INV.	85 V.	——	0
5GT	DRIVER	235 V.	——	12 V.
5GT	DRIVER	235 V.	——	12 V.
C5GT	PWR. AMP.	225 V.	——	0
C5GT	PWR. AMP.	225 V.	——	0
3Q	RECT.	A.C.	——	FROM FIL. 350 V.

FREQUENCY RANGES

B.C.– 538 K.C. TO 1720 K.C.
S.W.– 5.6 M.C. TO 12.2 M.C.

I.F. = 455 K.C.

MODELS

101 F 21
101 F 22

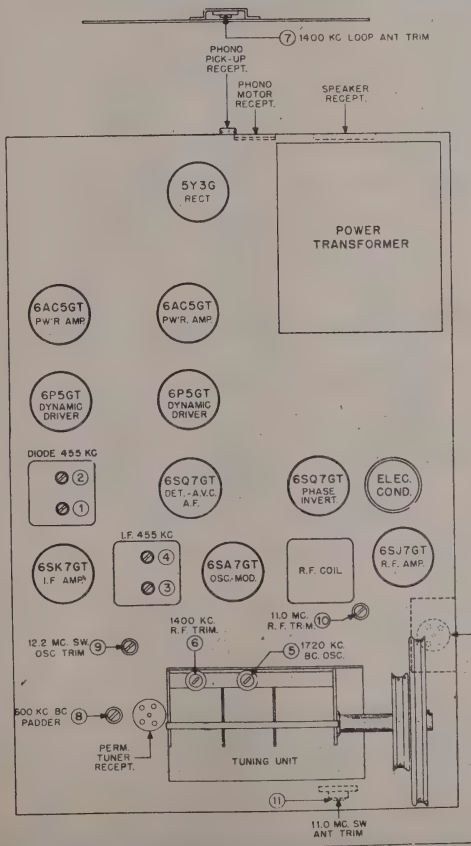
GALVIN MFG. CO.

MODEL 101 F 21 SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading
2500	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	.38
45	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
50	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
2	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	.38
2.	600 K.C.	Ant.Terminal	200 Mmf.	None	.38

MODELS 101 F 21 AND 101 F 22 ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	1720 K.C.	.1 Mfd.	B.C.	Osc.Mod.Grid	1-2-3-4	455 K.C.
2	1720 K.C.	200 Mmf.	B.C.	R.F.Grid	5	1720 K.C.
3	1400 K.C.	200 Mmf.	B.C.	Ext.Ant. Connection	6	1400 K.C.
4	1400 K.C.	200 Mmf.	B.C.	Ext.Ant. Connection	7	1400 K.C.
5	600 K.C.	200 Mmf.	B.C.	Ext.Ant. Connection	8	600 K.C.
5	12.2 M.C.	400 Ohms.	S.W.	Ext.Ant. Connection	9	12.2 M.C.
7	11.0 M.C.	400 Ohms.	S.W.	Ext.Ant. Connection	10	11.0 M.C.
8	11.0 M.C.	400 Ohms.	S.W.	Ext.Ant. Connection	11	11.0 M.C.



Models 101F21 & 22

1	1X28239	Back & Loop Assembly (Model 101F21)
	1X30955	Back & Loop Assembly (Model 101F22)
2	24A27298	Short Wave Antenna Coil
3	1X27274	B.C. & S.W. R.F. Coil & Shield Assembly
4	24A27297	B.C. & S.W. Oscillator Coil
5	1X28203	I.F. Coil & Shield Assembly
6	1X28232	Diode Coil & Shield Assembly
7	25B28217	Power Transformer
8	25B27661	Output Transformer
9	50B28568	Speaker (10" Electro)
10	20A18740	Trimmer & "U" Bracket (7 MMF Nom.)
11	20A27326	Trimmer & "Z" Bracket (118 MMF Nom.)
12	20A27273	Trimmer & "Z" Bracket (82 MMF Nom.)
13	20A27273	Trimmer & "Z" Bracket (82 MMF Nom.)
14	20A17935	B.C. Padder (Single) Range 300-800 MMF
15	1X28219	Gang Cond. & Pulley Assembly (3 Gang)
16	23A27718	Elect. Cond. (30 MFD/350W.V.-30 MFD/300W.V.-20 MFD/25W.V.)
29	21A28020	Mica Condenser (535 MMF-3%-500W.V.)
30	21B6511	Molded Mica Cond. (100 MMF-20%-400W.V.) Brn.O
31	21B6503	Molded Mica Cond. (50 MMF-20%-400W.V.) Brn.O
32	21B6503	Molded Mica Cond. (50 MMF-20%-400W.V.) Brn.O
33	21B6503	Molded Mica Cond. (50 MMF-20%-400W.V.) Brn.O
34	6B6202	Carbon Resistor (2.2 Meg-1/3 Watt-20%) Ins.
55	48X10089	Bias Cell
56	18A22065	Volume Control & Switch (1 Meg)
57	18A21481	Tone Control (1 Meg)
58	40A23221	Phono-Radio Switch (D.P.D.T.)
59	40B27295	Band Switch (3 Position)
60	30K21859	Line Cord & Plug (9 Ft.)
61	65X10867	Bulb (6.3V.-.25 Amp. Tub. Bay.) Clear #44
62	65X10867	Bulb (6.3V.-.25 Amp. Tub. Bay.) Clear #44
63	65X10867	Bulb (6.3V.-.25 Amp. Tub. Bay.) Clear #44
64	26A14760	Bantam Tube Shield
65	1X27890	Model B-14-RC Record Changer (Complete)
66	59B27687	Phono Motor & Mtg. Plate Only (117V.-60C)
67	59K27571	Phono Pickup Arm (Complete)
68	1X28240	Model PT-5 Permeability Tuner
69	40B27243	Latch Switch (Complete) 5 P.B.
70	24B27311	Perm. Osc. Coil (Brown) #1
71	24K27312	Perm. Osc. Coil (Red) #2
72	24K27313	Perm. Osc. Coil (Orange) #3
73	24K27314	Perm. Osc. Coil (Yellow) #4
74	24K27315	Perm. Osc. Coil (Green) #5
75	67A27283	Iron Core & Adjusting Screw
76	67A27283	Iron Core & Adjusting Screw
77	67A27283	Iron Core & Adjusting Screw
78	67A27283	Iron Core & Adjusting Screw
79	67A27283	Iron Core & Adjusting Screw
80	20A27381	P.B. Antenna Trimmer (143 MMF To 521 MMF) #1
81	20K27382	P.B. Antenna Trimmer (100 MMF To 412 MMF) #2
82	20K27383	P.B. Antenna Trimmer (65 MMF To 344 MMF) #3
83	20K27384	P.B. Antenna Trimmer (41 MMF To 246 MMF) #4
84	20K27385	P.B. Antenna Trimmer (6 MMF To 155 MMF) #5
85	889624	Tubular Condenser (.002 MFD-400W.V.)

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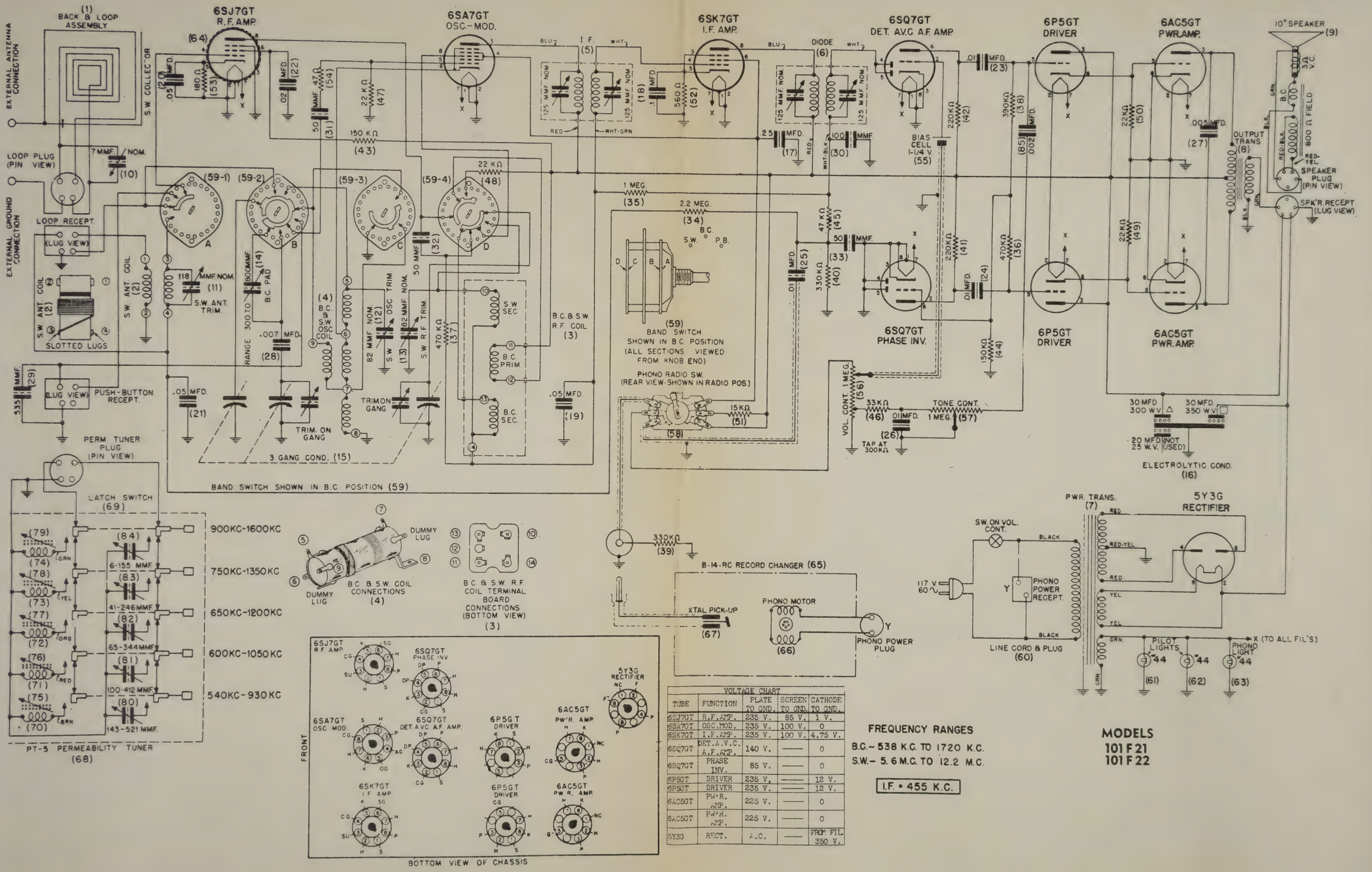
MODELS 101F21, 101F22

GALVIN MFG. CO.



VOLTAGE CHART				
TUBE	FUNCTION	PLATE TO GND.	SCREEN TO GND.	CATHODE TO GND.
6SJ7GT	R.F.AMP.	235 V.	85 V.	1 V.
6SA7GT	OSC.MOD.	235 V.	100 V.	0
6SK7GT	I.F.AMP.	235 V.	100 V.	4.75 V.
6SQ7GT	DET.A.V.C. A.F.AMP.	140 V.	——	0
6SQ7GT	PHASE INV.	85 V.	——	0
6P5GT	DRIVER	235 V.	——	12 V.
6P5GT	DRIVER	235 V.	——	12 V.
6AC5GT	PW'R. AMP.	225 V.	——	0
6AC5GT	PW'R. AMP.	225 V.	——	0
5Y3G	RECT.	A.C.	——	FROM FIL. 350 V.

FREQUENCY RANGES

B.C.- 538 K.C. TO 1720 K.C.
S.W.- 5.6 M.C. TO 12.2 M.C.

I.F. = 455 K.C.

MODELS
101 F 21
101 F 22

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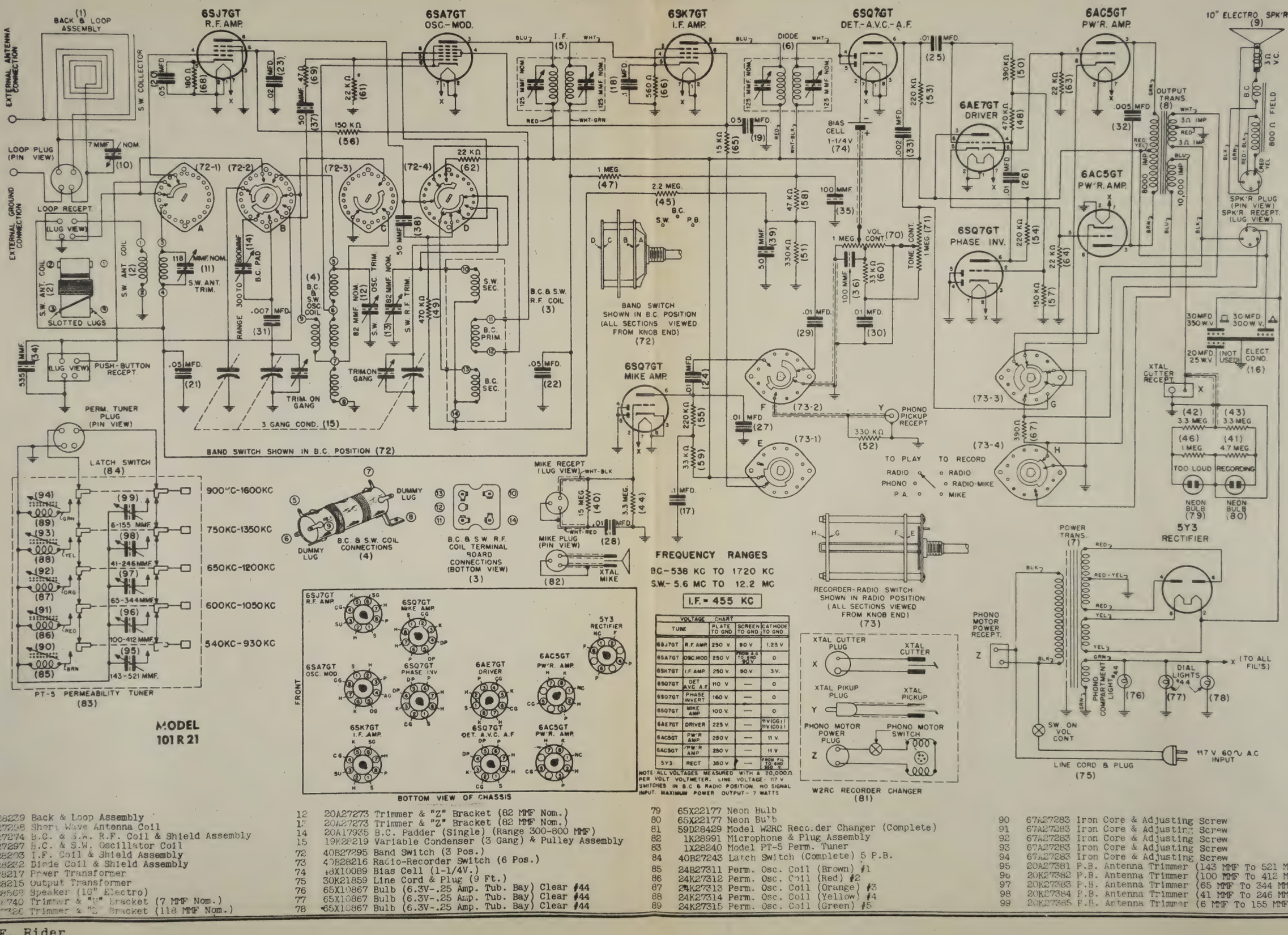
MODEL 101R21

GALVIN MFG. CO.



VOLTAGE CHART				
TUBE		PLATE TO GND	SCREEN TO GND	CATHODE TO GND.
6SJ7GT	R.F. AMP.	250 V.	80 V.	1.25 V.
6SA7GT	OSC.-MOD.	250 V.	FROM A.G TO GND 90 V.	0
6SK7GT	I.F. AMP.	250 V.	80 V.	3 V.
6SQ7GT	DET. A.V.C. A.F.	110 V.	—	0
6SQ7GT	PHASE INVERT	160 V.	—	0
6SQ7GT	MIKE AMP.	100 V.	—	0
6AE7GT	DRIVER	225 V.	—	110 V (CG1) 110 V (CG2)
6AC5GT	PW'R AMP.	250 V.	—	11 V.
6AC5GT	PW'R AMP.	250 V.	—	11 V.
5Y3	RECT.	350 V.	—	FROM FIL TO GND 350 V.

NOTE: ALL VOLTAGES MEASURED WITH A 20,000Ω PER VOLT VOLTMETER. LINE VOLTAGE- 117 V. SWITCHES IN B.C. & RADIO POSITION. NO SIGNAL INPUT. MAXIMUM POWER OUTPUT- 7 WATTS

1	1X28239	Back & Loop Assembly
2	24A27298	Short Wave Antenna Coil
3	1X27274	B.C. & S.W. R.F. Coil & Shield Assembly
4	24A27297	B.C. & S.W. Oscillator Coil
5	1X28203	I.F. Coil & Shield Assembly
6	1X28282	Diode Coil & Shield Assembly
7	25B28217	Power Transformer
8	25B28215	Output Transformer
9	30X28568	Speaker (10" Electro)
10	20A18740	Trimmer & "U" Bracket (7 MMF Nom.)
11	20A27286	Trimmer & "Z" Bracket (118 MMF Nom.)
12	20A27273	Trimmer & "Z" Bracket (82 MMF Nom.)
13	20A27273	Trimmer & "Z" Bracket (82 MMF Nom.)
14	20A17935	B.C. Padder (Single) (Range 300-800 MMF)
15	19K28219	Variable Condenser (3 Gang) & Pulley Assembly
72	40B27295	Band Switch (3 Pos.)
73	40B28216	Radio-Recorder Switch (6 Pos.)
74	48X10089	Bias Cell (1-1/4V.)
75	30K21859	Line Cord & Plug (9 Ft.)
76	65X10867	Bulb (6.3V-.25 Amp. Tub. Bay) Clear #44
77	65X10867	Bulb (6.3V-.25 Amp. Tub. Bay) Clear #44
78	65X10867	Bulb (6.3V-.25 Amp. Tub. Bay) Clear #44
79	65X22177	Neon Bulb
80	65X22177	Neon Bulb
81	59D28429	Model W2RC Recorder Changer (Complete)
82	1K28991	Microphone & Plug Assembly
83	1X28240	Model PT-5 Perm. Tuner
84	40B27243	Latch Switch (Complete) 5 P.B.
85	24B27311	Perm. Osc. Coil (Brown) #1
86	24K27312	Perm. Osc. Coil (Red) #2
87	24K27313	Perm. Osc. Coil (Orange) #3
88	24K27314	Perm. Osc. Coil (Yellow) #4
89	24K27315	Perm. Osc. Coil (Green) #5
90	67A27283	Iron Core & Adjusting Screw
91	67A27283	Iron Core & Adjusting Screw
92	67A27283	Iron Core & Adjusting Screw
93	67A27283	Iron Core & Adjusting Screw
94	67A27283	Iron Core & Adjusting Screw
95	20A27381	P.B. Antenna Trimmer (143 MMF To 521 MMF) #1
96	20K27382	P.B. Antenna Trimmer (100 MMF To 412 MMF) #2
97	20K27383	P.B. Antenna Trimmer (65 MMF To 344 MMF) #3
98	20K27384	P.B. Antenna Trimmer (41 MMF To 246 MMF) #4
99	20K27385	P.B. Antenna Trimmer (6 MMF To 155 MMF) #5

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MODEL 101F21
MODEL 101R21

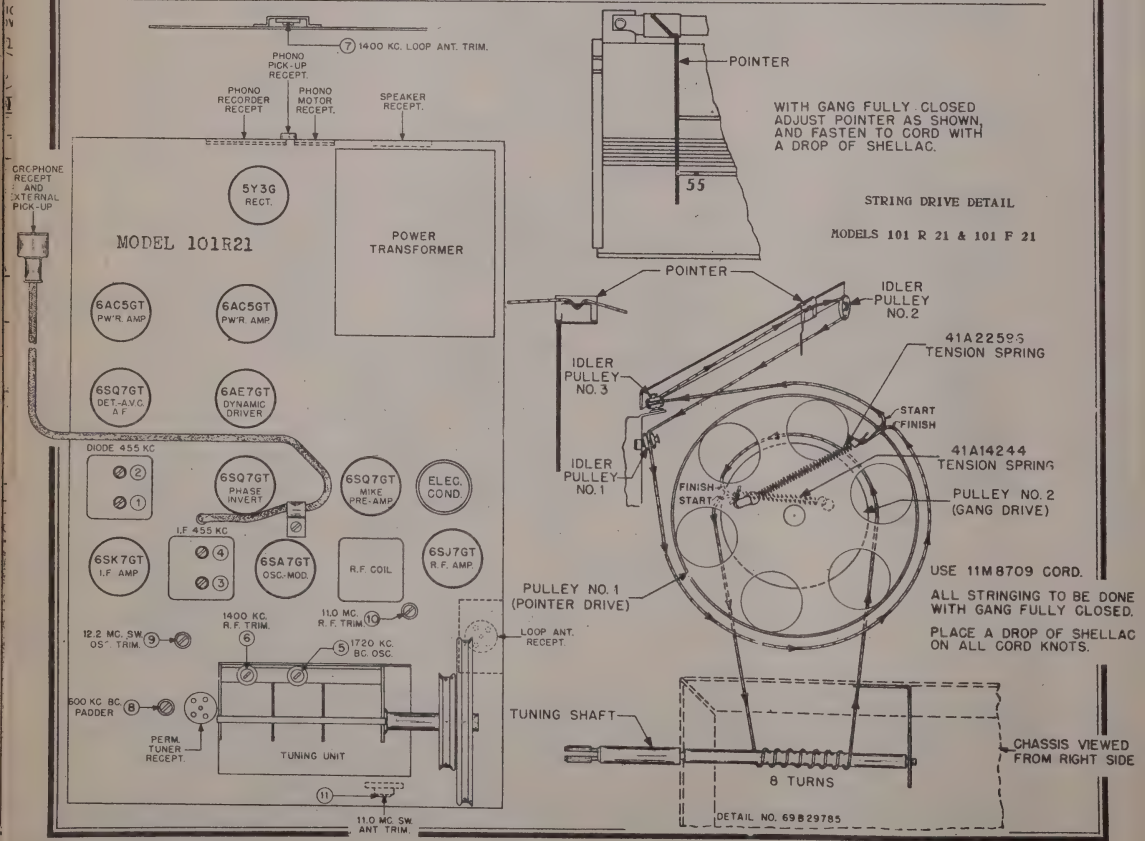
GALVIN MFG. CO.

MODEL 101R21 SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading
2500	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	.38
45	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
50	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
2	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	.38
2	600 K.C.	Ant.Terminal	200 Mmf.		

MODEL 101R21 ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	1720 K.C.	.1 Mfd.	B.C.	Osc.Mod.Grid	1-2-3-4	455 K.C.
2	1720 K.C.	200 Mmf.	B.C.	R.F.Grid	5	1720 K.C.
3	1400 K.C.	200 Mmf.	B.C.	Ext.Ant. Connection	6	1400 K.C.
4	1400 K.C.	200 Mmf.	B.C.	Ext.Ant. Connection	7	1400 K.C.
5	600 K.C.	200 Mmf.	B.C.	Ext.Ant. Connection	8	600 K.C.
5	12.2 M.C.	400 Ohms.	S.W.	Ext.Ant. Connection	9	12.2 M.C.
7	11.0 M.C.	400 Ohms.	S.W.	Ext.Ant. Connection	10	11.0 M.C.
8	11.0 M.C.	400 Ohms.	S.W.	Ext.Ant. Connection	11	11.0 M.C.



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GAROD ELECTRONICS CORP.

ALIGNMENT INSTRUCTIONS

Realignment of this receiver should not be attempted unless all other causes of faulty operation have been carefully investigated. In any event it should be performed only by a competent serviceman. Under no circumstances should alignment be attempted without a generator.

The final results obtained from the receiver will be largely determined by the i.f. alignment. It is therefore essential that the recommended procedure be followed exactly and with the greatest care.

A 0.1 mfd dummy should be connected between the generator and the #8 (control) grid of the 6SA7 converter tube. It will not be necessary to disconnect the coil and condenser leads unless the output of the generator is less than 0.1 volts. If this should be necessary a 0.1 meg resistor should be connected between the grid and ground, after the leads are removed, to provide a d.c. return.

With the power off, connect a 20,000 ohm-per-volt voltmeter across the 100,000 ohm diode load resistor or a 0-100 microammeter in series with the load at the point marked with an "X" on the schematic diagram.

With all connections made as described above, set the generator to 455 kc. Turn the receiver on and allow the tubes to warm up. If the set requires alignment only, no major changes having been necessary, proceed with the alignment as below. Otherwise, align the set roughly to 455 kc with the selector switch in the "TUNING" position. Use low generator output and work back from the diode transformer to the input.

Now increase the generator output to 0.1 volts. About 10 volts will be developed across the load and the current through it will be close to 100 microamperes. Tighten the primary trimmer (marked with red paint) on the diode transformer and adjust the secondary trimmer for maximum response. Then retune the primary trimmer for an exact peak.

Repeat this procedure on the interstage and input transformers in that order. Set the selector switch to "HIGH-FIDELITY" and carefully readjust the diode trimmers for maximum output. These adjustments will be broad and should be made with great care. This will complete the i.f. alignment. NO OTHER ADJUSTMENTS SHOULD BE MADE TO ANY I.F. TRIMMERS.

The i.f. amplifier should now be checked for symmetry by detuning the generator equal amounts each way from 455 kc and comparing the outputs. Up to 15 kc deviation the difference between comparative readings should be 5% or less. Greater differences indicate misalignment and the procedure should be repeated.

R.F. ALIGNMENT

Connect the generator to the "LONG ANTENNA" binding post through a "standard" dummy antenna, or a 0.00025 mfd mica condenser in series with a 400 ohm carbon resistor. With the variable condenser set at minimum capacity and the generator at 1750 kc, adjust the oscillator trimmer until a response is obtained. Then set the generator to 1500 kc and tune in the signal. Adjust the r.f. and antenna trimmers for maximum response in the order given, keeping the generator output as low as possible.

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GALVIN MFG. CO.

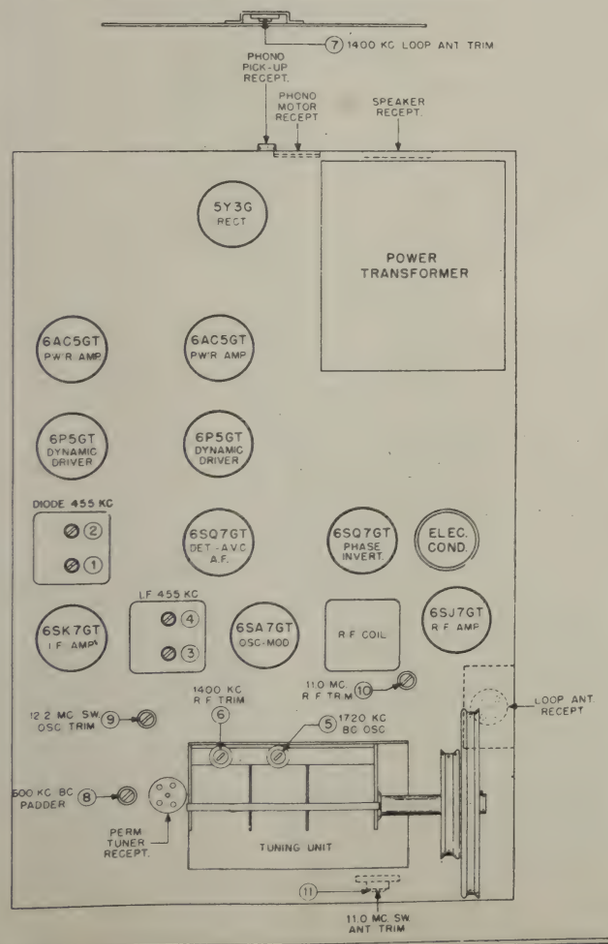
MODELS 101F21, 101F22

MODEL 101 F 21 SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading
2500	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	.38
45	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
50	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
2	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	.38
2	600 K.C.	Ant.Terminal	200 Mmf.	None	.38

MODELS 101 F 21 AND 101 F 22 ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	1720 K.C.	.1 Mfd.	B.C.	Osc.Mod.Grid	1-2-3-4	455 K.C.
2	1720 K.C.	200 Mmf.	B.C.	R.F.Grid	5	1720 K.C.
3	1400 K.C.	200 Mmf.	B.C.	Ext.Ant. Connection	6	1400 K.C.
4	1400 K.C.	200 Mmf.	B.C.	Ext.Ant. Connection	7	1400 K.C.
5	600 K.C.	200 Mmf.	B.C.	Ext.Ant. Connection	8	600 K.C.
5	12.2 M.C.	400 Ohms.	S.W.	Ext.Ant. Connection	9	12.2 M.C.
7	11.0 M.C.	400 Ohms.	S.W.	Ext.Ant. Connection	10	11.0 M.C.
8	11.0 M.C.	400 Ohms.	S.W.	Ext.Ant. Connection	11	11.0 M.C.



Models 101F21 & 22

1	1X28239	Back & Loop Assembly (Model 101F21)
	1X30955	Back & Loop Assembly (Model 101F22)
2	24A27298	Short Wave Antenna Coil
3	1X27274	B.C. & S.W. R.F. Coil & Shield Assembly
4	24A27297	B.C. & S.W. Oscillator Coil
5	1X28203	I.F. Coil & Shield Assembly
6	1X28232	Diode Coil & Shield Assembly
7	25B28217	Power Transformer
8	25B27661	Output Transformer
9	50B28568	Speaker (10" Electro)
10	20A18740	Trimmer & "U" Bracket (7 MMF Nom.)
11	20A27326	Trimmer & "Z" Bracket (118 MMF Nom.)
12	20A27273	Trimmer & "Z" Bracket (82 MMF Nom.)
13	20A27273	Trimmer & "Z" Bracket (82 MMF Nom.)
14	20A17935	B.C. Padder (Single) Range 300-800 MMF
15	1X28219	Gang Cond. & Pulley Assembly (3 Gang)
16	23A27718	Elect. Cond. (30 MFD/350W.V.-30 MFD/300W.V.-20 MFD/25W.V.)
29	21A28020	Mica Condenser (535 MMF-3%-500W.V.)
30	21B6511	Molded Mica Cond. (100 MMF-20%-400W.V.) Brn.O
31	21B6503	Molded Mica Cond. (50 MMF-20%-400W.V.) Brn.O
32	21B6503	Molded Mica Cond. (50 MMF-20%-400W.V.) Brn.O
33	21B6503	Molded Mica Cond. (50 MMF-20%-400W.V.) Brn.O
34	6B6202	Carbon Resistor (2.2 Meg-1/3 Watt-20%) Ins.
55	48X10089	Bias Cell
56	18A22065	Volume Control & Switch (1 Meg)
57	18A21481	Tone Control (1 Meg)
58	40A23221	Phono-Radio Switch (D.P.D.T.)
59	40B27295	Band Switch (3 Position)
60	30K21859	Line Cord & Plug (9 Ft.)
61	65X10867	Bulb (6.3V.-.25 Amp. Tub. Bay.) Clear #44
62	65X10867	Bulb (6.3V.-.25 Amp. Tub. Bay.) Clear #44
63	65X10867	Bulb (6.3V.-.25 Amp. Tub. Bay.) Clear #44
64	26A14760	Bantam Tube Shield
65	1X27890	Model B-14-RC Record Changer (Complete)
66	59B27687	Phono Motor & Mtg. Plate Only (117V.-60C)
67	59K27571	Phono Pickup Arm (Complete)
68	1X28240	Model PT-5 Permeability Tuner
69	40B27243	Latch Switch (Complete) 5 P.B.
70	24B27311	Perm. Osc. Coil (Brown) #1
71	24K27312	Perm. Osc. Coil (Red) #2
72	24K27313	Perm. Osc. Coil (Orange) #3
73	24K27314	Perm. Osc. Coil (Yellow) #4
74	24K27315	Perm. Osc. Coil (Green) #5
75	67A27283	Iron Core & Adjusting Screw
76	67A27283	Iron Core & Adjusting Screw
77	67A27283	Iron Core & Adjusting Screw
78	67A27283	Iron Core & Adjusting Screw
79	67A27283	Iron Core & Adjusting Screw
80	20A27381	P.B. Antenna Trimmer (143 MMF To 521 MMF) #1
81	20K27382	P.B. Antenna Trimmer (100 MMF To 412 MMF) #2
82	20K27383	P.B. Antenna Trimmer (65 MMF To 344 MMF) #3
83	20K27384	P.B. Antenna Trimmer (41 MMF To 246 MMF) #4
84	20K27385	P.B. Antenna Trimmer (6 MMF To 155 MMF) #5
85	839824	Tubular Condenser (.002 MFD-400W.V.)

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MODEL 101F21
MODEL 101R21

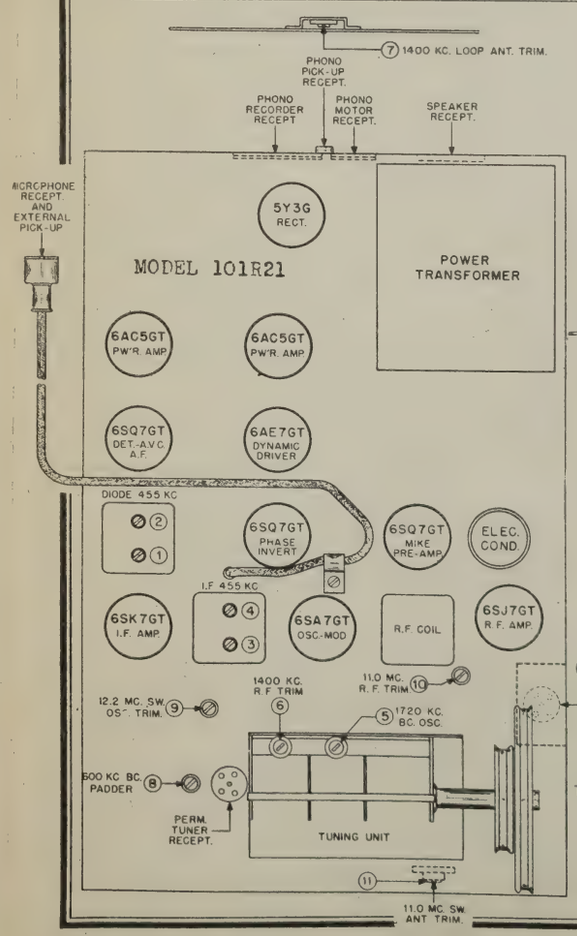
GALVIN MFG. CO.

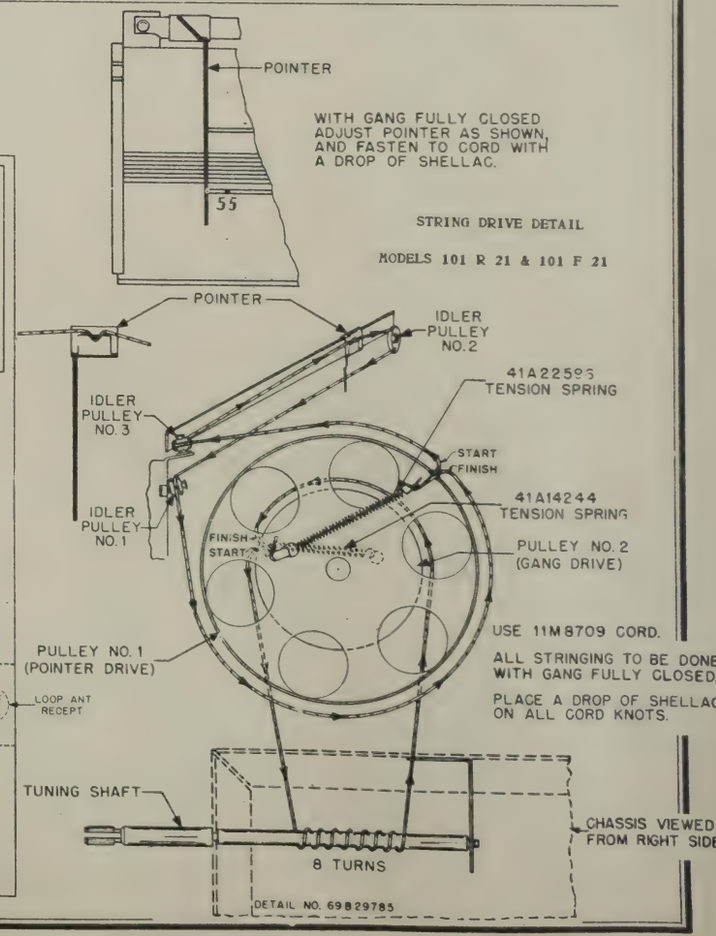
MODEL 101R21 SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading
2500	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	.38
45	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
50	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
2	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	.38
2	600 K.C.	Ant.Terminal	200 Mmf.		

MODEL 101R21 ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Band Switch Set At	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	1720 K.C.	.1 Mfd.	B.C.	Osc.Mod.Grid	1-2-3-4	455 K.C.
2	1720 K.C.	200 Mmf.	B.C.	R.F.Grid	5	1720 K.C.
3	1400 K.C.	200 Mmf.	B.C.	Ext.Ant. Connection	6	1400 K.C.
4	1400 K.C.	200 Mmf.	B.C.	Ext.Ant. Connection	7	1400 K.C.
5	600 K.C.	200 Mmf.	B.C.	Ext.Ant. Connection	8	600 K.C.
5	12.2 M.C.	400 Ohms.	S.W.	Ext.Ant. Connection	9	12.2 M.C.
7	11.0 M.C.	400 Ohms.	S.W.	Ext.Ant. Connection	10	11.0 M.C.
8	11.0 M.C.	400 Ohms.	S.W.	Ext.Ant. Connection	11	11.0 M.C.




POINTER
WITH GANG FULLY CLOSED ADJUST POINTER AS SHOWN, AND FASTEN TO CORD WITH A DROP OF SHELLAC.
55
STRING DRIVE DETAIL
MODELS 101 R 21 & 101 F 21
POINTER
IDLER PULLEY NO. 2
41A22595 TENSION SPRING
IDLER PULLEY NO. 3
START FINISH
41A14244 TENSION SPRING
IDLER PULLEY NO. 1
FINISH START
PULLEY NO. 2 (GANG DRIVE)
PULLEY NO. 1 (POINTER DRIVE)
USE 11M8709 CORD.
ALL STRINGING TO BE DONE WITH GANG FULLY CLOSED.
PLACE A DROP OF SHELLAC ON ALL CORD KNOTS.
TUNING SHAFT
CHASSIS VIEWED FROM RIGHT SIDE
8 TURNS
DETAIL NO. 69829785

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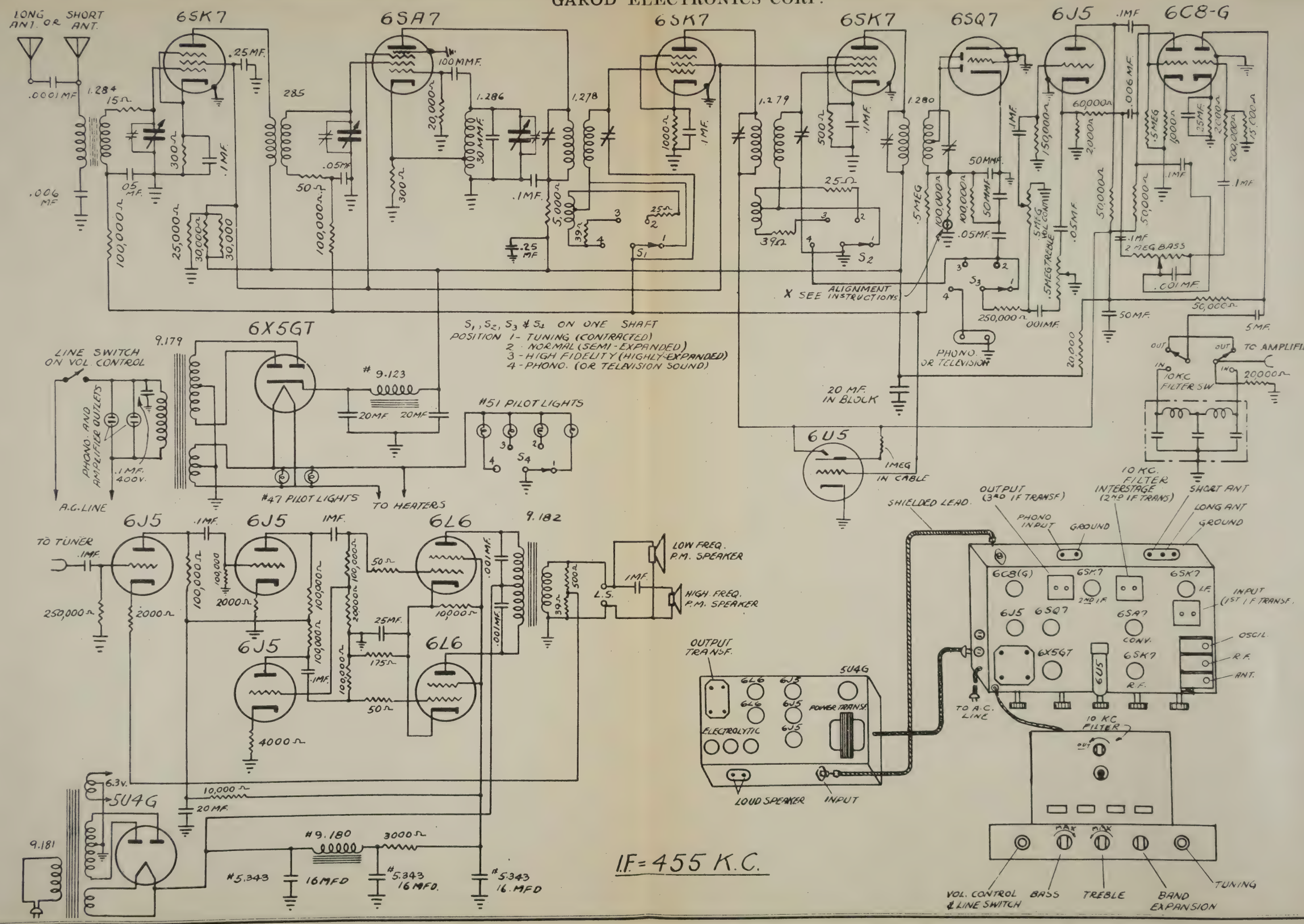
GAROD ELECTRONICS CORP.

HIGH FIDELITY



I.F. = 455 K.C.

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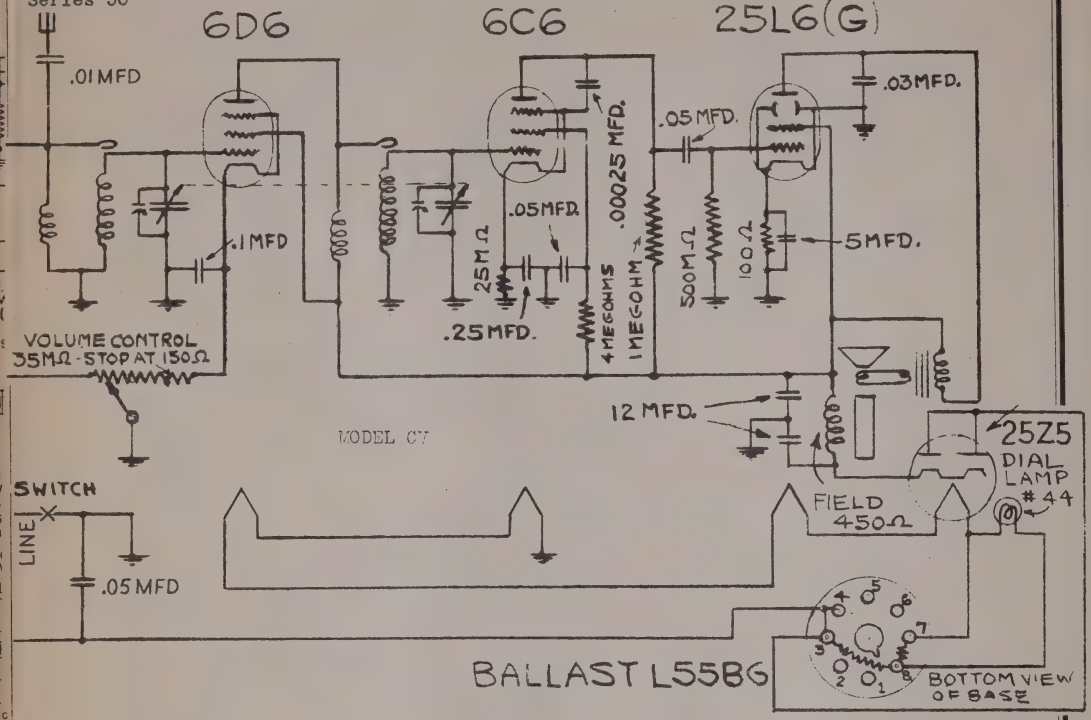
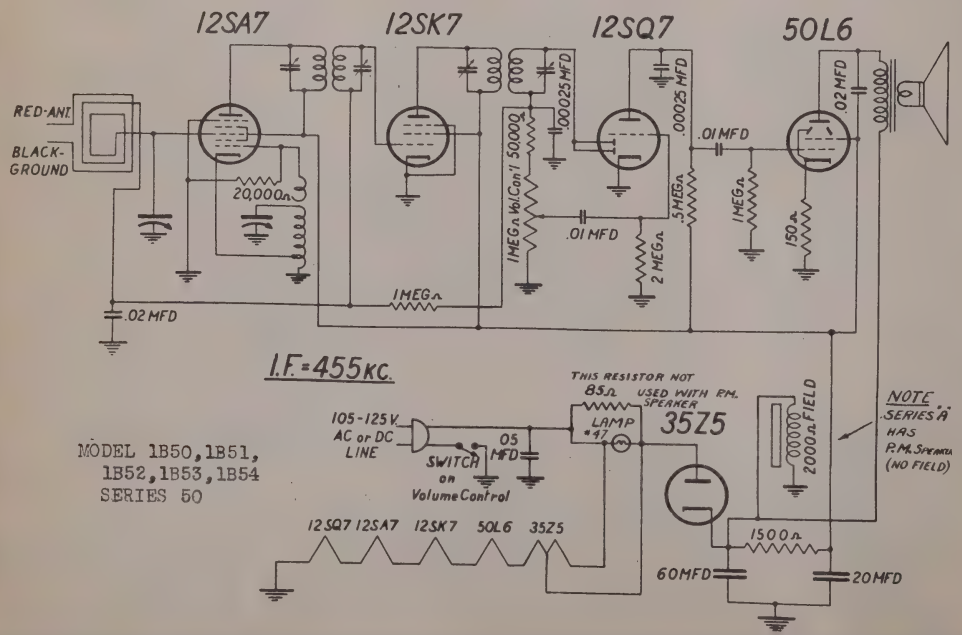
MODEL CV
MODELS 1B50, 1B51,
1B52, 1B53, 1B54
Series 50

GAROD ELECTRONICS CORP.





MODEL 1B50, 1B51,
1B52, 1B53, 1B54
SERIES 50

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GAROD ELECTRONICS CORP.

FREQUENCY MODULATION, AMPLITUDE MODULATION, RADIO-PHONOGRAPH COMBINATION

ALIGNMENT PROCEDURE

Re-alignment of this receiver should not be attempted unless all other possible causes of faulty operation have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave bands, and an output meter and microammeter for indicating the effect of adjustments are required.

During the alignment procedure all adjustments should be made under the following conditions:

1) Line Voltage as indicated on instruction sheet.
2) Volume, Treble and Bass controls at maximum volume positions.
3) Minimum Input from signal generator. (as required to give a sufficient reading on the indicating instrument)

If this procedure is not adhered to, all adjustments will appear very broad and incorrect alignment may result.

AMPLITUDE MODULATION (Broadcast and Short Wave)

I.F. ALIGNMENT - Set the Signal Generator to 455KC and connect to the grid of the 7Q7 A.M. converter tube. Adjust trimmers #1, 2, 3 and 4 (see diagram) of the A.M. I.F. transformers for maximum output as indicated by an output meter connected across the speaker voice coil.

1630KC - Now connect the output of the Signal Generator to the L.A.-Broadcast Antenna terminal, rotate the tuning dial so that the condenser plates are entirely out of mesh. BAND SWITCH is in the BROADCAST position. Set the Signal Generator to 1630KC and adjust the oscillator trimmer (#5, see diagram) for maximum response.

1500KC - Reset the generator to 1500KC and tune in this signal on the receiver. Adjust the B.C. antenna trimmer (#7) and the B.C. interstage trimmer (#6) for maximum output.

600KC - With the generator at 600KC, tune in the signal, then while rocking the dial, align the 600KC padder (#8, on front of chassis).

SHORT WAVE - Set the BAND SWITCH to SHORT WAVE. Signal Generator is still connected as for broadcast. The condenser is opened to minimum capacity and the Short Wave oscillator trimmer (#9) is adjusted so that at this position the receiver tunes to 18.3 Megacycles.

17 M.C. ADJUSTMENT - Now set the generator to 17 M.C., tune in the signal and adjust the Antenna trimmer (#10) for maximum response.

FREQUENCY MODULATION - For the F.M. Band a Signal Generator which will cover the band (40 to 50 megacycles) and a 500 microamp D.C. meter are required.

To align the F.M.-I.F. with Modulation OFF, set the Signal Generator to 4.3 M.C., connect to the grid of the first F.M.-I.F. tube. (7A7-1). The microammeter is connected with the Negative side to chassis and the Positive thru a 250,000 ohm resistor to the low side of the 500,000 ohm resistor in the grid return circuit of the 1st limiter tube (7C7-1), (See point "X" on the circuit diagram).

Adjust the primaries and secondaries of the 3rd and 2nd F.M.-I.F. transformers for the highest reading on the microammeter.

Now reconnect the output of the generator to the grid of the F.M. converter (7Q7-1), and realign the 1st, 2nd, and 3rd I.F.'s.

NOTE--Stop the Signal Generator. There should be no reading on the microammeter. If there is, the I.F. amplifier is oscillating. This should be eliminated by checking all by-passes, grounds, and grounding of I.F. shield cans.

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HIGH FIDELITY

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ALIGNMENT INSTRUCTIONS

Realignment of this receiver should not be attempted unless all other causes of faulty operation have been carefully investigated. In any event it should be performed only by a competent serviceman. Under no circumstances should alignment be attempted without a generator.

The final results obtained from the receiver will be largely determined by the i.f. alignment. It is therefore essential that the recommended procedure be followed exactly and with the greatest care.

A 0.1 mfd dummy should be connected between the generator and the #8 (control) grid of the 6SA7 converter tube. It will not be necessary to disconnect the coil and condenser leads unless the output of the generator is less than 0.1 volts. If this should be necessary a 0.1 meg resistor should be connected between the grid and ground, after the leads are removed, to provide a d.c. return.

With the power off, connect a 20,000 ohm-per-volt voltmeter across the 100,000 ohm diode load resistor or a 0-100 microammeter in series with the load at the point marked with an "X" on the schematic diagram.

With all connections made as described above, set the generator to 455 kc. Turn the receiver on and allow the tubes to warm up. If the set requires alignment only, no major changes having been necessary, proceed with the alignment as below. Otherwise, align the set roughly to 455 kc with the selector switch in the "TUNING" position. Use low generator output and work back from the diode transformer to the input.

Now increase the generator output to 0.1 volts. About 10 volts will be developed across the load and the current through it will be close to 100 microamperes. Tighten the primary trimmer (marked with red paint) on the diode transformer and adjust the secondary trimmer for maximum response. Then retune the primary trimmer for an exact peak.

Repeat this procedure on the interstage and input transformers in that order. Set the selector switch to "HIGH-FIDELITY" and carefully readjust the diode trimmers for maximum output. These adjustments will be broad and should be made with great care. This will complete the i.f. alignment. NO OTHER ADJUSTMENTS SHOULD BE MADE TO ANY I.F. TRIMMERS.

The i.f. amplifier should now be checked for symmetry by detuning the generator equal amounts each way from 455 kc and comparing the outputs. Up to 15 kc deviation the difference between comparative readings should be 5% or less. Greater differences indicate misalignment and the procedure should be repeated.

R.F. ALIGNMENT
Connect the generator to the "LONG ANTENNA" binding post through a "standard" dummy antenna, or a 0.00025 mfd mica condenser in series with a 400 ohm carbon resistor. With the variable condenser set at minimum capacity and the generator at 1750 kc, adjust the oscillator trimmer until a response is obtained. Then set the generator to 1500 kc and tune in the signal. Adjust the r.f. and antenna trimmers for maximum response in the order given, keeping the generator output as low as possible.

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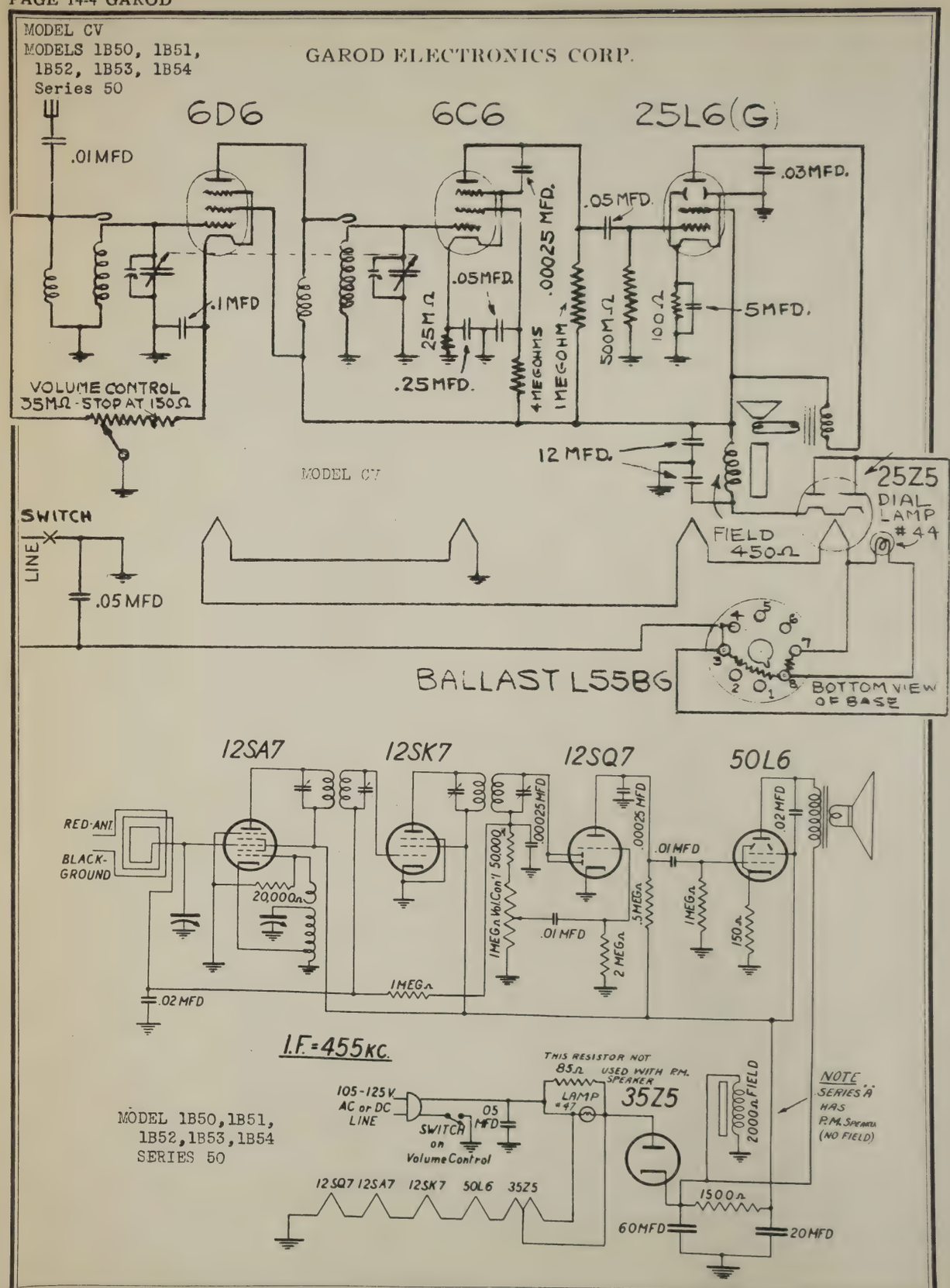

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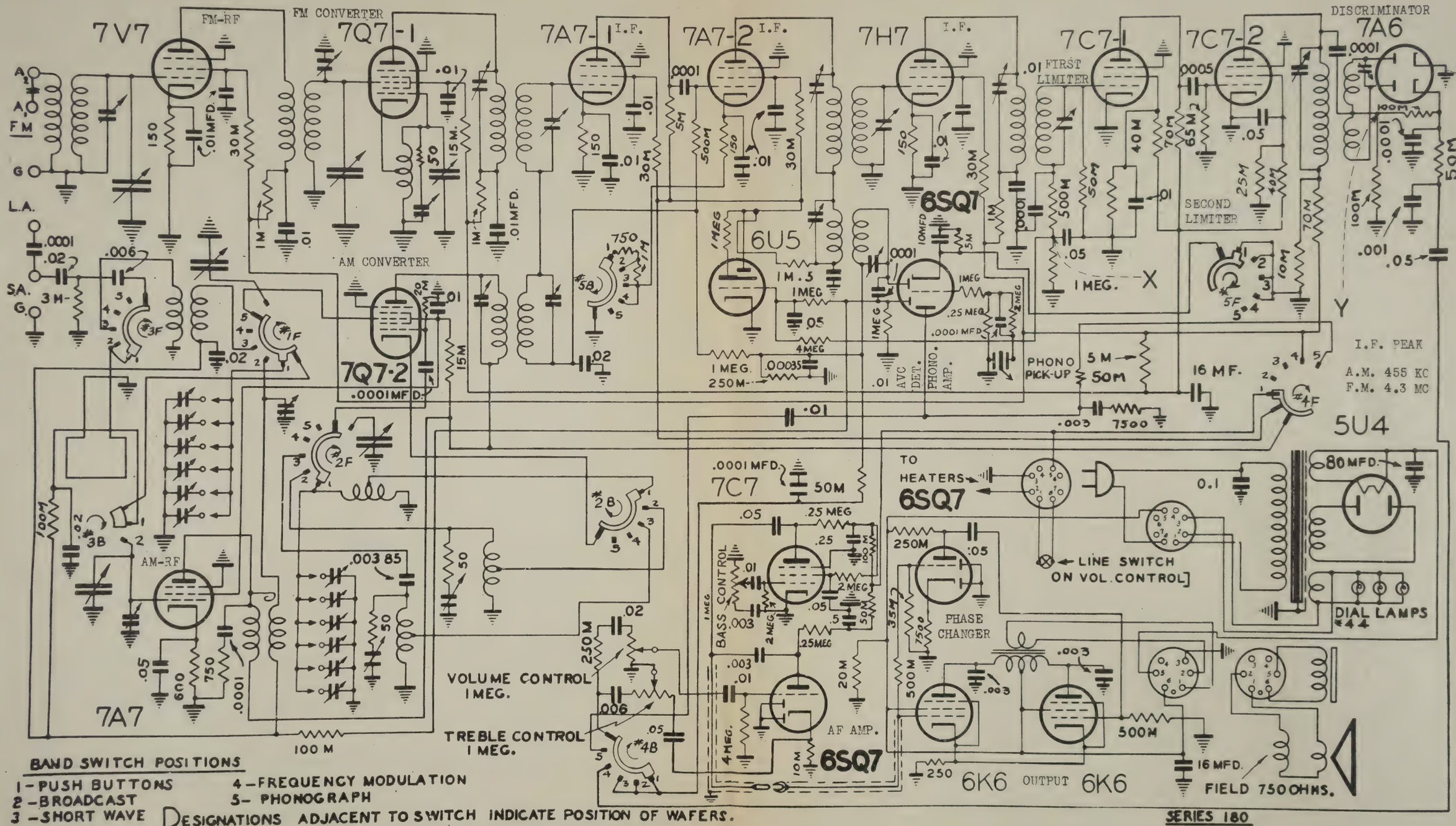

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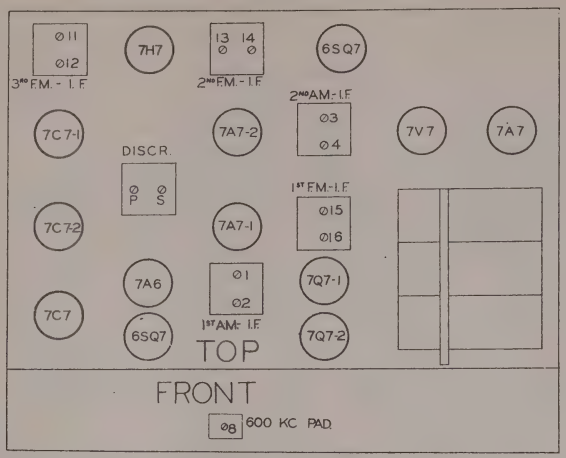
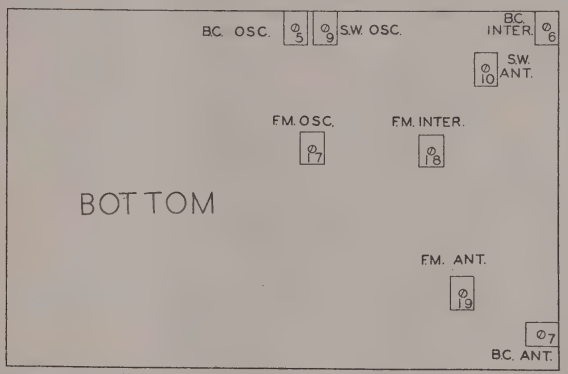
MODEL 3P1812
Series 180

GAROD ELECTRONICS CORP.





DISCRIMINATOR ALIGNMENT - This is the most critical adjustment on the F.M. band. If improperly done, distortion will result, and general operation will be unsatisfactory. Leave the generator connected to the F.M. converter grid. The microammeter is connected (thru the 250,000 ohm resistor) to the junction of the two 100,000 ohm load resistors of the discriminator diode (6H6). This point is connected to the #4 lug on this socket, which is not connected internally to the tube and is used as a dummy lug only. This is point "Y" on the circuit diagram. Rotate the primary trimmer marked "P" on the discriminator shield can, for maximum reading. Now reconnect the meter across the entire load (both resistors) at the cathode. This is lug #7 on the 6H6 socket. Without disturbing the generator, rotate the secondary trimmer "S" till the most negative reading is obtained, then slowly continue rotation till ZERO current reading is reached.

F.M.-R.F. ALIGNMENT - Connect the Signal Generator to the F.M. Ant terminal (A-2). Set the Generator to approximately 44 M.C. Adjust the antenna trimmer (#19; see trimmer layout diagrams) for maximum output as indicated by a microammeter connected in the limiter, as for the I.F. alignments; or the tuning eye may be used as an indicator. Then align the F.M. interstage trimmer for maximum. Should the F.M. calibration be off, due to drift or aging of components, the correction can be made by resetting the oscillator trimmer (#17).

NOTE - In the absence of a high frequency Signal Generator for F.M. alignment, where powerful local stations operating near this frequency are available, this adjustment can be made by connecting a large antenna to the receiver, and going thru the procedure outlined above.

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Table I IF ALIGNMENT WITH OSCILLOSCOPE—"FM" CHANNEL

Step	Input Signal Connected to	Input Frequency	Band and Pointer Setting	Trimmer Adjustment	Comments
1	6SG7 converter grid in series with 22 mmf.	4.3 MC & ±200 KC Sweep	"FM" Band 42 MC	C52 C53	Connect high side of oscilloscope in series with 470,000 ohm resistor to R19 at point "B." Connect low side to chassis ground. Peak trimmers for resultant curve shown in Fig. 3.
2	6SG7 converter grid in series with 22 mmf.	4.3 KC & ±200 KC Sweep	"FM" Band 42 MC	C35 C36	
3	Repeat Step 1				
4	Repeat Step 2				
5	6SG7 converter grid in series with 22 mmf.	4.3 MC & ±200 KC Sweep	"FM" Band 42 MC	C60 C58	Connect high side of oscilloscope in series with 470,000 ohm resistor to R36, point "A." Connect low side to chassis ground. Peak trimmers for resultant curve shown in Fig. 4. C60 is aligned when curve crosses midway in vertical plane. Proper alignment of C58 gives straightest sides to curve near crossover point.

Table II IF ALIGNMENT WITH METER—"FM" CHANNEL

Step	Input Signal Connected to	Input Frequency	Band and Pointer Setting	Trimmer Adjustment	Comments
1	6SG7 converter grid in series with 22 mmf.	Unmodulated 4.3 MC signal	"FM" Band 42 MC	C52 C53 C35 C36	Connect the 10-volt scale of a 20,000 ohm per volt voltmeter in series with a 470,000 ohm resistor between point "B" and ground. Peak all trimmers for maximum output using just enough input signal to give a satisfactory output reading.
2	Repeat Step 1				
3	6SG7 converter grid in series with 22 mmf.	Unmodulated 4.3 MC signal	"FM" Band 42 MC	C60 C58	Connect the 10-volt scale of a 20,000 ohm per volt voltmeter in series with a 470,000-ohm resistor between points "A" and ground. *With C60 purposely detuned*, peak C58 for maximum meter reading. Align C60 for the 0 voltage point where the meter reading changes from a positive to negative value. Use as low a signal input as necessary to give a satisfactory meter reading.

Table III RF ALIGNMENT—"FM" CHANNEL

Step	Input Signal Connected to	Input Frequency	Band and Pointer Setting	Trimmer Adjustment	Comments
1	Direct to "FM" Antenna Post	Unmodulated 49 MC signal	"FM" Band 49 MC	C4 (Osc.)	Connect the 10-volt range of a 20,000 ohm per volt voltmeter in series with a 470,000-ohm resistor to point "B." The other side of the voltmeter lead connects to chassis ground. Peak trimmers for maximum meter reading using just enough signal input to give satisfactory meter reading.
2	Direct to "FM" Antenna Post	Unmodulated 49 MC Signal	"FM" Band 49 MC	C2 C30	
3	Direct to "FM" Antenna Post	Unmodulated 43 MC Signal	"FM" Band 43 MC	C76 (Osc.)	
4	Direct to "FM" Antenna Post	Unmodulated 43 MC Signal	"FM" Band 43 MC	C75 C77	
5	Capacitively Coupled to "FM" Antenna	Unmodulated 46 MC Signal	"FM" Band 46 MC	C1	Using built-in dipole adjust C1 for maximum output with Signal Generator capacitively coupled to it, (place lead about 2 ft. from dipole) or on an outside station.
6	Repeat Step 1				
7	Repeat Step 2				

Table IV IF, "BC," and "SW" ALIGNMENT—"AM" CHANNEL

Step	Input Signal Connected to	Input Frequency	Band and Pointer Setting	Trimmer Adjustment	Comments
1	6SG7 converter grid in series with .05 mfd.	455 KC Modulated	"BC" Band 550 KC	C50 C39 C34 C33	Connect 5.0-volt AC voltmeter across the voice coil of the speaker. Peak all trimmers for maximum output. All RF alignments must be made with the chassis in the cabinet. *When aligning the SW oscillator trimmer, use maximum capacity peak. The image frequency should appear at 18,710 KC. **Rock gang condenser when making alignment.
2	Capacity Coupled	17.8 MC Modulated	"SW" Band 17.8 MC	C23*	
3	Capacity Coupled	17.8 MC Modulated	"SW" Band 17.8 MC	C19** C11	
4	Capacity Coupled	1500 KC Modulated	"BC" Band 1500 KC	C24	
5	Capacity Coupled	1500 KC Modulated	"BC" Band 1500 KC	C17 C8	
6	Capacity Coupled	580 KC Modulated	"BC" Band 580 KC	C25**	
7	Repeat Steps 4 and 5				

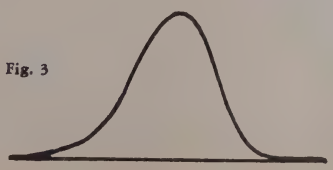

Fig. 3

Fig. 4

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FREQUENCY MODULATION, AMPLITUDE MODULATION, RADIO-PHONOGRAPH COMBINATION

ALIGNMENT PROCEDURE

Re-alignment of this receiver should not be attempted unless all other possible causes of faulty operation have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave bands, and an output meter and microammeter for indicating the effect of adjustments are required.

During the alignment procedure all adjustments should be made under the following conditions:

1) Line Voltage as indicated on instruction sheet.
2) Volume, Treble and Bass controls at maximum volume positions.
3) Minimum Input from signal generator. (as required to give a sufficient reading on the indicating instrument)

If this procedure is not adhered to, all adjustments will appear very broad and incorrect alignment may result.

AMPLITUDE MODULATION (Broadcast and Short Wave)

I.F. ALIGNMENT - Set the Signal Generator to 455KC and connect to the grid of the 7Q7 A.M. converter tube. Adjust trimmers #1, 2, 3 and 4 (see diagram) of the A.M. I.F. transformers for maximum output as indicated by an output meter connected across the speaker voice coil.

1630KC - Now connect the output of the Signal Generator to the L.A.-Broadcast Antenna terminal, rotate the tuning dial so that the condenser plates are entirely out of mesh. BAND SWITCH is in the BROADCAST position. Set the Signal Generator to 1630KC and adjust the oscillator trimmer (#5, see diagram) for maximum response.

1500KC - Reset the generator to 1500KC and tune in this signal on the receiver. Adjust the B.C. antenna trimmer (#7) and the B.C. interstage trimmer (#6) for maximum output.

600KC - With the generator at 600KC, tune in the signal, then while rocking the dial, align the 600KC padder (#8, on front of chassis).

SHORT WAVE - Set the BAND SWITCH to SHORT WAVE. Signal Generator is still connected as for broadcast. The condenser is opened to minimum capacity and the Short Wave oscillator trimmer (#9) is adjusted so that at this position the receiver tunes to 18.3 Megacycles.

17 M.C. ADJUSTMENT - Now set the generator to 17 M.C., tune in the signal and adjust the Antenna trimmer (#10) for maximum response.

FREQUENCY MODULATION - For the F.M. Band a Signal Generator which will cover the band (40 to 50 megacycles) and a 500 microamp D.C. meter are required.

To align the F.M.-I.F. with Modulation OFF, set the Signal Generator to 4.3 M.C., connect to the grid of the first F.M.-I.F. tube. (7A7-1). The microammeter is connected with the Negative side to chassis and the Positive thru a 250,000 ohm resistor to the low side of the 500,000 ohm resistor in the grid return circuit of the 1st limiter tube (7C7-1), (See point "X" on the circuit diagram).

Adjust the primaries and secondaries of the 3rd and 2nd F.M.-I.F. transformers for the highest reading on the microammeter.

Now reconnect the output of the generator to the grid of the F.M. converter (7Q7-1), and realign the 1st, 2nd, and 3rd I.F.'s.

NOTE--Stop the Signal Generator. There should be no reading on the microammeter. If there is, the I.F. amplifier is oscillating. This should be eliminated by checking all by-passes, grounds, and grounding of I.F. shield cans.

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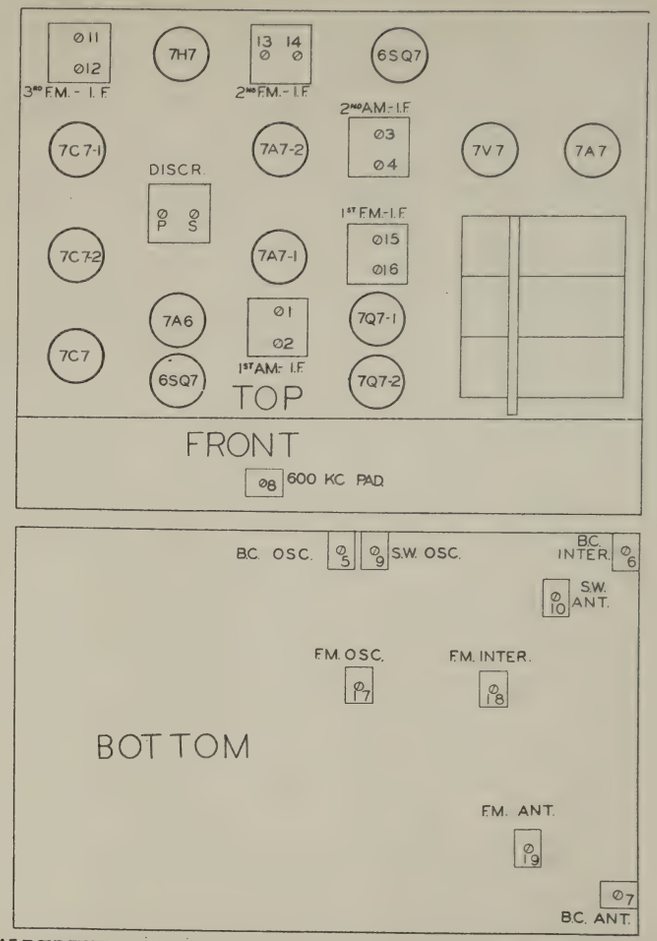

DISCRIMINATOR ALIGNMENT - This is the most critical adjustment on the F.M. band. If improperly done, distortion will result, and general operation will be unsatisfactory. Leave the generator connected to the F.M. converter grid. The microammeter is connected (thru the 250,000 ohm resistor) to the junction of the two 100,000 ohm load resistors of the discriminator diode (6H6). This point is connected to the #4 lug on this socket, which is not connected internally to the tube and is used as a dummy lug only. This is point "Y" on the circuit diagram. Rotate the primary trimmer marked "P" on the discriminator shield can, for maximum reading. Now reconnect the meter across the entire load (both resistors) at the cathode. This is lug #7 on the 6H6 socket. Without disturbing the generator, rotate the secondary trimmer "S" till the most negative reading is obtained, then slowly continue rotation till ZERO current reading is reached.

F.M.-R.F. ALIGNMENT - Connect the Signal Generator to the F.M. Ant terminal (A-2). Set the Generator to approximately 44 M.C. Adjust the antenna trimmer (#19; see trimmer layout diagrams) for maximum output as indicated by a microammeter connected in the limiter, as for the I.F. alignments; or the tuning eye may be used as an indicator. Then align the F.M. interstage trimmer for maximum. Should the F.M. calibration be off, due to drift or aging of components, the correction can be made by resetting the oscillator trimmer (#17).

NOTE - In the absence of a high frequency Signal Generator for F.M. alignment, where powerful local stations operating near this frequency are available, this adjustment can be made by connecting a large antenna to the receiver, and going thru the procedure outlined above.

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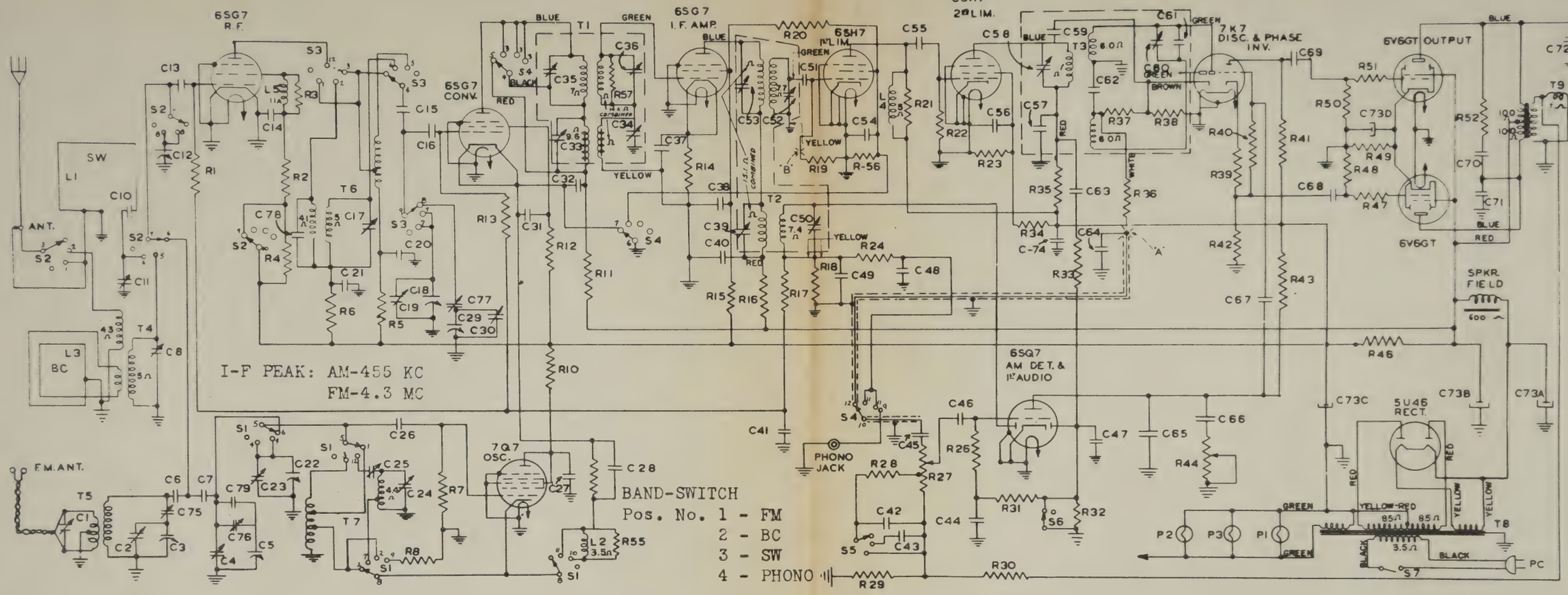
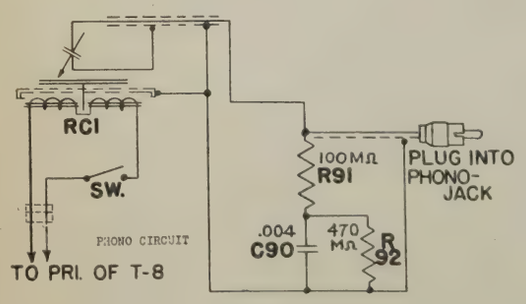
MODEL 40
MUSAPHONIC

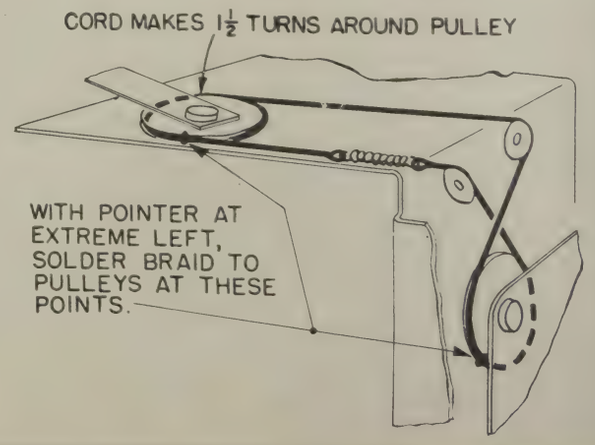


C-1	F.M. Ant Trimmer
C-2	F.M.-RF Trimmer
C-3	Tuning Gang Cond.
C-4	F.M. Osc. Trimmer
C-5	Tuning Gang Cond.
C-6	47 mmfd. Mica
C-7	10 mmfd. Temp. Compensating Cond.
C-8	B.C. Ant. Trimmer
C-10	3000 mmfd. Mica
C-11	S.W. Ant. Trimmer
C-12	Tuning Gang Cond.
C-13	220 mmfd. Mica
C-14	.02 mfd.
C-15	.05 mfd.
C-16	47 mmfd. Mica
C-17	B.C. R.F. Trimmer
C-18	Tuning Gang Cond.
C-19	S.W. R.F. Trimmer
C-20	3600 mmfd. Mica
C-21	.05 mfd.
C-22	Tuning Gang Cond.
C-23	S.W. Osc. Trimmer
C-24	B.C. Osc. Trimmer
C-25	B.C. Osc. Padder
C-26	65 mmfd. Temp. Compensating Cond.
C-27	.05 mfd.
C-28	.005 mfd.
C-29	Tuning Gang Cond.
C-30	F.M.-R.F. Trimmer
C-31,32,	.02 mfd.
C-33,34	A.M.-I.F. Trimmer
C-35,36	F.M. I.F. Trimmer
C-37,38	.05 mfd.
C-39	A.M. I.F. Trimmer
C-40	.02 mfd.
C-41	.05 mfd.
C-42	.003 "
C-43,44,45	.01 "
C-46	.005 "
C-47,48,49	100 mmfd. Mica
C-50	A.M. I.F. Trimmer
C-51	33 mmf., mica capacitor
C-54	.01 mfd., paper capacitor
C-55	22 mmf., mica capacitor
C-56	.02 mfd., paper capacitor
C-57, -59	47 mmf., mica capacitor
C-61	8 mmf., compensating capacitor
C-62	220 mmf., mica capacitor
C-63	.01 mfd., paper capacitor
C-64	220 mmf., mica capacitor
C-65	100 mmf., mica capacitor
C-66	.01 mfd., paper capacitor
C-67, -68, -69	.05 mfd., paper capacitor
C-70	.005 mfd., paper capacitor
C-71, -72	.002 mfd., paper capacitor
C-73a	30 mfd., dry electrolytic
C-73b	15 mfd., dry electrolytic
C-73c	10 mfd., dry electrolytic
C-73d	20 mfd., dry electrolytic
C-74	.05 mfd., paper capacitor
C-75	"FM" RF padder
C-76	"FM" Oscillator padder
C-77	"FM" Converter padder
C-78	270 mmf., mica capacitor
C-79	65 mmf., compensating capacitor
R-1	1.5 megohm, carbon resistor
R-2	3,900 ohm, carbon resistor
R-3	100,000 ohm, carbon resistor
R-4	33,000 ohm, carbon resistor
R-5, -6	2,200 ohm, carbon resistor
R-7	33,000 ohm, carbon resistor
R-8	330 ohm, carbon resistor
R-9	1,200 ohm, carbon resistor
R-10	10,000 ohm, carbon resistor
R-11	2,200 ohm, carbon resistor
R-12	22,000 ohm, carbon resistor
R-13	1.5 megohm, carbon resistor
R-14	330 ohm, carbon resistor
R-15	15,000 ohm, carbon resistor
R-16	2,200 ohm, carbon resistor
R-17	2.2 megohm, carbon resistor
R-18	150,000 ohm, carbon resistor
R-19	100,000 ohm, carbon resistor
R-20	220,000 ohm, carbon resistor
R-21	8,200 ohm, carbon resistor
R-22	180,000 ohm, carbon resistor
R-23, -24	47,000 ohm, carbon resistor
R-26	6.8 megohm, carbon resistor
R-27	2 megohm, volume control
R-28	68,000 ohm, carbon resistor
R-29	22 ohm, carbon resistor
R-30	470 ohm, carbon resistor
R-31	2.2 megohm, carbon resistor
R-32	1.0 megohm, carbon resistor
R-33	10,000 ohm, carbon resistor
R-34	68,000 ohm, carbon resistor
R-35	22,000 ohm, carbon resistor
R-36	68,000 ohm, carbon resistor
R-37, -38	100,000 ohm, carbon resistor
R-39	3,300 ohm, carbon resistor
R-40	470,000 ohm, carbon resistor
R-41, -42	82,000 ohm, carbon resistor
R-43	220,000 ohm, carbon resistor
R-44	0.5 megohm treble-tone control
R-46	2,500 ohm, wire wound resistor
R-47	1,000 ohm, carbon resistor
R-48	220,000 ohm, carbon resistor
R-49	270 ohm, carbon resistor
R-50	220,000 ohm, carbon resistor
R-51	1,000 ohm, carbon resistor
R-52	8,200 ohm, carbon resistor
R-55	100,000 ohm, carbon resistor
R-56	47,000 ohm, carbon resistor
R-57	220,000 ohm, carbon resistor
R-58	820,000 ohm, carbon resistor
S-1, -2, -3, -4	Band switch
S-5	Bass tone switch
S-6	Squelch switch
S-7	Power switch (combined R-44)
T-1	1st IF transformer
T-2	2nd IF transformer
T-3	Discriminator IF transformer
T-4	"BC" Band antenna transformer
T-5	"FM" band antenna transformer
T-6	"BC," "SW" and "FM" converter transformer
T-7	"BC," "SW" and "FM" oscillator transformer
T-8	Power transformer
T-9	Output transformer
L-1	"SW" Beam-a-Scope
L-2	Cathode choke
L-3	"BC" Beam-a-Scope
L-4	Limiter plate choke
L-5	Screen choke



Drive Control Stringing

When replacing a drive cord, the stringing is accomplished as shown in Fig. 7. Before soldering the cord to the two drums as shown, check the pointer location as being at the last mark on the left-hand end of the scale when the gang condenser plates are completely closed; then solder.



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MODEL 40
MUSAPHONIC

GENERAL ELECTRIC CO.

Oscillator-converter Circuit

The first 6SG7 tube acts as a conventional RF amplifier when operating in the Short-wave or Broadcast bands. However, in order to obtain optimum gain, the above tube becomes the first converter of a double or cascade converter system when operating in the FM band.

This cascade converter system consists of the two 6SG7 converter tubes and an oscillator tube 7Q7, with their associated circuits. The tuning condensers for the two converters and oscillator are low capacity sections and ganged together as usual. The antenna tuning circuit consisting of T5 and C3 tunes the FM band from 42 to 50 megacycles; the second converter tuned circuit consisting of a portion of T6 and C29 tunes from 23.15 to 27.15 megacycles; while the oscillator tuned circuit consisting of C5 and a portion of T7 tunes from 18.85 to 22.85 megacycles. The oscillator voltage is capacity coupled to the grid of the first converter tube through C-7. This produces, by heterodyne action, a signal to which the plate circuit of this first converter is tuned. The first converter tube also provides a gain of unity for the oscillator frequency. Accordingly, oscillator voltage is also applied to the grid of the second 6SG7 converter tube which produces in its plate circuit the IF frequency of 4.3 megacycles.

To illustrate the action consider an FM signal of 42 MC to which the receiver is tuned. The oscillator frequency for this setting of the tuning control is 18.85 MC and it heterodynes in the 1st converter tube with the 42 MC signal to form 23.15 MC (42–18.85). The 23.15 MC signal, in turn, beats with oscillator signal in the 2nd converter to produce the 4.3 MC intermediate frequency.

IF Amplifier

The IF amplifier operates as a dual amplifier in that it will operate either at the 455 KC required for the Broadcast and SW bands or at 4.3 MC required for the FM band, without the need of switching transformers except at the primary of the 1st IF. When the IF is operating at 455 KC, the primary and secondary coils of the 4.3 MC section of T1 and T2 are such a low impedance that they can be considered as shorted across; while when operating at 4.3 MC, the primary and secondary trimmers of the 455 KC section of T1 and T2 are such a low impedance that they effectively short out this portion of the transformer. Thus the frequency at which the IF is operating is applied across the proper section of the dual transformers and is amplified by the IF tubes.

Cascade Limiter Circuit

The limiter circuit consists of two resistance coupled 6SH7 tubes in series. Each limiter operates at zero initial bias and low screen voltage. Both grid circuits are designed for self-biasing and the use of capacity-resistance networks provides enough time delay to retain the grid bias between signal peaks. The action of the limiter is such that as soon as a signal is applied to the grid of the tube the grid draws current. This grid current charges up the capacitor across the grid resistor and at the same time establishes a bias through current drain in the resistor. The circuit is so designed that negative signal swings are all beyond plate current cutoff and positive signal peaks are cut off by plate current saturation. The value of the 1st limiter capacity-resistance network is so chosen as to limit noise amplitudes This arrangement leaves the 2nd limiter with the very much simplified task of reducing the remaining noise to the desired level.

FM Station Silencer

This circuit operates on amplitude modulated signals to produce squelch or quieting of the audio amplifier. Since the noise limiter circuits only operate when an FM carrier is present, noise between stations will ride through with undiminished amplitude. This amplitude modulation appears in the last noise limiter plate circuit and develops a voltage across R35. This voltage is rectified by one diode of the 6SQ7 tube and then applied to the 1st audio grid circuit of this tube provided the switch S6 is open. This rectified DC voltage is sufficient to completely bias off this audio tube so that no signal is passed. When a sufficiently strong FM signal is received so that the noise limiters operate with satisfactory signal strength, the noise or amplitude signal is reduced so low that the proper bias is restored to the 6SQ7 audio amplifier and the audio signal is then passed through to the output and phase inverter circuits. This squelch voltage can be manually removed by closing switch S6 so that weak FM stations that have considerable noise present can be received if desired.

FM CHANNEL ALIGNMENT

Due to good stability of components and the wide band characteristics of the IF amplifier circuits, alignment should be unnecessary under normal conditions. However, if alignment is necessary, the procedure is given in table form on page 3 with the location of all trimmers shown in Fig. 2.

IF Alignment

It is preferable to align the IF amplifier by means of a cathode ray oscilloscope and a 4.3 megacycle signal generator with a superimposed 200 KC sweep frequency. Many signal generators and mechanical frequency wobblers are available wherein the above requirements are fulfilled. As for example: G-E Model TMV-97-C Test Oscillator used in conjunction with the G-E Frequency Modulator TMV-128A will give a sufficient sweep of 200 KC when operated in the "Hi" position in conjunction with the 3100–6800 KC band of the Test Oscillator. When the Frequency Modulator is added to the Test Oscillator, the Test Oscillator calibration no longer is accurate, thus making necessary a recalibration. The following procedure may be followed. With a factory aligned receiver where the IF alignment can be assumed to be accurate, connect the above equipment to show the IF selectivity curve as described in Table I. When the two curves are brought together (by tuning Test Oscillator rather than receiver IF trimmers) so that they coincide, take the reading of the signal generator as being the proper point for 4.3 MC with 200 KC sweep alignment. As a further check on the accuracy, another signal generator where the 4.3 MC calibration is accurately known can be coupled to the same point of input as the Test Oscillator and Modulator are coupled and then when the 2nd single frequency generator (4.3 MC) is turned ON, a beat note should be observed at the peak of the resonance curve on the oscilloscope. If this beat note is not at the peak retune the Test Oscillator-Modulator until it does appear at this point.

Where the above equipment is not available, satisfactory alignment can be accomplished by using the equipment and procedure given in Table II. This makes use of an unmodulated RF signal of 4.3 MC and a high resistance (20,000 ohm per volt) voltmeter. The calibration of the signal generator must be accurately known.

A dummy antenna of 50 mmf. or less should be used in series with the signal generator input to the receiver when all IF alignments are made.

RF Alignment

Make all Frequency Modulation RF alignments with the chassis in the cabinet. The alignment procedure is given in Table III on page 3. The image signal should be below 46 MC when the oscillator is properly set.

AM CHANNEL ALIGNMENT

The Amplitude Modulation Channel of the receiver is aligned by following the procedure as outlined in Table IV. All IF alignment may be made with the chassis either installed in or removed from the cabinet. The RF alignment, however, must be made with the chassis and loop antennas securely fastened into their respective places in the cabinet as their relative position in respect to each other affects the alignment. The RF signal should be capacity coupled to the loop antennas by placing a two-foot wire for an antenna on the test-oscillator output post (high side). Keeping this antenna two feet or more from the receiver loops will generally insure freedom from too much coupling.

SERVICE HINTS

Replacement of Components

When servicing the FM portion of this receiver and especially when replacing parts, care should be exercised to return all components including wiring to the original position occupied in the chassis. The positioning of parts and wiring is very critical. When replacing coils or IF transformers, maintain the lead lengths provided and use the same terminals to which the original coil or transformer was connected.

Pointer Focusing

The focusing of the pointer on the dial scale is accomplished by increasing or decreasing the pointer distance from the dial scale. This is a rather critical adjustment and can be varied enough by loosening the mounting bolts and moving the chassis either back or forward in the cabinet until properly focused and then tightening mounting bolts.

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ALIGNMENT CHART

Step	Test-Osc. Connect to	Test-Osc. Setting	Pointer Setting	Tune Trimmer for Max. Output
1	6SK7 IF Grid in Series with .05 mfd.	455 KC	"BC" Band 550 KC	C52 and C53
2	6SA7 Conv. Grid in Series with .05 mfd.	455 KC	"BC" Band 550 KC	C50 and C51
3	Use Capacity Coupling	580 KC	"BC" Band 580 KC	C48 **
4	Use Capacity Coupling	1500 KC	"BC" Band 1500 KC	C75 and C83
5	Use Capacity Coupling	580 KC	"BC" Band 580 KC	C48 **
6	Use Capacity Coupling	6.0 MC	"SW1" Band 6.0 MC	C74
7	Use Capacity Coupling	21.0 MC	"SW2" Band 21.0 MC	C76 *
8	Use Capacity Coupling	21.0 MC	"SW2" Band 21.0 MC	C84 **

* Use minimum capacity peak.
** Rock gang tuning condenser for optimum peak.

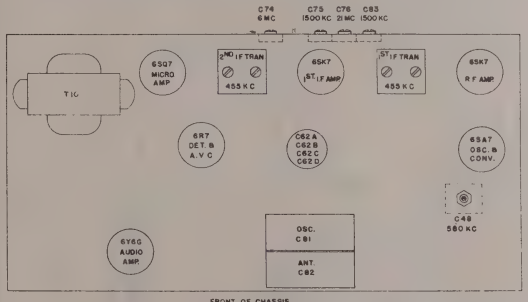

Fig. 3. SW-BC Trimmer Location

Alignment—BC and Short-wave Chassis

The alignment procedure, shown in table form, should be made with the chassis bolted in the cabinet. All RF alignment can be performed by capacity-coupling the test-oscillator signal to the respective built-in loop antenna of the band being aligned. Use a three-foot piece of wire connected as an antenna to the high side of the test-oscillator output. Bring this wire to within three feet of the proper loop antenna of the band in use. Metal objects such as meters, tools, etc., should not be brought in close proximity to the built-in loop antenna.

Before making the RF alignment make sure the pointer is set to the line at the low frequency end of the dial scale when the gang condenser plates are closed. Output meter alignment is preferable and the meter may be connected across the voice coil leads, then turn volume control partially up. Keep the signal input as low as possible to avoid AVC action.

Alignment—FM Receiver

Equipment

In order to perform the necessary alignment operations on this Translator the following equipment is recommended:

(1) A good signal generator capable of giving a 46 MC signal with adjustable output voltage.
(2) A wide band signal generator covering 4.3 MC with a sweep circuit of plus or minus 200 KC.
(3) A cathode ray oscilloscope.
(4) A 0–100 microammeter.

I.F. Alignment

Alignment of the I.F. transformers must be performed stage by stage and no over-all adjustments should be made after completing the stage by stage adjustments.

Connect the high side of the oscilloscope input through a 470,000 ohm carbon resistor to point "A" on the 1st limiter 6SJ7 load circuit. The ground side of the oscilloscope input connects to the chassis. Progressively apply a wide band signal generator output of 4.3 MC to points "B," "C" and "D" of the 2nd I.F., 1st I.F. and 2nd converter grids. Use a .05 mfd. capacitor between the generator output and points "B" and "C." Use a 22 mmf. capacitor between the generator output and point "D." Connect the ground lead of the wide band signal generator output to the chassis at the same point to which the oscilloscope ground is connected. Align the primary and secondary I.F. transformer trimmers for maximum vertical deflection of the oscilloscope curve. The third circuit trimmers (C14 and C17) of the 1st and 2nd I.F. transformers should be adjusted to give maximum broadness to the peak of the oscilloscope curve consistent with maximum vertical deflection. The I.F. curve should not be broadened beyond that point where the vertical deflection of the oscilloscope curve is reduced.

Discriminator Alignment

Remove the oscilloscope input connections from the limiter load and connect the high lead directly to the audio output. Connect the ground lead to the chassis using the same point to which the generator ground is connected. Apply the wide band generator signal of 4.3 MC through a 22 mmf. capacitor to point "D" on the 2nd converter grid. Adjust the discriminator transformer (T4) primary trimmer (C21) for maximum vertical deflection on the oscilloscope. Align the secondary trimmer (C22) for center crossover of the two curves. Retrim the primary trimmer (C21) for straight crossover lines if necessary.

R.F. Alignment

Connect a 0–100 microammeter in series with a 470,000 ohm resistor between chassis and point "A" on the load circuit of the 1st limiter tube, 6SJ7. The resistor should be between the meter and point "A." Apply a 46 MC generator signal to the antenna input terminals of the Translator. Set dial pointer to 46 MC and align oscillator trimmer (C2). The image signal should be below 46 MC when the oscillator is properly set. Peak the converter trimmers (C3 and C4) for maximum output.

NOTE. If oscillations develop in the I.F. circuits during alignment it is probably due to the generator and oscilloscope ground connections. Be sure these ground connections are made to the same point on the chassis. Changing ground points will generally assist in eliminating instability.

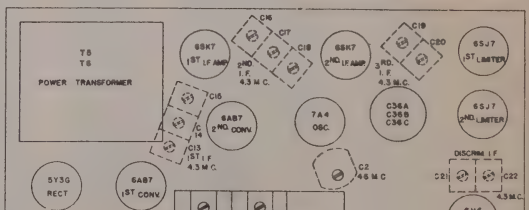

Fig. 4. FM Trimmer Location

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Table I IF ALIGNMENT WITH OSCILLOSCOPE—"FM" CHANNEL

Step	Input Signal Connected to	Input Frequency	Band and Pointer Setting	Trimmer Adjustment	Comments
1	6SG7 converter grid in series with 22 mmf.	4.3 MC & ±200 KC Sweep	"FM" Band 42 MC	C52 C53	Connect high side of oscilloscope in series with 470,000 ohm resistor to R19 at point "B." Connect low side to chassis ground. Peak trimmers for resultant curve shown in Fig. 3.
2	6SG7 converter grid in series with 22 mmf.	4.3 KC & ±200 KC Sweep	"FM" Band 42 MC	C35 C36	
3	Repeat Step 1				
4	Repeat Step 2				
5	6SG7 converter grid in series with 22 mmf.	4.3 MC & ±200 KC Sweep	"FM" Band 42 MC	C60 C58	Connect high side of oscilloscope in series with 470,000 ohm resistor to R36, point "A." Connect low side to chassis ground. Peak trimmers for resultant curve shown in Fig. 4. C60 is aligned when curve crosses midway in vertical plane. Proper alignment of C58 gives straightest sides to curve near crossover point.

Table II IF ALIGNMENT WITH METER—"FM" CHANNEL

Step	Input Signal Connected to	Input Frequency	Band and Pointer Setting	Trimmer Adjustment	Comments
1	6SG7 converter grid in series with 22 mmf.	Unmodulated 4.3 MC signal	"FM" Band 42 MC	C52 C53 C35 C36	Connect the 10-volt scale of a 20,000 ohm per volt voltmeter in series with a 470,000 ohm resistor between point "B" and ground. Peak all trimmers for maximum output using just enough input signal to give a satisfactory output reading.
2	Repeat Step 1				
3	6SG7 converter grid in series with 22 mmf.	Unmodulated 4.3 MC signal	"FM" Band 42 MC	C60 C58	Connect the 10-volt scale of a 20,000 ohm per volt voltmeter in series with a 470,000-ohm resistor between points "A" and ground. *With C60 purposely detuned*, peak C58 for maximum meter reading. Align C60 for the 0 voltage point where the meter reading changes from a positive to negative value. Use as low a signal input as necessary to give a satisfactory meter reading.

Table III RF ALIGNMENT—"FM" CHANNEL

Step	Input Signal Connected to	Input Frequency	Band and Pointer Setting	Trimmer Adjustment	Comments
1	Direct to "FM" Antenna Post	Unmodulated 49 MC signal	"FM" Band 49 MC	C4 (Osc.)	Connect the 10-volt range of a 20,000 ohm per volt voltmeter in series with a 470,000-ohm resistor to point "B." The other side of the voltmeter lead connects to chassis ground. Peak trimmers for maximum meter reading using just enough signal input to give satisfactory meter reading.
2	Direct to "FM" Antenna Post	Unmodulated 49 MC Signal	"FM" Band 49 MC	C2 C30	
3	Direct to "FM" Antenna Post	Unmodulated 43 MC Signal	"FM" Band 43 MC	C76 (Osc.)	
4	Direct to "FM" Antenna Post	Unmodulated 43 MC Signal	"FM" Band 43 MC	C75 C77	
5	Capacitively Coupled to "FM" Antenna	Unmodulated 46 MC Signal	"FM" Band 46 MC	C1	Using built-in dipole adjust C1 for maximum output with Signal Generator capacitively coupled to it, (place lead about 2 ft. from dipole) or on an outside station.
6	Repeat Step 1				
7	Repeat Step 2				

Table IV IF, "BC," and "SW" ALIGNMENT—"AM" CHANNEL

Step	Input Signal Connected to	Input Frequency	Band and Pointer Setting	Trimmer Adjustment	Comments
1	6SG7 converter grid in series with .05 mfd.	455 KC Modulated	"BC" Band 550 KC	C50 C39 C34 C33	Connect 5.0-volt AC voltmeter across the voice coil of the speaker. Peak all trimmers for maximum output. All RF alignments must be made with the chassis in the cabinet.
2	Capacity Coupled	17.8 MC Modulated	"SW" Band 17.8 MC	C23*	*When aligning the SW oscillator trimmer, use maximum capacity peak. The image frequency should appear at 18,710 KC.
3	Capacity Coupled	17.8 MC Modulated	"SW" Band 17.8 MC	C19** C11	**Rock gang condenser when making alignment.
4	Capacity Coupled	1500 KC Modulated	"BC" Band 1500 KC	C24	
5	Capacity Coupled	1500 KC Modulated	"BC" Band 1500 KC	C17 C8	
6	Capacity Coupled	580 KC Modulated	"BC" Band 580 KC	C25**	
7	Repeat Steps 4 and 5				

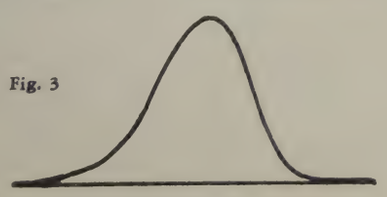

Fig. 3

Fig. 4

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Oscillator-converter Circuit

The first 6SG7 tube acts as a conventional RF amplifier when operating in the Short-wave or Broadcast bands. However, in order to obtain optimum gain, the above tube becomes the first converter of a double or cascade converter system when operating in the FM band.

This cascade converter system consists of the two 6SG7 converter tubes and an oscillator tube 7Q7, with their associated circuits. The tuning condensers for the two converters and oscillator are low capacity sections and ganged together as usual. The antenna tuning circuit consisting of T5 and C3 tunes the FM band from 42 to 50 megacycles; the second converter tuned circuit consisting of a portion of T6 and C29 tunes from 23.15 to 27.15 megacycles; while the oscillator tuned circuit consisting of C5 and a portion of T7 tunes from 18.85 to 22.85 megacycles. The oscillator voltage is capacity coupled to the grid of the first converter tube through C-7. This produces, by heterodyne action, a signal to which the plate circuit of this first converter is tuned. The first converter tube also provides a gain of unity for the oscillator frequency. Accordingly, oscillator voltage is also applied to the grid of the second 6SG7 converter tube which produces in its plate circuit the IF frequency of 4.3 megacycles.

To illustrate the action consider an FM signal of 42 MC to which the receiver is tuned. The oscillator frequency for this setting of the tuning control is 18.85 MC and it heterodynes in the 1st converter tube with the 42 MC signal to form 23.15 MC (42–18.85). The 23.15 MC signal, in turn, beats with oscillator signal in the 2nd converter to produce the 4.3 MC intermediate frequency.

IF Amplifier

The IF amplifier operates as a dual amplifier in that it will operate either at the 455 KC required for the Broadcast and SW bands or at 4.3 MC required for the FM band, without the need of switching transformers except at the primary of the 1st IF. When the IF is operating at 455 KC, the primary and secondary coils of the 4.3 MC section of T1 and T2 are such a low impedance that they can be considered as shorted across; while when operating at 4.3 MC, the primary and secondary trimmers of the 455 KC section of T1 and T2 are such a low impedance that they effectively short out this portion of the transformer. Thus the frequency at which the IF is operating is applied across the proper section of the dual transformers and is amplified by the IF tubes.

Cascade Limiter Circuit

The limiter circuit consists of two resistance coupled 6SH7 tubes in series. Each limiter operates at zero initial bias and low screen voltage. Both grid circuits are designed for self-biasing and the use of capacity-resistance networks provides enough time delay to retain the grid bias between signal peaks. The action of the limiter is such that as soon as a signal is applied to the grid of the tube the grid draws current. This grid current charges up the capacitor across the grid resistor and at the same time establishes a bias through current drain in the resistor. The circuit is so designed that negative signal swings are all beyond plate current cutoff and positive signal peaks are cut off by plate current saturation. The value of the 1st limiter capacity-resistance network is so chosen as to limit noise amplitudes This arrangement leaves the 2nd limiter with the very much simplified task of reducing the remaining noise to the desired level.

FM Station Silencer

This circuit operates on amplitude modulated signals to produce squelch or quieting of the audio amplifier. Since the noise limiter circuits only operate when an FM carrier is present, noise between stations will ride through with undiminished amplitude. This amplitude modulation appears in the last noise limiter plate circuit and develops a voltage across R35. This voltage is rectified by one diode of the 6SQ7 tube and then applied to the 1st audio grid circuit of this tube provided the switch S6 is open. This rectified DC voltage is sufficient to completely bias off this audio tube so that no signal is passed. When a sufficiently strong FM signal is received so that the noise limiters operate with satisfactory signal strength, the noise or amplitude signal is reduced so low that the proper bias is restored to the 6SQ7 audio amplifier and the audio signal is then passed through to the output and phase inverter circuits. This squelch voltage can be manually removed by closing switch S6 so that weak FM stations that have considerable noise present can be received if desired.

FM CHANNEL ALIGNMENT

Due to good stability of components and the wide band characteristics of the IF amplifier circuits, alignment should be unnecessary under normal conditions. However, if alignment is necessary, the procedure is given in table form on page 3 with the location of all trimmers shown in Fig. 2.

IF Alignment

It is preferable to align the IF amplifier by means of a cathode ray oscilloscope and a 4.3 megacycle signal generator with a superimposed 200 KC sweep frequency. Many signal generators and mechanical frequency wobblers are available wherein the above requirements are fulfilled. As for example: G-E Model TMV-97-C Test Oscillator used in conjunction with the G-E Frequency Modulator TMV-128A will give a sufficient sweep of 200 KC when operated in the "Hi" position in conjunction with the 3100-6800 KC band of the Test Oscillator. When the Frequency Modulator is added to the Test Oscillator, the Test Oscillator calibration no longer is accurate, thus making necessary a recalibration. The following procedure may be followed. With a factory aligned receiver where the IF alignment can be assumed to be accurate, connect the above equipment to show the IF selectivity curve as described in Table I. When the two curves are brought together (by tuning Test Oscillator rather than receiver IF trimmers) so that they coincide, take the reading of the signal generator as being the proper point for 4.3 MC with 200 KC sweep alignment. As a further check on the accuracy, another signal generator where the 4.3 MC calibration is accurately known can be coupled to the same point of input as the Test Oscillator and Modulator are coupled and then when the 2nd single frequency generator (4.3 MC) is turned ON, a beat note should be observed at the peak of the resonance curve on the oscilloscope. If this beat note is not at the peak retune the Test Oscillator-Modulator until it does appear at this point.

Where the above equipment is not available, satisfactory alignment can be accomplished by using the equipment and procedure given in Table II. This makes use of an unmodulated RF signal of 4.3 MC and a high resistance (20,000 ohm per volt) voltmeter. The calibration of the signal generator must be accurately known.

A dummy antenna of 50 mmf. or less should be used in series with the signal generator input to the receiver when all IF alignments are made.

RF Alignment

Make all Frequency Modulation RF alignments with the chassis in the cabinet. The alignment procedure is given in Table III on page 3. The image signal should be below 46 MC when the oscillator is properly set.

AM CHANNEL ALIGNMENT

The Amplitude Modulation Channel of the receiver is aligned by following the procedure as outlined in Table IV. All IF alignment may be made with the chassis either installed in or removed from the cabinet. The RF alignment, however, must be made with the chassis and loop antennas securely fastened into their respective places in the cabinet as their relative position in respect to each other affects the alignment. The RF signal should be capacity coupled to the loop antennas by placing a two-foot wire for an antenna on the test oscillator output post (high side). Keeping this antenna two feet or more from the receiver loops will generally insure freedom from too much coupling.

SERVICE HINTS

Replacement of Components

When servicing the FM portion of this receiver and especially when replacing parts, care should be exercised to return all components including wiring to the original position occupied in the chassis. The positioning of parts and wiring is very critical. When replacing coils or IF transformers, maintain the lead lengths provided and use the same terminals to which the original coil or transformer was connected.

Pointer Focusing

The focusing of the pointer on the dial scale is accomplished by increasing or decreasing the pointer distance from the dial scale. This is a rather critical adjustment and can be varied enough by loosening the mounting bolts and moving the chassis either back or forward in the cabinet until properly focused and then tightening mounting bolts.

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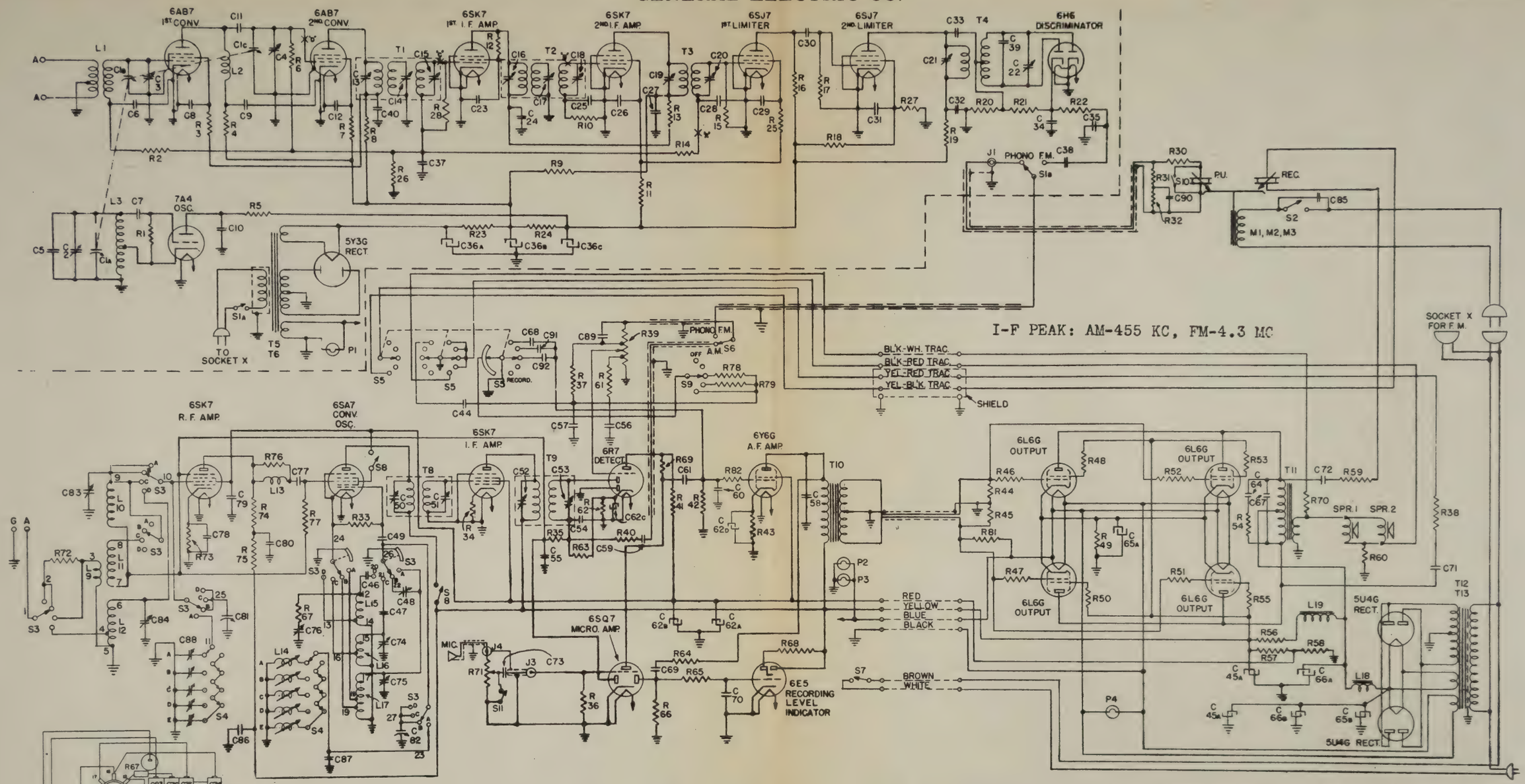

C1a, b, c	Tuning condenser (FM)	C49	47 mmf. mica cap.	C86	.05 mfd. paper cap.	R25	47,000 ohm carbon	R61	56,000 ohm carbon	T1	1st IF trans. (FM)
C2	5–24 mmf. trimmer	C54	220 mmf. mica cap.	C87	750 silvered mica	R26	.47 megohm carbon	R62	4,700 ohm carbon	T2	2nd IF trans. (FM)
C3, 4	Trimmers on cond. C1	C55	.05 mfd. paper cap.	C88	Selector trimmers	R27, 28	47,000 ohm carbon	R63	.15 megohm carbon	T3	3rd IF trans. (FM)
C5	40 mmf. temp. compensated	C56	.008 mfd. paper cap.	C89	270 mmf. mica cap.	R30, 31	.10 megohm carbon	R64	.68 megohm carbon	T4	Discrim. IF trans. (FM)
C6	470 mmf mica cap.	C57	.0025 mfd. paper cap.	C90	.005 mfd. paper cap.	R32	.27 megohm carbon	R65, 66	2.2 megohm carbon	T5, 6	Power trans. (FM)
C7	50 mmf temp. compensated	C58, 59	.005 mfd. paper cap.	C91	.0032 mfd. paper cap.	R33	22,000 ohm carbon	R67	27 ohm carbon	T8	1st IF trans. (AM)
C8, 9, 10, 11	470 mmf. mica cap.	C60	150 mmf. mica cap.	C92	.0015 mfd. paper cap.	R34	150 ohm carbon	R68	1.0 megohm carbon	T9	2nd IF trans. (AM)
C12, 23, 24	.01 mfd. paper cap.	C61	.05 mfd. paper cap.	R1	33,000 ohm carbon	R35	2.2 megohm carbon	R69	.10 megohm carbon	T10	Interstage audio trans.
C25	47 mmf. mica cap.	C62a, b	15 mfd. dry electrolytic	R2	3.3 megohm carbon	R36	4.7 megohm carbon	R70	4.5 ohm W.W.	T11	Output trans.
C26, 27	.01 mfd. paper cap.	C62c, d	40 mfd. dry electrolytic	R3	6,800 ohm carbon	R37, 38	47,000 ohm carbon	R71	2.0 meg. vol. control	T12, 13	Power trans. (AM)
C28, 29	47 mmf. mica cap.	C64	.005 mfd. paper cap.	R4	2,200 ohm carbon	R39	2.0 meg. vol. control	R72	1,000 ohm carbon	P1, 2, 3, 4	Pilot lamps
C30	22 mmf. mica cap.	C65a	20 mfd. dry electrolytic	R5	1,000 ohm carbon	R40, 41	47,000 ohm carbon	R73	47 ohm carbon	M1, 2, 3	Phono motor
C31, 32	47 mmf. mica cap.	C65b	10 mfd. dry electrolytic	R6	3.3 megohm carbon	R42	.47 megohm carbon	R74	3,300 ohm carbon	REC	Recorder unit
C33	50 mmf. temp. compensated	C66a, b	10 mfd. dry electrolytic	R7	12,000 ohm carbon	R43	270 ohm carbon	R75	1,000 ohm carbon	L1	Ant. coil (FM)
C34	47 mmf. mica cap.	C67	.001 mfd. paper cap.	R8, 9	1,000 ohm carbon	R44, 45	680 ohm carbon	R76	10,000 ohm carbon	L2	RF coil (FM)
C35	220 mmf. mica cap.	C68	.0072 mfd. paper cap.	R10	47,000 ohm carbon	R46, 47	1,000 ohm carbon	R77	47,000 ohm carbon	L3	Oscillator coil (FM)
C36a	15 mfd. dry electrolytic	C69	.001 mfd. paper cap.	R11	15,000 ohm carbon	R48	100 ohm carbon	R78	.47 megohm carbon	L9, 10	"BC" loop antenna
C36b	30 mfd. dry electrolytic	C70	.05 mfd. paper cap.	R12	47,000 ohm carbon	R49	110 ohm W.W.	R79	.10 megohm carbon	L11	"SW1" ant. coil
C36c	10 mfd. dry electrolytic	C71, 72	.02 mfd. paper cap.	R13	2,200 ohm carbon	R50	100 ohm carbon	R81	.22 megohm carbon	L12	"SW2" loop antenna
C37	0.1 mfd. paper cap.	C73	.05 mfd. paper cap.	R14	2.2 megohm carbon	R51, 52	1,000 ohm carbon	R82	1000 ohm carbon	L13	RF Choke coil
C38	.02 mfd. paper cap.	C74	7–65 mmf. trimmer	R15	47,000 ohm carbon	R53	100 ohm carbon	S1a, b	Pwr.-FM-Phono Switch	L14	Station selector coils
C39	8 mmf. temp. compensated	C75	5–40 mmf. trimmer	R16	10,000 ohm carbon	R54	10,000 ohm carbon	S2	Phono motor switch	L15	"SW2" Osc. coil
C40	.01 mfd. paper cap.	C76	3–30 mmf. trimmer	R17	.18 megohm carbon	R55	100 ohm carbon	S3	Band switch	L16	"SW1" Osc. coil
C44	.02 mfd. paper cap.	C77	100 mmf. mica cap.	R18	68,000 ohm carbon	R56	390 ohm W.W.	S4, 6, 8	Station selector sw.	L17	"BC" Osc. coil
C45 a, b	10 mfd. dry electrolytic	C78, 79, 80	.01 mfd. paper cap.	R19	22,000 ohm carbon	R57	4,000 ohm carbon	S5	Treble tone control	L18, 19	Filter chokes
C46	.008 mfd. polystyrene cap.	C81, 82	Tuning cond. (AM)	R20, 21, 22	.10 megohm carbon	R58	5,500 ohm W.W.	S7, 9	Pwr-Bass tone control		
C47	2400 mmf. mica cap.	C83, 84	1.8–20 mmf. trimmer	R23	1,200 ohm W.W.	R59	47,000 ohm carbon	S10	Phono silence switch		
C48	"BC" padder	C85	Line capacitor	R24	3,300 ohm carbon	R60	40 ohm W.W.	S11	Microphone switch		

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MODELS 60, 80

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Special Service Information

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains†

(a) Antenna Post to R.F. Grid at
1000 KC.....5.0
4000 KC.....2.5
18,000 KC.....2.5

(b) R.F. Grid to Converter Grid at
1000 KC.....5.0
4000 KC.....3.0
18,000 KC.....2.0

(c) R.F. on Converter Grid to I.F. on 1st I.F. Grid at
1000 KC.....47
4000 KC.....47
18,000 KC.....45

(d) I.F. on Converter Grid to I.F. on 1st I.F. Grid at
455 KC.....55

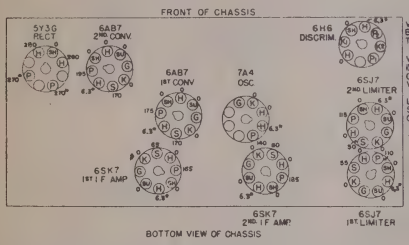
(e) I.F. Amplifier Grid to Detector Plate at
455 KC.....70

(2) Voltage across Volume Control to Give ½-watt Speaker Output‡ at 400 cycles.....05 volts

(3) DC Voltage Developed across Oscillator Grid Resistor R-33 at
1000 KC.....7.5
4000 KC.....7.5
18,000 KC.....5.0

†Variations of ±20% permissible. All readings obtained with enough input signal to give ½-watt speaker output.

‡½-watt speaker output at 400 cycles is equivalent to a reading of 1.41 volts as measured by a high resistance AC voltmeter across the voice coil leads of the two speakers connected in parallel.


FRONT OF CHASSIS
5Y3G RECT
6AB7 2ND CONV.
6H6 DISCRIM.
6AB7 1ST CONV
7A4 OSC
6SJ7 2ND LIMITER
6SK7 1ST I F AMP
6SK7 2ND I F AMP
6SJ7 1ST LIMITER
VOLTAGES MEASURED BETWEEN SOCKET TERMINALS & CHASSIS
VOLTAGES MEASURED ON 500 VOLT SCALE OF 1000 OHMS PER VOLTMETER.
LINE VOLTS-117 NO SIGNAL INPUT GANG CLOSED.
*VOLTS-A.C
BOTTOM VIEW OF CHASSIS

Phono-FM-Television Connection

If a television picture receiver with sound converter, a separate record player, or a frequency modulation translator (Model 60) is desired to be used with either of these models proceed as follows. On Model 80, remove the black shielded plug connection to the rear of the broadcast short-wave receiver rear chassis deck; on Model 60, remove the shielded lead to left of broadcast short-wave receiver rear chassis deck; then make the plug connection to the auxiliary unit. General Electric plug, Stock No. RP-145, fits the pin jack. To switch the receiver from radio to auxiliary unit operation, merely depress the Phono-FM push button selector key.

Service Hints

1. Audio howl is traceable usually to the 6Y6G audio driver tube. In making new tube replacements, it may be necessary to try several before a quiet tube is found.

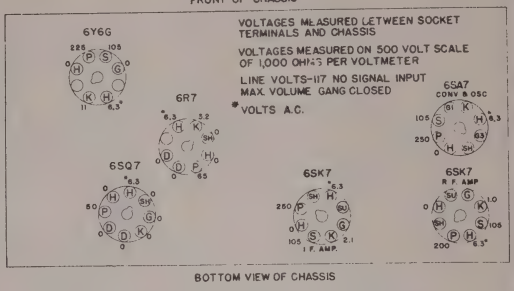
2. A method of setting up broadcast automatic station selector buttons which will assure drift-proof adjustment is to screw the iron core all the way out and then turn slowly inward until the desired station is tuned in.

3. The black speaker lead should be connected to the 10-inch speaker terminal which is grounded to the speaker frames. When replacing a speaker, make sure of the proper phasing. With the speaker terminal boards facing each other, the interconnecting leads should be crossed.

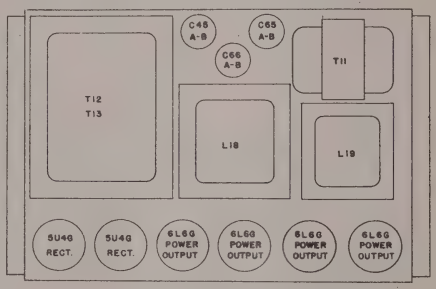
Reproducers

The voice coil is accurately centered at the factory and should seldom give trouble. In case the voice coil needs recentering, loosen the three hex head clamping screws which hold the voice coil spider assembly; remove the voice coil dust cap, and insert four centering shims in the air gap. Tighten the clamping set screws; remove the shims and replace dust cover.

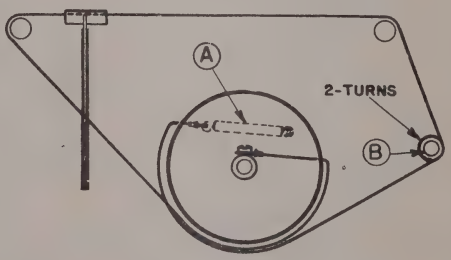
NOTE—In no case should the magnet be loosened or removed from the assembled position.


FRONT OF CHASSIS
6Y6G
6R7
6SQ7
6SK7
6SA7 CONV & OSC
6SK7 R F AMP
6SK7 I F AMP.
VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS
VOLTAGES MEASURED ON 500 VOLT SCALE OF 1,000 OHMS PER VOLTMETER
LINE VOLTS-117 NO SIGNAL INPUT MAX. VOLUME GANG CLOSED
*VOLTS A.C.
BOTTOM VIEW OF CHASSIS

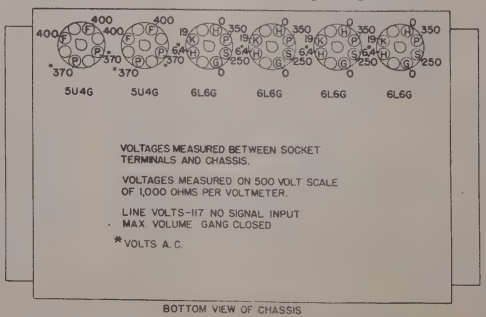
Socket Voltages—AM Chassis



Power Unit Component Layout



Dial Cord Stringing Diagram



Socket Voltages—Power Unit

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MODEL HM-225B
MODEL HM-226B

GENERAL ELECTRIC CO.

IMPORTANT NOTE

COMBINATION TELEVISION AND RADIO RECEIVER MODEL HM-226B CONSISTS OF THE TELEVISION RECEIVER MODEL HM-225B REVISED FOR NEW STANDARDS AND RADIO RECEIVER MODEL HM226-7A.

ALIGNMENT REVISED FOR NEW STANDARDS

TELEVISION ALIGNMENT PROCEDURE

The problem of aligning the several circuits in a television receiver is much more involved and requires more specialized equipment than the alignment of conventional radio receivers. Fortunately, the use of stable components in carefully engineered circuits of wide-band characteristics reduces to a minimum the necessity for alignment under normal operating conditions. Should alignment become necessary the following equipment will be needed:

(A) For Video I.F. Alignment
  (1) Cathode ray oscilloscope
  (2) Wide-band sweep oscillator capable of sweeping from 7.5 to 15 MC.
  (3) Marker system either provided in sweep oscillator or from separate signal generator for locating 12.75 and 9.75 MC points.

(B) Sound I.F. Alignment
  (1) Cathode ray oscilloscope
  (2) Wide band sweep oscillator capable of sweeping from 7.75 to 8.75 MC.

(C) R.F. Alignment
  (1) Cathode ray oscilloscope
  (2) Wide-band sweep oscillator capable of sweeping the following bands.
    (a) 50 to 56 MC
    (b) 60 to 66 MC
    (c) 66 to 72 MC
    (d) 78 to 84 MC
    (e) 84 to 90 MC

VIDEO I. F. ALIGNMENT

Input Freq.	Point of Input	Adjustments	Comments
1.			Connect vertical input cable of cathode ray oscilloscope across resistor R-43 of 6H6 video detector.
2. 7.5–15MC Sweep	Control grid of 6AB7 (2nd video I.F.)		Connect low output tap of video I.F. sweep oscillator to control grid of 6AB7 (2nd video I.F.). Connect ground lead to chassis. Turn contrast control (R-67) to about half of maximum or to a point which gives satisfactory vertical deflection without overloading. Set horizontal centering and gain controls on oscilloscope to give suitable horizontal deflection. Adjust sweep phase to give curve similar to Fig. 8, curve 2.
NOTE: If sweep oscillator has marker points internally supplied, steps 3 and 4 may be omitted.			
3. Same as in No. 2 plus 12.75 MC	Same as in No. 2		Superimpose an accurately calibrated 12.75 MC signal in parallel with sweep signal. Signal will appear on sweep curve in oscilloscope as a wiggle, the center of which is a thin black line. With a pen or crayon mark this point on the screen of the oscilloscope. (NOTE: Hereafter the horizontal controls on the oscilloscope must not be touched.)
4. Same as in No. 2 plus 9.75 MC	Same as in No. 2		Superimpose an accurately calibrated 9.75 MC signal in parallel with sweep signal. Mark screen at point where signal appears on curve as in No. 2 above.
5. 7.5–15 MC Sweep	Control grid 6AC7 (4th video IF)	Iron cores of detector transformer T-9	Connect high tap of video I.F. sweep oscillator to control grid of 6AC7 (4th video I.F.). (Do not touch horizontal controls of oscilloscope.) Turn sweep phase to give as near a single curve as possible. Adjust iron cores of T-9 until curve appears similar to Fig. 8, curve 1, with relatively flat top, 12.75 MC mark half-way down one side and 9.75 MC mark at corner of other side. These conditions plus maximum amplitude insure correct alignment.
6. 7.5–15 MC Sweep	Control grid 6AB7 (3rd video IF)	Iron cores of 4th video transformer T-8.	Connect low tap of video I.F. sweep oscillator to control grid of 6AB7 (3rd video I.F.). Adjust iron cores for maximum gain, flatness and proper centering between markers as described in step No. 5 and illustrated in Fig. 8, curve 1.
7. 7.5–15 MC Sweep	Control grid 6AB7 (2nd video IF)	Iron cores of 3rd video transformer T-7.	Connect low tap to grid. Adjust primary and secondary iron cores for maximum gain, flatness and proper centering. Adjust series iron core for sharp cut-off on 9.75 MC side of curve. See Fig. 8, curve 3.
8. 7.5–15 MC Sweep	Control grid of 6AC7 (1st video I.F.)	Iron cores of 2nd video transformer T-6	Connect low tap to grid. Adjust primary and secondary iron cores for maximum gain, flatness and proper centering. Adjust series iron core for sharp cut-off on 12.75 MC side of curve. See Fig. 8, curve 3.
9. 7.5–15 MC Sweep	Converter Grid, 6F8G	Iron cores of 1st video transformer T-11	Connect low tap to grid. Adjust iron cores for maximum gain flatness and proper centering. 12.75 MC response must be equal to or slightly greater than 50% of the maximum response as indicated in Fig. 8, curve 4.
10. 14.25 MC	Converter Grid, 6F8G	Series iron core of 2nd video transformer T-6	To check alignment of 14.25 MC trap proceed as follows: Connect low tap to grid. Reduce horizontal gain of oscilloscope to minimum. Adjust iron core for minimum line length.
11. 8.25 MC	Converter Grid, 6F8G	Series iron core of 3rd video transformer T-7	To check alignment of 8.25 MC trap proceed as follows: Connect low tap to grid. Reduce horizontal gain of oscilloscope to minimum. Adjust iron core for minimum line length.

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ALIGNMENT CHART

Step	Test-Osc. Connect to	Test-Osc. Setting	Pointer Setting	Tune Trimmer for Max. Output
1	6SK7 IF Grid in Series with .05 mfd.	455 KC	"BC" Band 550 KC	C52 and C53
2	6SA7 Conv. Grid in Series with .05 mfd.	455 KC	"BC" Band 550 KC	C50 and C51
3	Use Capacity Coupling	580 KC	"BC" Band 580 KC	C48 **
4	Use Capacity Coupling	1500 KC	"BC" Band 1500 KC	C75 and C83
5	Use Capacity Coupling	580 KC	"BC" Band 580 KC	C48 **
6	Use Capacity Coupling	6.0 MC	"SW1" Band 6.0 MC	C74
7	Use Capacity Coupling	21.0 MC	"SW2" Band 21.0 MC	C76 *
8	Use Capacity Coupling	21.0 MC	"SW2" Band 21.0 MC	C84 **

* Use minimum capacity peak.
** Rock gang tuning condenser for optimum peak.

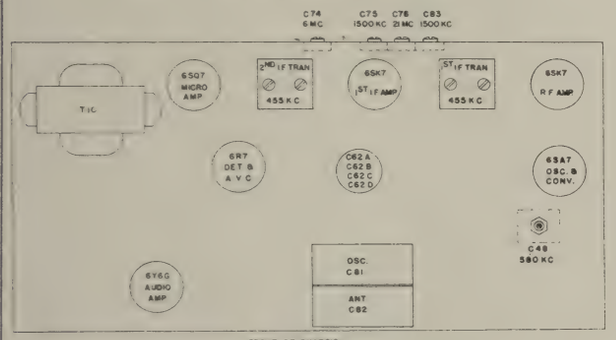

Fig. 3. SW-BC Trimmer Location

Alignment—BC and Short-wave Chassis

The alignment procedure, shown in table form, should be made with the chassis bolted in the cabinet. All RF alignment can be performed by capacity-coupling the test-oscillator signal to the respective built-in loop antenna of the band being aligned. Use a three-foot piece of wire connected as an antenna to the high side of the test-oscillator output. Bring this wire to within three feet of the proper loop antenna of the band in use. Metal objects such as meters, tools, etc., should not be brought in close proximity to the built-in loop antenna.

Before making the RF alignment make sure the pointer is set to the line at the low frequency end of the dial scale when the gang condenser plates are closed. Output meter alignment is preferable and the meter may be connected across the voice coil leads, then turn volume control partially up. Keep the signal input as low as possible to avoid AVC action.

Alignment—FM Receiver

Equipment

In order to perform the necessary alignment operations on this Translator the following equipment is recommended:

(1) A good signal generator capable of giving a 46 MC signal with adjustable output voltage.
(2) A wide band signal generator covering 4.3 MC with a sweep circuit of plus or minus 200 KC.
(3) A cathode ray oscilloscope.
(4) A 0–100 microammeter.

I.F. Alignment

Alignment of the I.F. transformers must be performed stage by stage and no over-all adjustments should be made after completing the stage by stage adjustments.

Connect the high side of the oscilloscope input through a 470,000 ohm carbon resistor to point "A" on the 1st limiter 6SJ7 load circuit. The ground side of the oscilloscope input connects to the chassis. Progressively apply a wide band signal generator output of 4.3 MC to points "B," "C" and "D" of the 2nd I.F., 1st I.F. and 2nd converter grids. Use a .05 mfd. capacitor between the generator output and points "B" and "C." Use a 22 mmf. capacitor between the generator output and point "D." Connect the ground lead of the wide band signal generator output to the chassis at the same point to which the oscilloscope ground is connected. Align the primary and secondary I.F. transformer trimmers for maximum vertical deflection of the oscilloscope curve. The third circuit trimmers (C14 and C17) of the 1st and 2nd I.F. transformers should be adjusted to give maximum broadness to the peak of the oscilloscope curve consistent with maximum vertical deflection. The I.F. curve should not be broadened beyond that point where the vertical deflection of the oscilloscope curve is reduced.

Discriminator Alignment

Remove the oscilloscope input connections from the limiter load and connect the high lead directly to the audio output. Connect the ground lead to the chassis using the same point to which the generator ground is connected. Apply the wide band generator signal of 4.3 MC through a 22 mmf. capacitor to point "D" on the 2nd converter grid. Adjust the discriminator transformer (T4) primary trimmer (C21) for maximum vertical deflection on the oscilloscope. Align the secondary trimmer (C22) for center crossover of the two curves. Retrim the primary trimmer (C21) for straight crossover lines if necessary.

R.F. Alignment

Connect a 0–100 microammeter in series with a 470,000 ohm resistor between chassis and point "A" on the load circuit of the 1st limiter tube, 6SJ7. The resistor should be between the meter and point "A." Apply a 46 MC generator signal to the antenna input terminals of the Translator. Set dial pointer to 46 MC and align oscillator trimmer (C2). The image signal should be below 46 MC when the oscillator is properly set. Peak the converter trimmers (C3 and C4) for maximum output.

NOTE. If oscillations develop in the I.F. circuits during alignment it is probably due to the generator and oscilloscope ground connections. Be sure these ground connections are made to the same point on the chassis. Changing ground points will generally assist in eliminating instability.

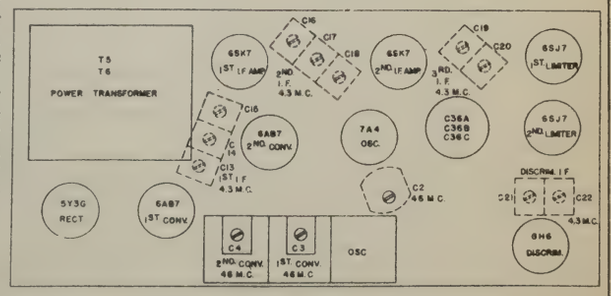

Fig. 4. FM Trimmer Location

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Special Service Information

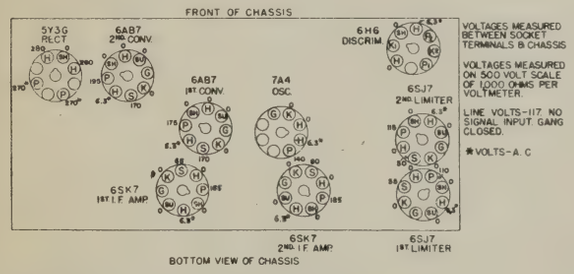
The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains†
  (a) Antenna Post to R.F. Grid at
    1000 KC.....5.0
    4000 KC.....2.5
    18,000 KC.....2.5
  (b) R.F. Grid to Converter Grid at
    1000 KC.....5.0
    4000 KC.....3.0
    18,000 KC.....2.0
  (c) R.F. on Converter Grid to I.F. on 1st I.F. Grid at
    1000 KC.....47
    4000 KC.....47
    18,000 KC.....45
  (d) I.F. on Converter Grid to I.F. on 1st I.F. Grid at
    455 KC.....55
  (e) I.F. Amplifier Grid to Detector Plate at
    455 KC.....70
(2) Voltage across Volume Control to Give ½-watt Speaker Output‡ at 400 cycles.....05 volts

(3) DC Voltage Developed across Oscillator Grid Resistor R-33 at
    1000 KC.....7.5
    4000 KC.....7.5
    18,000 KC.....5.0

†Variations of ±20% permissible. All readings obtained with enough input signal to give ½-watt speaker output.

‡½-watt speaker output at 400 cycles is equivalent to a reading of 1.41 volts as measured by a high resistance AC voltmeter across the voice coil leads of the two speakers connected in parallel.



Phono-FM-Television Connection

If a television picture receiver with sound converter, a separate record player, or a frequency modulation translator (Model 60) is desired to be used with either of these models proceed as follows. On Model 80, remove the black shielded plug connection to the rear of the broadcast short-wave receiver rear chassis deck; on Model 60, remove the shielded lead to left of broadcast short-wave receiver rear chassis deck; then make the plug connection to the auxiliary unit. General Electric plug, Stock No. RP-145, fits the pin jack. To switch the receiver from radio to auxiliary unit operation, merely depress the Phono-FM push button selector key.

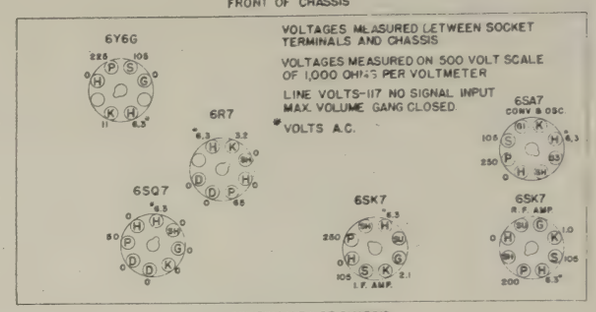
Service Hints

1. Audio howl is traceable usually to the 6Y6G audio driver tube. In making new tube replacements, it may be necessary to try several before a quiet tube is found.
2. A method of setting up broadcast automatic station selector buttons which will assure drift-proof adjustment is to screw the iron core all the way out and then turn slowly inward until the desired station is tuned in.
3. The black speaker lead should be connected to the 10-inch speaker terminal which is grounded to the speaker frames. When replacing a speaker, make sure of the proper phasing. With the speaker terminal boards facing each other, the interconnecting leads should be crossed.

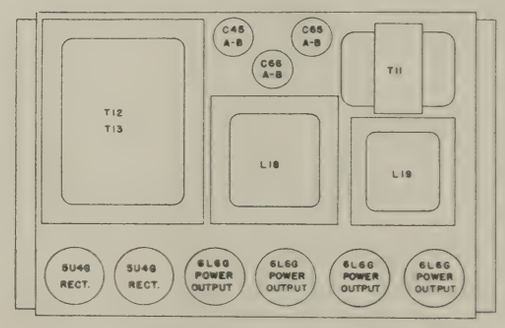
Reproducers

The voice coil is accurately centered at the factory and should seldom give trouble. In case the voice coil needs recentering, loosen the three hex head clamping screws which hold the voice coil spider assembly; remove the voice coil dust cap, and insert four centering shims in the air gap. Tighten the clamping set screws; remove the shims and replace dust cover.

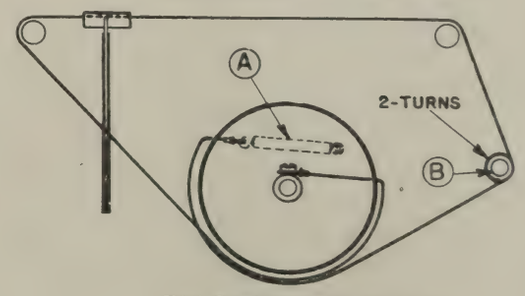
NOTE—In no case should the magnet be loosened or removed from the assembled position.



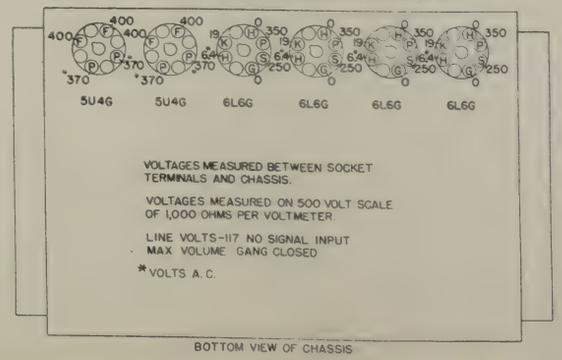
Socket Voltages—AM Chassis



Power Unit Component Layout



Dial Cord Stringing Diagram



Socket Voltages—Power Unit

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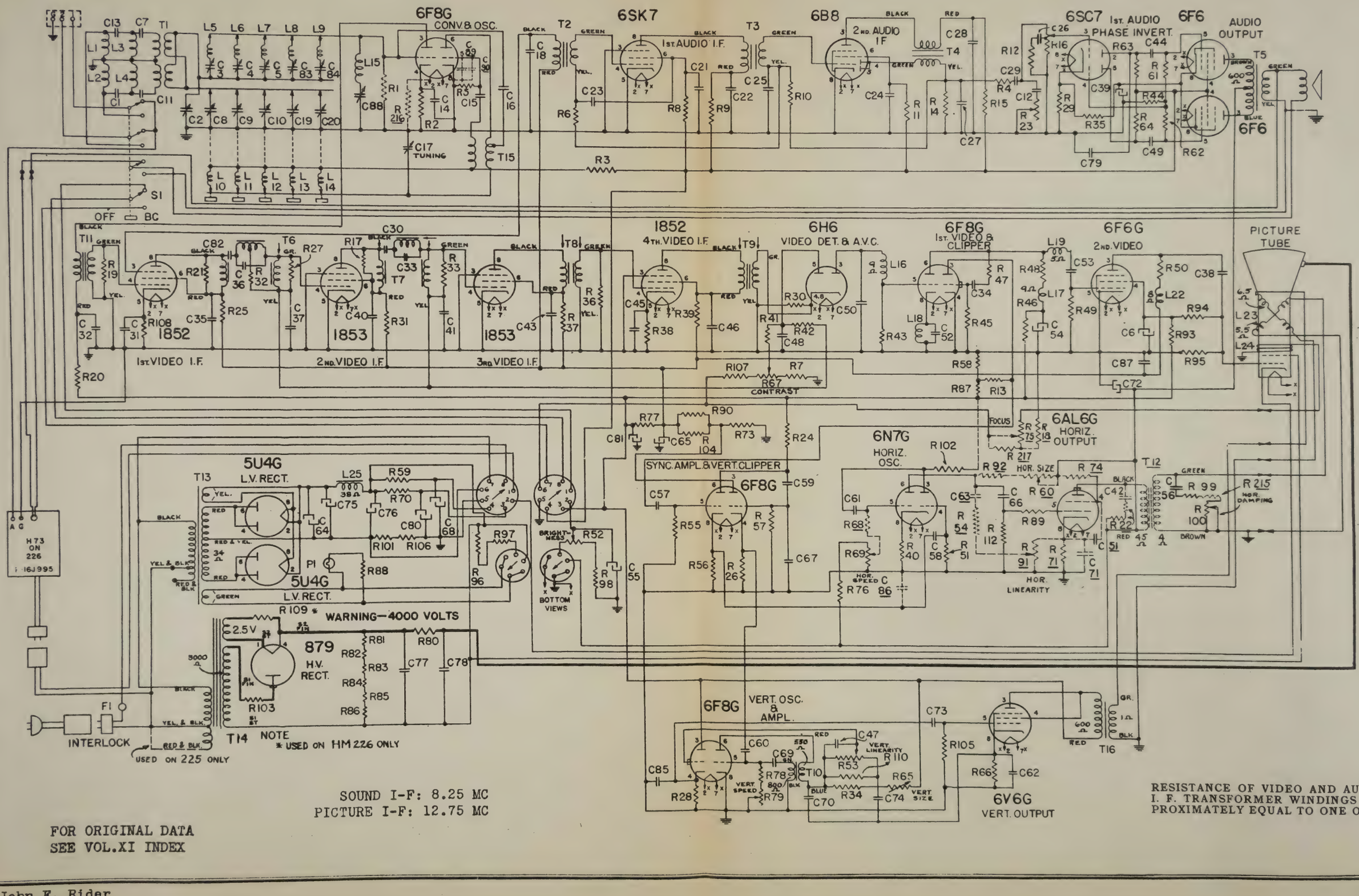
MODEL HM-225B
MODEL HM-226B

GENERAL ELECTRIC CO.



SOUND I-F: 8.25 MC
PICTURE I-F: 12.75 MC

FOR ORIGINAL DATA
SEE VOL.XI INDEX

RESISTANCE OF VIDEO AND AUDIO I. F. TRANSFORMER WINDINGS APPROXIMATELY EQUAL TO ONE OHM

© John F. Rider

MODEL HM-225B.
MODEL HM-226B

GENERAL ELECTRIC CO

ALIGNMENT REVISED FOR NEW STANDARDS

R. F. ALIGNMENT

Signal Input	Point of Input	Adjustments	Comments
1.		Band width adjustment coupling condenser	Turn (C-2) in until tight, then open approximately $\frac{1}{16}$ of a turn. Connect oscilloscope to junction of R-20 and C-32. Open-circuit B+ end of R-3 and short-circuit R-2.
2. 50 to 56 MC sweep	Antenna terminals	(L-10), (C-3), (C-8)	Depress band No. 1 push button. Set tuning control to mid-rotation. Adjust L-10 until curve is centered between maximum horizontal sweep points. Adjust C-3 and C-8 for maximum amplitude. See Fig. 8, curve 4.
3. 60 to 66 MC sweep	Antenna terminals	(L-11), (C-4), (C-9)	Depress band No. 2 push button. Adjust L-11 for centering; C-4 and C-9 for maximum amplitude. See Fig. 8, curve 4.
4. 66 to 72 MC sweep	Antenna terminals	(L-12, (C-5), (C-10)	Depress band No. 3 push button. Adjust L-12 for centering; C-5 and C-10 for maximum amplitude. See Fig. 8, curve 4.
5. 78 to 84 MC sweep	Antenna terminals	(L-13), (C-83), (C-19)	Depress band No. 4 push button. Adjust L-13 for centering; C-83 and C-19 for maximum amplitude. See Fig. 8, curve 4.
6. 84 to 90 MC sweep	Antenna terminals	(L-14), (C-84), (C-20)	Depress band No. 5 push button. Adjust L-14 for centering; C-84 and C-20 for maximum amplitude. See Fig. 8, curve 4.

WAVE TRAP ALIGNMENT

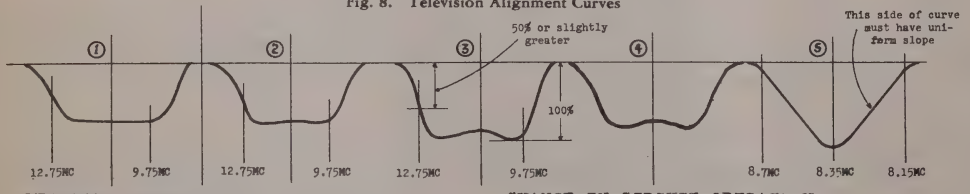
1. 11.75 MC With modulation	Antenna terminals	Wave trap trimmer, C-88	Adjust for maximum dip in oscilloscope curve, with oscilloscope connected to diode load resistor R-43.

AUDIO I.F. ALIGNMENT

NOTE: In order to obtain frequency modulation detection in the sound channel with good fidelity, the audio I.F. amplifiers must be aligned to give a satisfactory selectivity curve for slope detection. For this reason a sweep generator and oscilloscope are necessary to obtain the resultant curve shown in Fig. 8, curve 5.

1.			Connect vertical input cable of cathode ray oscilloscope between junction of R-4 and C-29 chassis.
2. 8.25 MC with 30% tone modulation	Grid of 6F8G converter.	Iron cores of all audio transformers	Align for maximum amplitude
3. 7.75 to 8.75 MC Sweep	Control grid of 6B8		Superimpose an accurately calibrated 8.15 MC signal in parallel with sweep signal and mark center of beat "wiggle" on oscilloscope screen as in step 3 of Video IF alignment. Also obtain an 8.35 MC beat signal mark on the oscilloscope screen. The steep straight portion of the over-all audio IF response curve must extend between these limits.
4. 7.75 to 8.75 MC Sweep	Control grid of converter 6F8G	Iron cores of audio IF transformers T2, T3 and T4.	Adjust iron cores until curve has been shaped as shown by curve 5, Fig. 7. It is important that the steep side be straight between 8.15 and 8.35 MC. The more gradual slope on the other side should extend from 8.35 MC to approximately 8.7 MC. Very few turns of the cores should be required to obtain the desired result. No more than 30% loss in peak over-all response should result from this process.

Fig. 8. Television Alignment Curves



IMPORTANT NOTES

OTHER SERVICE DATA NOT LISTED IS THE SAME AS FOR THE ORIGINAL TELEVISION RECEIVER.

FOR SERVICE DATA ON THE REGULAR RADIO CHASSIS OF THE COMBINATION TELEVISION AND RADIO RECEIVER MODEL HM-226B, SEE MODEL HM226-7A.

CHANGE IN CIRCUIT OPERATION

The horizontal oscillator is a multi-vibrator with speed controlled by varying the small positive grid voltage through R-69. The horizontal pulses are passed through proper wave shaping and amplifier circuits to the horizontal deflection coils of the picture tube. Horizontal linearity is adjustable by varying R-91. Horizontal sweep size is controlled by R-60 in the plate circuit of the 6F8G. The series circuits across the primary and secondary of the 6AL6G output transformer damp the output transient. Damping is adjustable through R-100.

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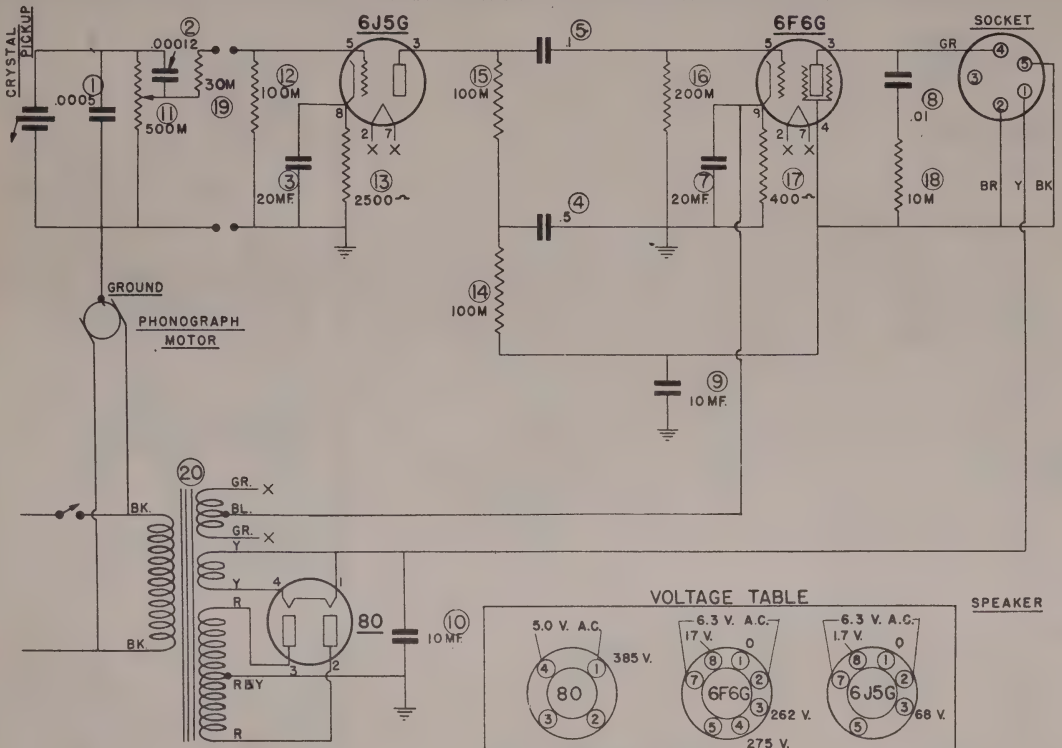

FOR PARTS LIST, SEE INDEX

VOLTAGE TABLE

NOTE:
MEASURE HEATER AND FILAMENT VOLTAGES DIRECTLY ACROSS SOCKET TERMINALS.
ALL OTHER VOLTAGES MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM/VOLT VOLTMETER.
LINE VOLTAGE 117 V. A.C.
BOTTOM VIEW OF CHASSIS

A-401

SPECIFICATIONS

Primary voltage.....117 V. AC;
Power consumption..... 45 watts;
Power output..... 3 watts;
Type tubes..... 1 - 6J5G, 1 - 6F6G, 1 - 80;
Speaker:
Field Coil..... 2700 ohms;
Transformer..... 7000 ohms;

Several changes have been made in the values of parts used in this amplifier, since it was first released and it is suggested that the circuit of the amplifier requiring service be checked with the schematic shown in this bulletin and changes made if required.

MODEL HM-225B
MODEL HM-226B

GENERAL ELECTRIC CO.

IMPORTANT NOTE

COMBINATION TELEVISION AND RADIO RECEIVER MODEL HM-226B CONSISTS OF THE TELEVISION RECEIVER MODEL HM-225B REVISED FOR NEW STANDARDS AND RADIO RECEIVER MODEL HM226-7A.

ALIGNMENT REVISED FOR NEW STANDARDS

TELEVISION ALIGNMENT PROCEDURE

The problem of aligning the several circuits in a television receiver is much more involved and requires more specialized equipment than the alignment of conventional radio receivers. Fortunately, the use of stable components in carefully engineered circuits of wide-band characteristics reduces to a minimum the necessity for alignment under normal operating conditions. Should alignment become necessary the following equipment will be needed:

(A) For Video I.F. Alignment
- (1) Cathode ray oscilloscope
- (2) Wide-band sweep oscillator capable of sweeping from 7.5 to 15 MC.
- (3) Marker system either provided in sweep oscillator or from separate signal generator for locating 12.75 and 9.75 MC points.

(B) Sound I.F. Alignment
- (1) Cathode ray oscilloscope
- (2) Wide band sweep oscillator capable of sweeping from 7.75 to 8.75 MC.

(C) R.F. Alignment
- (1) Cathode ray oscilloscope
- (2) Wide-band sweep oscillator capable of sweeping the following bands.
  - (a) 50 to 56 MC
  - (b) 60 to 66 MC
  - (c) 66 to 72 MC
  - (d) 78 to 84 MC
  - (e) 84 to 90 MC

VIDEO I. F. ALIGNMENT

Input Freq.	Point of Input	Adjustments	Comments
1.			Connect vertical input cable of cathode ray oscilloscope across resistor R-43 of 6H6 video detector.
2. 7.5–15MC Sweep	Control grid of 6AB7 (2nd video I.F.)		Connect low output tap of video I.F. sweep oscillator to control grid of 6AB7 (2nd video I.F.). Connect ground lead to chassis. Turn contrast control (R-67) to about half of maximum or to a point which gives satisfactory vertical deflection without overloading. Set horizontal centering and gain controls on oscilloscope to give suitable horizontal deflection. Adjust sweep phase to give curve similar to Fig. 8, curve 2.
NOTE: If sweep oscillator has marker points internally supplied, steps 3 and 4 may be omitted.			
3. Same as in No. 2 plus 12.75 MC	Same as in No. 2		Superimpose an accurately calibrated 12.75 MC signal in parallel with sweep signal. Signal will appear on sweep curve in oscilloscope as a wiggle, the center of which is a thin black line. With a pen or crayon mark this point on the screen of the oscilloscope. (NOTE: Hereafter the horizontal controls on the oscilloscope must not be touched.)
4. Same as in No. 2 plus 9.75 MC	Same as in No. 2		Superimpose an accurately calibrated 9.75 MC signal in parallel with sweep signal. Mark screen at point where signal appears on curve as in No. 2 above.
5. 7.5–15 MC Sweep	Control grid 6AC7 (4th video IF)	Iron cores of detector transformer T-9	Connect high tap of video I.F. sweep oscillator to control grid of 6AC7 (4th video I.F.). (Do not touch horizontal controls of oscilloscope.) Turn sweep phase to give as near a single curve as possible. Adjust iron cores of T-9 until curve appears similar to Fig. 8, curve 1, with relatively flat top, 12.75 MC mark half-way down one side and 9.75 MC mark at corner of other side. These conditions plus maximum amplitude insure correct alignment.
6. 7.5–15 MC Sweep	Control grid 6AB7 (3rd video IF)	Iron cores of 4th video transformer T-8.	Connect low tap of video I.F. sweep oscillator to control grid of 6AB7 (3rd video I.F.). Adjust iron cores for maximum gain, flatness and proper centering between markers as described in step No. 5 and illustrated in Fig. 8, curve 1.
7. 7.5–15 MC Sweep	Control grid 6AB7 (2nd video IF)	Iron cores of 3rd video transformer T-7.	Connect low tap to grid. Adjust primary and secondary iron cores for maximum gain, flatness and proper centering. Adjust series iron core for sharp cut-off on 9.75 MC side of curve. See Fig. 8, curve 3.
8. 7.5–15 MC Sweep	Control grid of 6AC7 (1st video I.F.)	Iron cores of 2nd video transformer T-6	Connect low tap to grid. Adjust primary and secondary iron cores for maximum gain, flatness and proper centering. Adjust series iron core for sharp cut-off on 12.75 MC side of curve. See Fig. 8, curve 3.
9. 7.5–15 MC Sweep	Converter Grid, 6F8G	Iron cores of 1st video transformer T-11	Connect low tap to grid. Adjust iron cores for maximum gain flatness and proper centering. 12.75 MC response must be equal to or slightly greater than 50% of the maximum response as indicated in Fig. 8, curve 4.
10. 14.25 MC	Converter Grid, 6F8G	Series iron core of 2nd video transformer T-6	To check alignment of 14.25 MC trap proceed as follows: Connect low tap to grid. Reduce horizontal gain of oscilloscope to minimum. Adjust iron core for minimum line length.
11. 8.25 MC	Converter Grid, 6F8G	Series iron core of 3rd video transformer T-7	To check alignment of 8.25 MC trap proceed as follows: Connect low tap to grid. Reduce horizontal gain of oscilloscope to minimum. Adjust iron core for minimum line length.

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MODEL HM-225B.
MODEL HM-226B

GENERAL ELECTRIC CO

ALIGNMENT REVISED FOR NEW STANDARDS

R. F. ALIGNMENT

Signal Input	Point of Input	Adjustments	Comments
1.		Band width adjustment coupling condenser	Turn (C-2) in until tight, then open approximately $\frac{1}{8}$ of a turn. Connect oscilloscope to junction of R-20 and C-32. Open-circuit B+ end of R-3 and short-circuit R-2.
2. 50 to 56 MC sweep	Antenna terminals	(L-10), (C-3), (C-8)	Depress band No. 1 push button. Set tuning control to mid-rotation. Adjust L-10 until curve is centered between maximum horizontal sweep points. Adjust C-3 and C-8 for maximum amplitude. See Fig. 8, curve 4.
3. 60 to 66 MC sweep	Antenna terminals	(L-11), (C-4), (C-9)	Depress band No. 2 push button. Adjust L-11 for centering; C-4 and C-9 for maximum amplitude. See Fig. 8, curve 4.
4. 66 to 72 MC sweep	Antenna terminals	(L-12, (C-5), (C-10)	Depress band No. 3 push button. Adjust L-12 for centering; C-5 and C-10 for maximum amplitude. See Fig. 8, curve 4.
5. 78 to 84 MC sweep	Antenna terminals	(L-13), (C-83), (C-19)	Depress band No. 4 push button. Adjust L-13 for centering; C-83 and C-19 for maximum amplitude. See Fig. 8, curve 4.
6. 84 to 90 MC sweep	Antenna terminals	(L-14), (C-84), (C-20)	Depress band No. 5 push button. Adjust L-14 for centering; C-84 and C-20 for maximum amplitude. See Fig. 8, curve 4.

WAVE TRAP ALIGNMENT

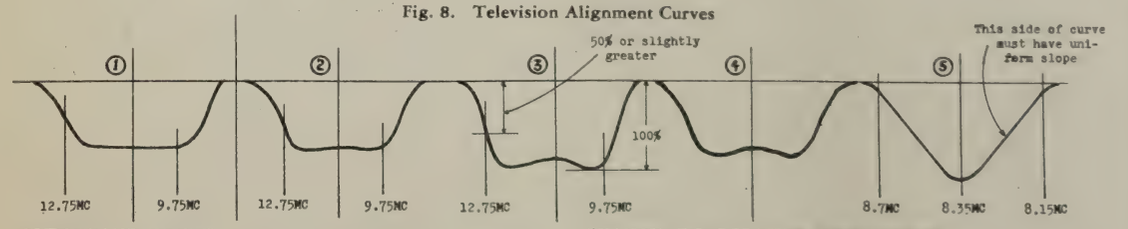
1. 11.75 MC With modulation	Antenna terminals	Wave trap trimmer, C-88	Adjust for maximum dip in oscilloscope curve, with oscilloscope connected to diode load resistor R-43.

AUDIO I.F. ALIGNMENT

NOTE: In order to obtain frequency modulation detection in the sound channel with good fidelity, the audio I.F. amplifiers must be aligned to give a satisfactory selectivity curve for slope detection. For this reason a sweep generator and oscilloscope are necessary to obtain the resultant curve shown in Fig. 8, curve 5.

1.			Connect vertical input cable of cathode ray oscilloscope between junction of R-4 and C-29 chassis.
2. 8.25 MC with 30% tone modulation	Grid of 6F8G converter.	Iron cores of all audio transformers	Align for maximum amplitude
3. 7.75 to 8.75 MC Sweep	Control grid of 6B8		Superimpose an accurately calibrated 8.15 MC signal in parallel with sweep signal and mark center of beat "wiggle" on oscilloscope screen as in step 3 of Video IF alignment. Also obtain an 8.35 MC beat signal mark on the oscilloscope screen. The steep straight portion of the over-all audio IF response curve must extend between these limits.
4. 7.75 to 8.75 MC Sweep	Control grid of converter 6F8G	Iron cores of audio IF transformers T2, T3 and T4.	Adjust iron cores until curve has been shaped as shown by curve 5, Fig. 7. It is important that the steep side be straight between 8.15 and 8.35 MC. The more gradual slope on the other side should extend from 8.35 MC to approximately 8.7 MC. Very few turns of the cores should be required to obtain the desired result. No more than 30% loss in peak over-all response should result from this process.

Fig. 8. Television Alignment Curves



IMPORTANT NOTES

OTHER SERVICE DATA NOT LISTED IS THE SAME AS FOR THE ORIGINAL TELEVISION RECEIVER.

FOR SERVICE DATA ON THE REGULAR RADIO CHASSIS OF THE COMBINATION TELEVISION AND RADIO RECEIVER MODEL HM-226B, SEE MODEL HM226-7A.

CHANGE IN CIRCUIT OPERATION

The horizontal oscillator is a multi-vibrator with speed controlled by varying the small positive grid voltage through R-69. The horizontal pulses are passed through proper wave shaping and amplifier circuits to the horizontal deflection coils of the picture tube. Horizontal linearity is adjustable by varying R-91. Horizontal sweep size is controlled by R-60 in the plate circuit of the 6F8G. The series circuits across the primary and secondary of the 6AL6G output transformer damp the output transient. Damping is adjustable through R-100.

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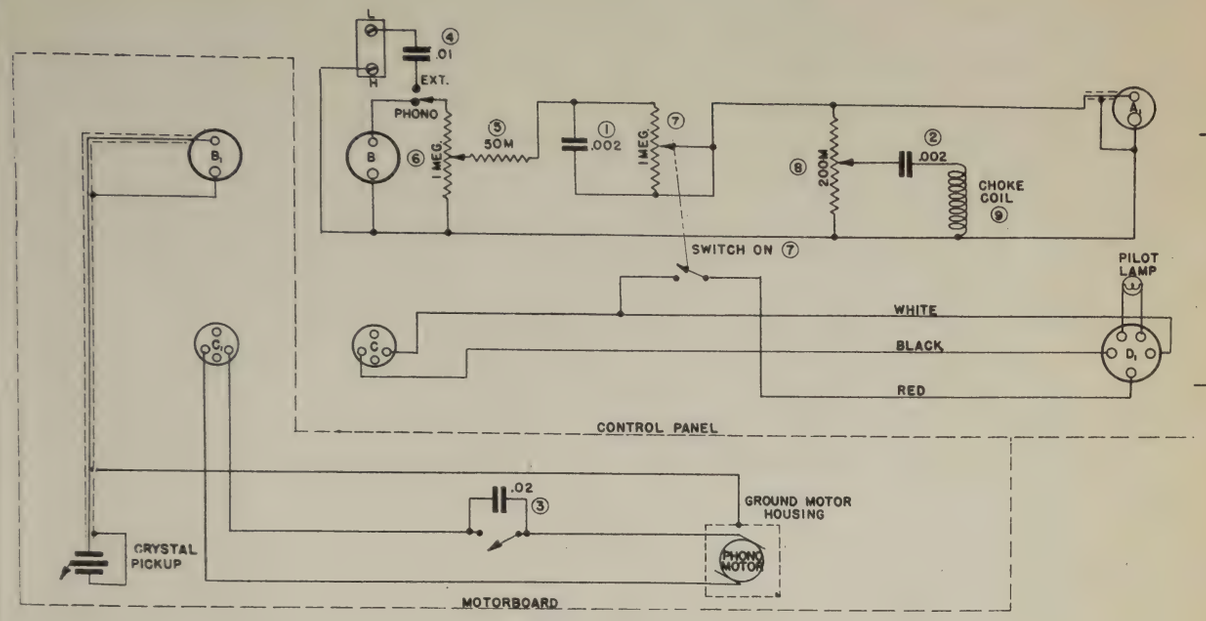
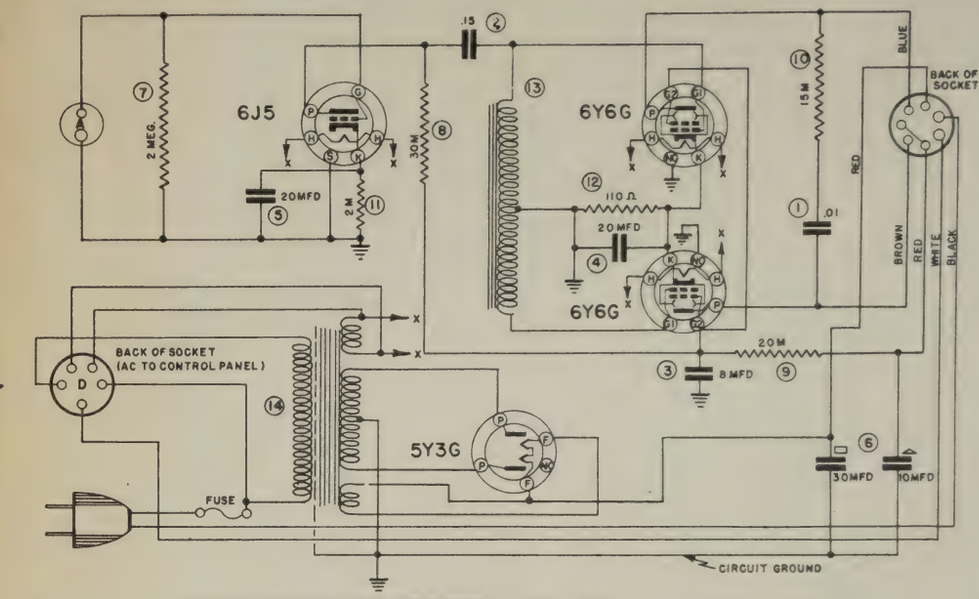
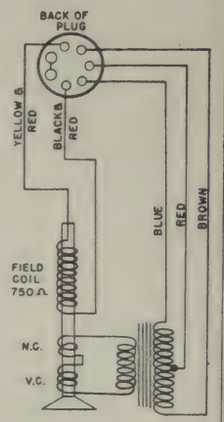
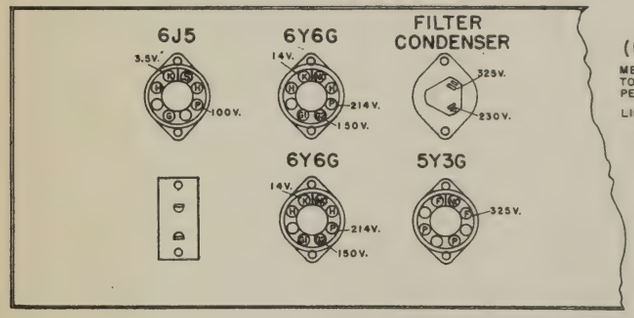




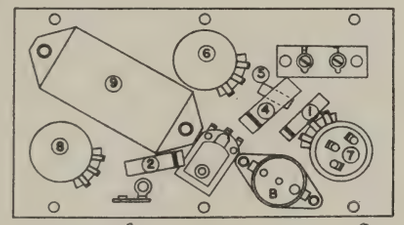




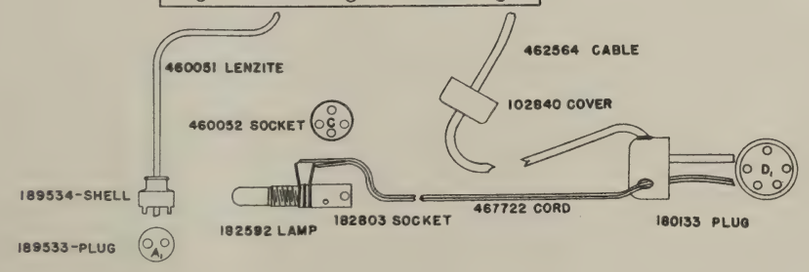
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

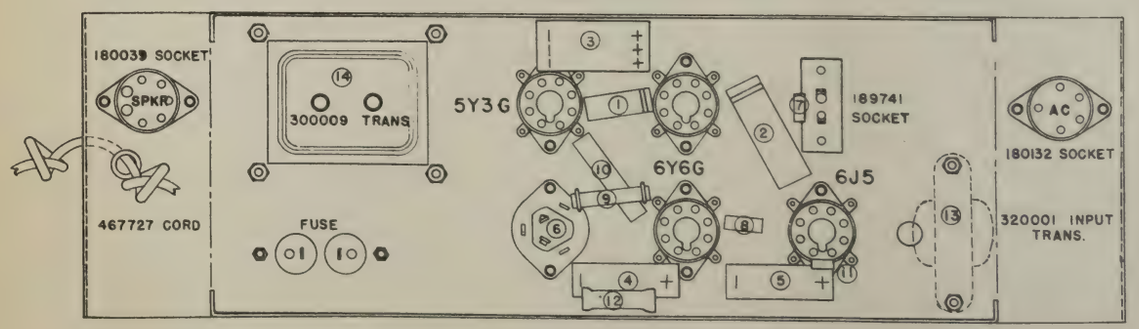
MEASURE ALL D.C. VOLTAGES DIRECT TO CIRCUIT GROUND WITH A 1000 OHM PER VOLT VOLTMETER

LINE VOLTAGE 117 VOLTS AC



FOR PARTS LIST, SEE INDEX





SPECIFICATIONS

Primary voltage.....117 V. AC;
Power consumption.....100 watts;
Power output..... 14 watts;
Type tubes:..... 1 - 6J5G; 2 - 6Y6G; 1 - 5Y3G;
Speaker:
Field coil..... 750 ohms;
Transformer.....5500 ohms;

A-1101

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MODEL A-307P5
MODEL A-401

THE MAGNAVOX CO.

Illus. No.	Part No.	Part Name	Description MODEL A-401
1.	259774	Condenser	Moulded mica, .0005 mfd.
2.	259470	Condenser	Tubular, .00012 mfd. 600 V.
3. 7.	279912	Condenser	Electrolytic, 20-20 mfd. 25 V.
4.	254147	Condenser	Tubular, .5 mfd. 400 V.
5.	254168	Condenser	Tubular, .1 mfd. 400 V.
8.	254158	Condenser	Tubular, .01 mfd. 400 V.
9. 10.	279911	Condenser	Electrolytic, 10-10 mfd. 450 V.
11.	223495	Control	Volume, 500,000 ohm
12.	234445	Resistor	Carbon, 100,000 ohm 1/2 W.
13.	234427	Resistor	Carbon, 2500 ohm 1/2 W.
14.	234445	Resistor	Carbon, 100,000 ohm 1/2 W.
15.	234445	Resistor	Carbon, 100,000 ohm 1/2 W.
16.	234447	Resistor	Carbon, 200,000 ohm 1/2 W.
17.	234509	Resistor	Carbon, 400 ohm 2 W.
18.	234473	Resistor	Carbon, 10,000 ohm 1 W.
19.	234437	Resistor	Carbon, 30,000 ohm 1/2 W.
20.	300139	Transformer	Power, 117 V. 60 cycle

MODEL A-307P5

If a high resistance A.C. voltmeter is connected between the chassis and ground, a reading will be obtained, however this does not indicate that the amplifier is "hot". This condition is caused by the fact that a .02 mfd. condenser is connected between the chassis and the supply line, therefore a low resistance voltmeter should be used to determine if the amplifier is actually "hot". If a slight shock is felt when the chassis is touched and the amplifier is operating, the supply plug should be reversed in the receptacle to correct this condition. This could happen only if the amplifier was connected to an alternating current supply.

Low volume due to low plate voltage may be caused by an open fuse inside one of the 25Z5 tubes and can be checked by replacing the tubes.

Low output with distortion and hum, are most likely due to one or two defective 25L6 tubes.

Illus. No.	Part No.	Part Name	Description
1.	270014	Condenser	Molanode, 40 mfd. 150 V.
2.	270014	Condenser	Molanode, 40 mfd. 150 V.
3.	270017	Condenser	Molanode, 20 mfd. 150 V.
4.	254152	Condenser	Tubular, .1 mfd. 200 V.
5.	254127	Condenser	Tubular, .02 mfd. 600 V.
6.	254127	Condenser	Tubular, .02 mfd. 600 V.
7.	254153	Condenser	Tubular, .01 mfd. 600 V.
8.	254153	Condenser	Tubular, .01 mfd. 600 V.
9.	254161	Condenser	Tubular, .002 mfd. 600 V.
10.	254180	Condenser	Tubular, .005 mfd. 600 V.
11.	239755	Resistor	Carbon, 500,000 ohm 1/3 W.
12.	239755	Resistor	Carbon, 500,000 ohm 1/3 W.
13.	239755	Resistor	Carbon, 500,000 ohm 1/3 W.
14.	239755	Resistor	Carbon, 500,000 ohm 1/3 W.
15.	230010	Resistor	Carbon, 250,000 ohm 1/3 W.
16.	230010	Resistor	Carbon, 250,000 ohm 1/3 W.
17.	239785	Resistor	Carbon, 150,000 ohm 1/3 W.
18.	230024	Resistor	Carbon, 4000 ohm 1/3 W.
19.	239745	Resistor	Carbon, 1000 ohm 1/3 W.
20.	234537	Resistor	Carbon, 60 ohm 1 W.
21.	247852	Resistor	Wire wound, 60 ohm W.L.
22.	223086	Control	Volume, 500,000 ohm
23.	220024	Control	Tone, 70,000 ohm, with power switch

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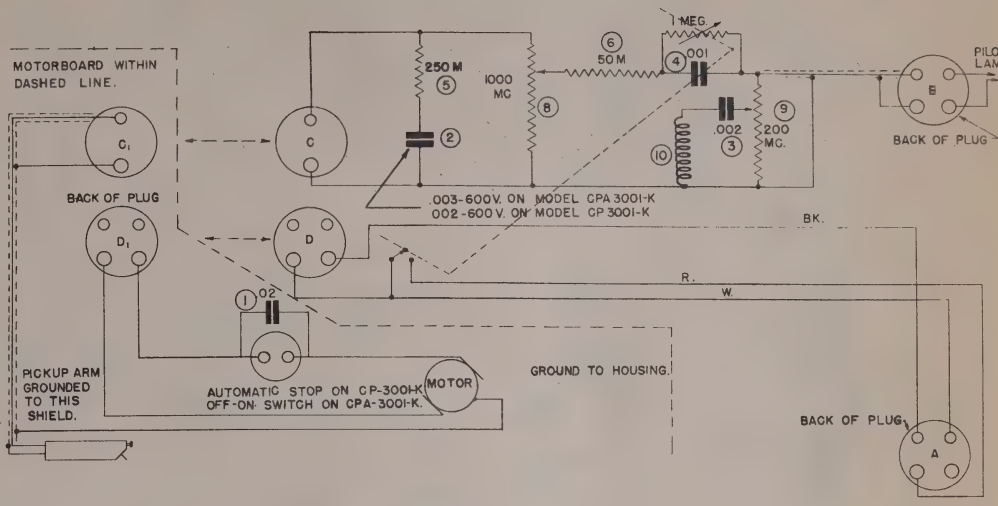
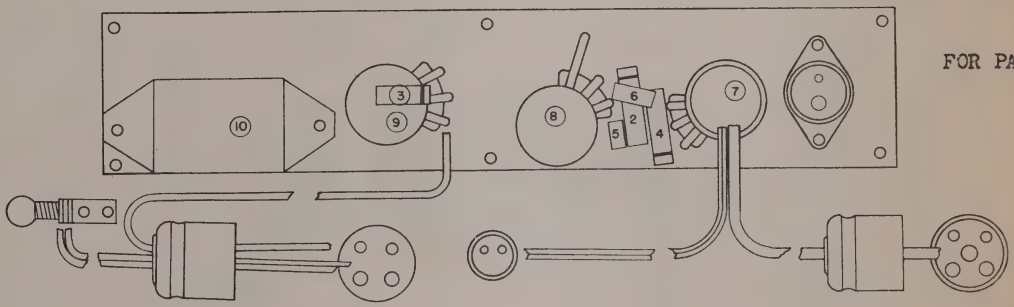
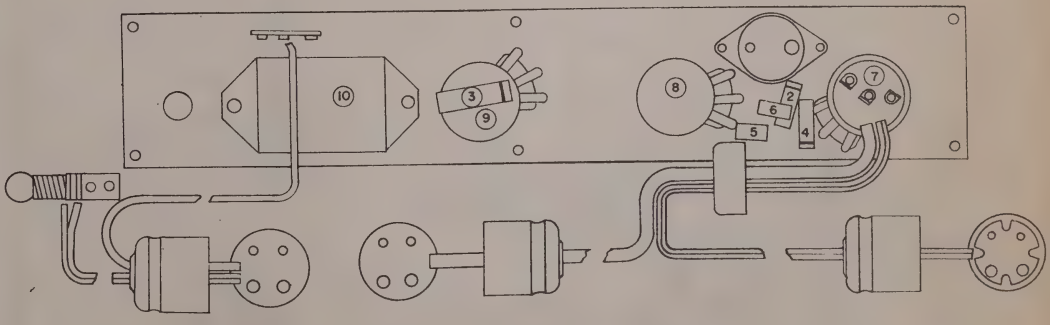
MODEL A-3001C

THE MAG



FOR PAR





A pronounced hum in this amplifier may often be traced to an unbalance in 6L6G tubes. If substitution of new tubes fails to remedy the condition, the 6C5 tube should be replaced as a possible cure.

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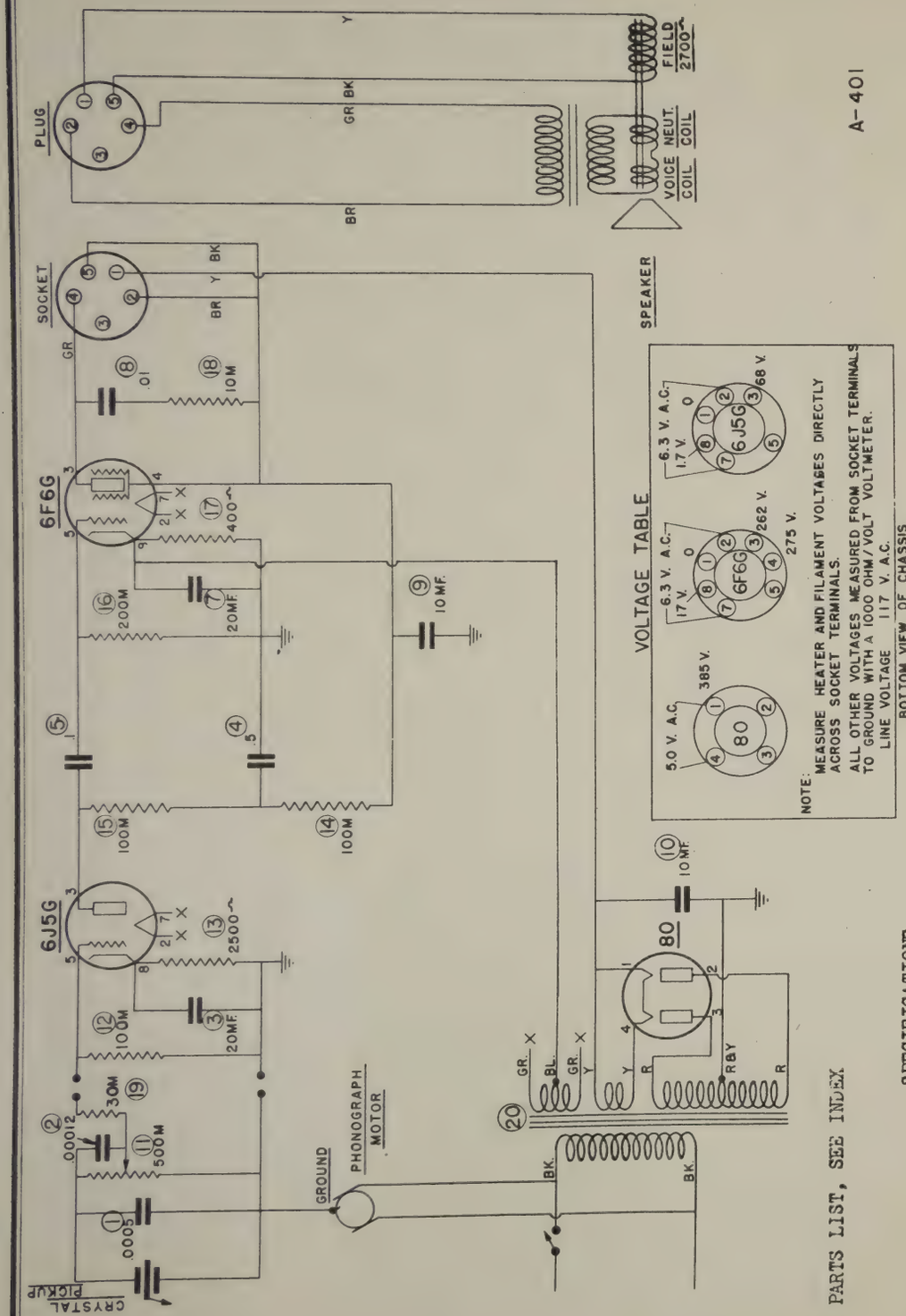
MODEL A-401

THE MAGNAVOX CO.



A-401

Several changes have been made in the values of parts used in this amplifier, since it was first released and it is suggested that the circuit of the amplifier requiring service be checked with the schematic shown in this bulletin and changes made if required.

FOR PARTS LIST, SEE INDEX

SPECIFICATIONS

Primary voltage.....117 V. AC;
Power consumption..... 45 watts;
Power output..... 3 watts;
Type tubes..... 1 - 6J5G, 1 - 6F6G, 1 - 80;
Speaker:
Field Coil..... 2700 ohms;
Transformer..... 7000 ohms;

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MODEL A-307P5
MODEL A-401

THE MAGNAVOX CO.

Illus. No.	Part No.	Part Name	Description MODEL A-401
1.	259774	Condenser	Moulded mica, .0005 mfd.
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3. 7.	279912	Condenser	Electrolytic, 20-20 mfd. 25 V.
4.	254147	Condenser	Tubular, .5 mfd. 400 V.
5.	254168	Condenser	Tubular, .1 mfd. 400 V.
8.	254158	Condenser	Tubular, .01 mfd. 400 V.
9. 10.	279911	Condenser	Electrolytic, 10-10 mfd. 450 V.
11.	223495	Control	Volume, 500,000 ohm
12.	234445	Resistor	Carbon, 100,000 ohm 1/2 W.
13.	234427	Resistor	Carbon, 2500 ohm 1/2 W.
14.	234445	Resistor	Carbon, 100,000 ohm 1/2 W.
15.	234445	Resistor	Carbon, 100,000 ohm 1/2 W.
16.	234447	Resistor	Carbon, 200,000 ohm 1/2 W.
17.	234509	Resistor	Carbon, 400 ohm 2 W.
18.	234473	Resistor	Carbon, 10,000 ohm 1 W.
19.	234437	Resistor	Carbon, 30,000 ohm 1/2 W.
20.	300139	Transformer	Power, 117 V. 60 cycle

MODEL A-307P5

If a high resistance A.C. voltmeter is connected between the chassis and ground, a reading will be obtained, however this does not indicate that the amplifier is "hot". This condition is caused by the fact that a .02 mfd. condenser is connected between the chassis and the supply line, therefore a low resistance voltmeter should be used to determine if the amplifier is actually "hot". If a slight shock is felt when the chassis is touched and the amplifier is operating, the supply plug should be reversed in the receptacle to correct this condition. This could happen only if the amplifier was connected to an alternating current supply.

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Low output with distortion and hum, are most likely due to one or two defective 25L6 tubes.

Illus. No.	Part No.	Part Name	Description
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3.	270017	Condenser	Molanode, 20 mfd. 150 V.
4.	254152	Condenser	Tubular, .1 mfd. 200 V.
5.	254127	Condenser	Tubular, .02 mfd. 600 V.
6.	254127	Condenser	Tubular, .02 mfd. 600 V.
7.	254153	Condenser	Tubular, .01 mfd. 600 V.
8.	254153	Condenser	Tubular, .01 mfd. 600 V.
9.	254161	Condenser	Tubular, .002 mfd. 600 V.
10.	254180	Condenser	Tubular, .005 mfd. 600 V.
11.	239755	Resistor	Carbon, 500,000 ohm 1/3 W.
12.	239755	Resistor	Carbon, 500,000 ohm 1/3 W.
13.	239755	Resistor	Carbon, 500,000 ohm 1/3 W.
14.	239755	Resistor	Carbon, 500,000 ohm 1/3 W.
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16.	230010	Resistor	Carbon, 250,000 ohm 1/3 W.
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18.	230024	Resistor	Carbon, 4000 ohm 1/3 W.
19.	239745	Resistor	Carbon, 1000 ohm 1/3 W.
20.	234537	Resistor	Carbon, 60 ohm 1 W.
21.	247852	Resistor	Wire wound, 60 ohm W.L.
22.	223086	Control	Volume, 500,000 ohm
23.	220024	Control	Tone, 70,000 ohm, with power switch

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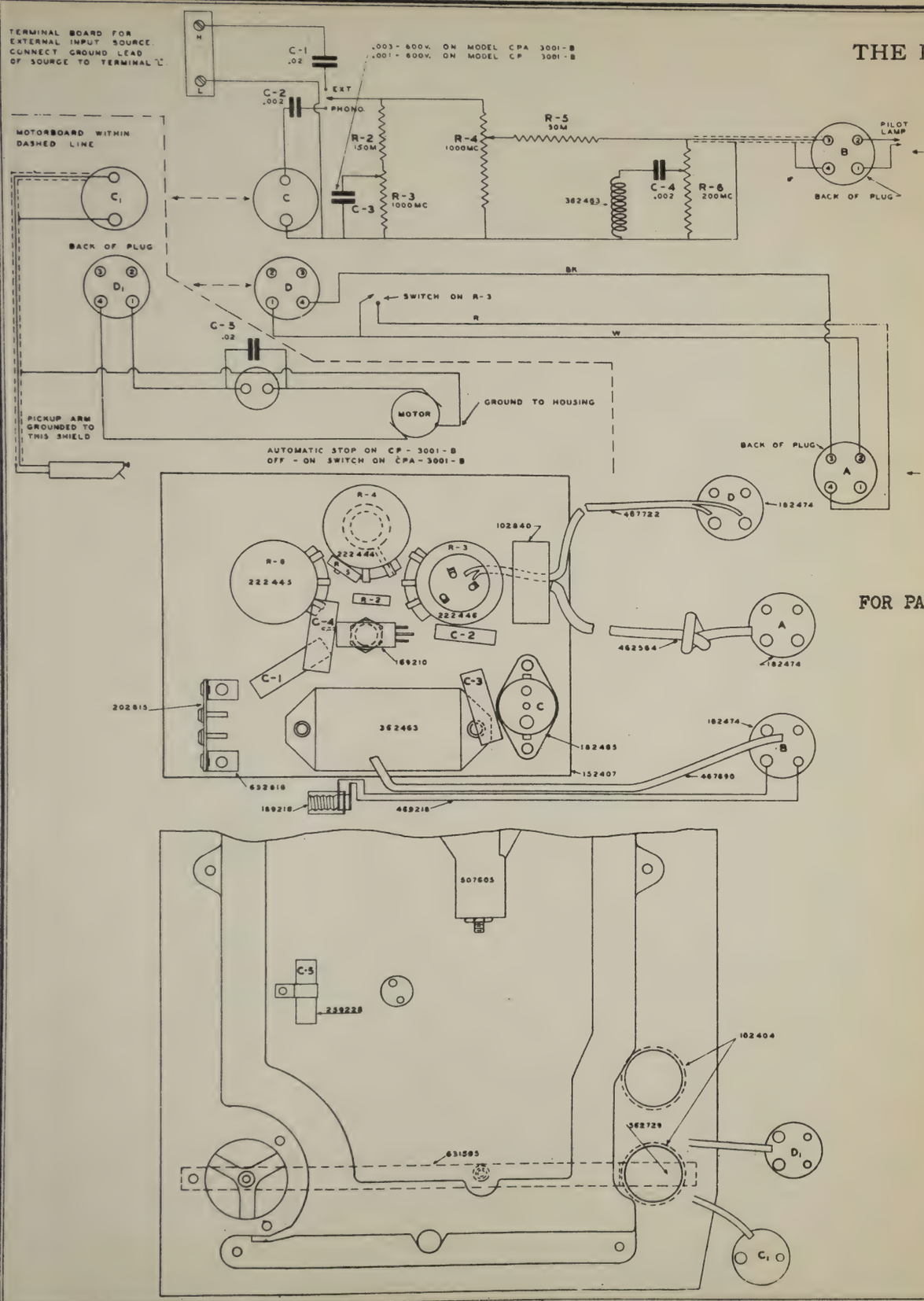
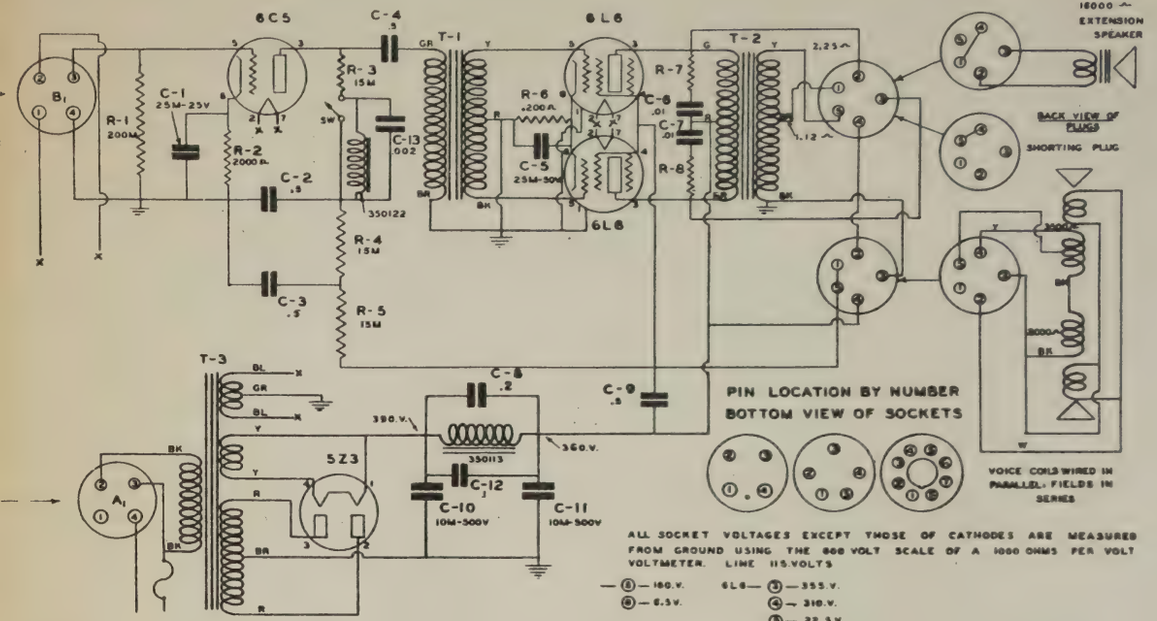
MODEL A-3001A

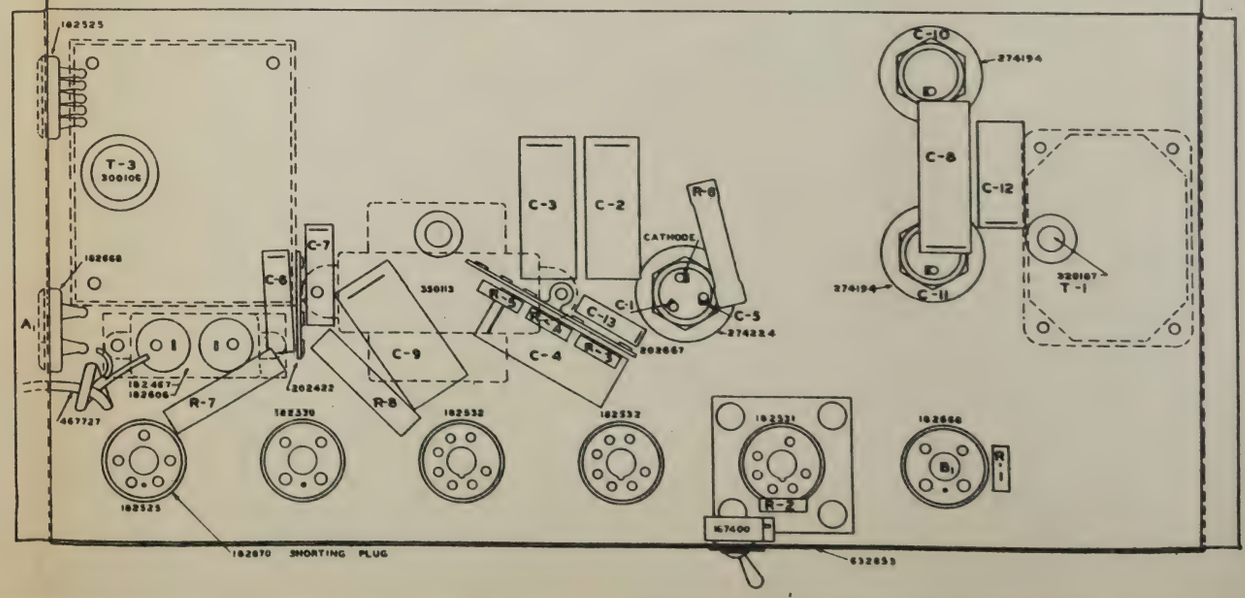
THE MAGNAVOX CO.





FOR PARTS LIST, SEE INDEX

Primary voltage.....117 V. AC;
Power consumption.....134 watts;
Input impedance.....200M ohms;
Output impedance.....2.25 ohms;
Power output..... 25 watts;



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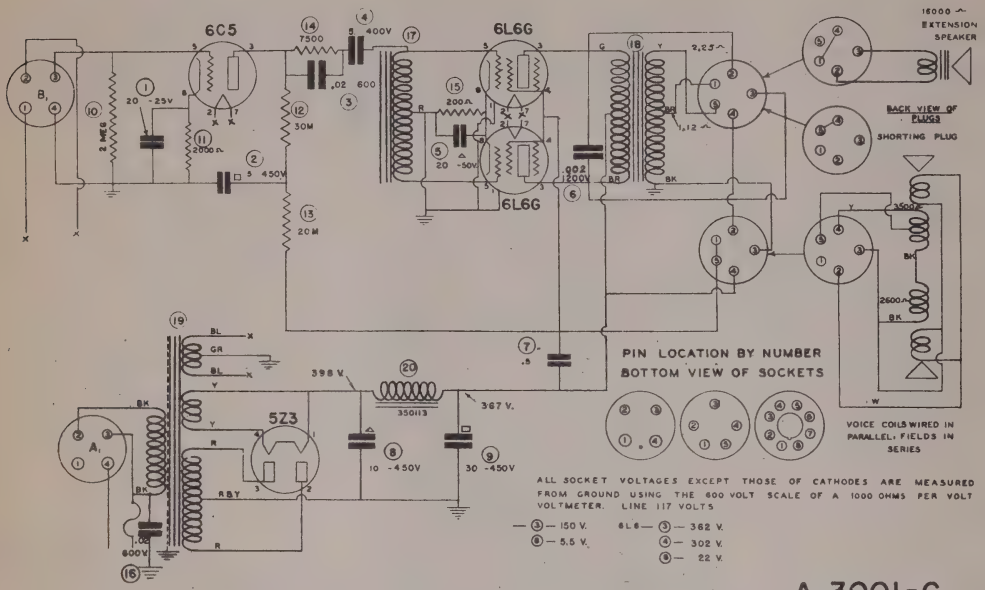
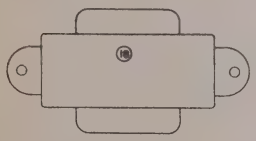
NAVOX CO.

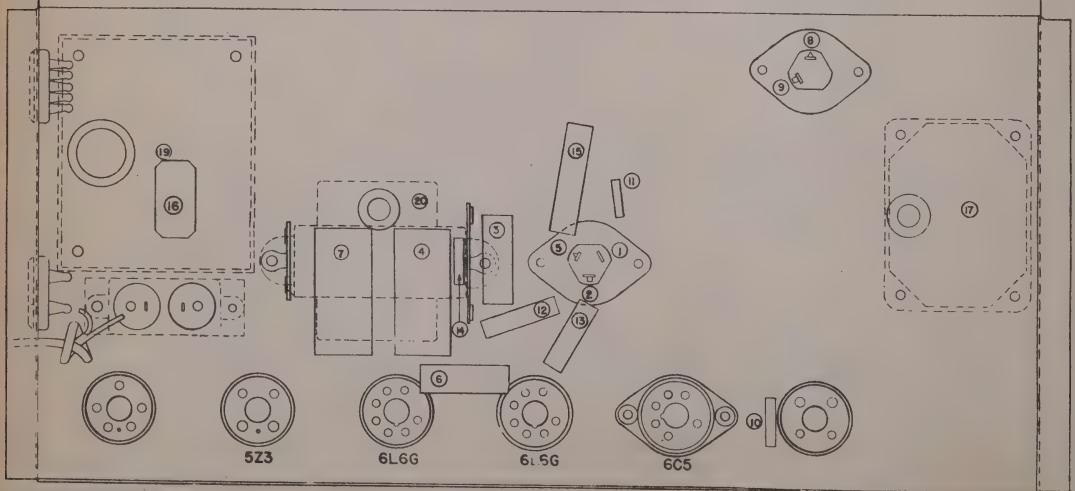

6C5
6L6G
6L6G
5Z3
350113
398 V.
367 V.
16000 ~ EXTENSION SPEAKER
BACK VIEW OF PLUGS
SHORTING PLUG
PIN LOCATION BY NUMBER
BOTTOM VIEW OF SOCKETS
VOICE COILS WIRED IN PARALLEL; FIELDS IN SERIES
ALL SOCKET VOLTAGES EXCEPT THOSE OF CATHODES ARE MEASURED FROM GROUND USING THE 600 VOLT SCALE OF A 1000 OHMS PER VOLT VOLTMETER. LINE 117 VOLTS
— ③ — 150 V. 6L6 — ③ — 362 V.
⑧ — 5.5 V. ④ — 302 V.
⑤ — 22 V.

A-3001-C

TS LIST, SEE INDEX



Primary voltage.....117 V. AC;
Power consumption.....134 watts;
Input impedance.....2 megohms;
Output impedance.....2.25 ohms;
Power output.....25 watts;



MODEL 04WG-804

MONTGOMERY-WARD & CO.

ALIGNMENT PROCEDURE

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.					1A29 ONLY: 1st I.F. (C19) & (C20); 2nd I.F. (C24) & (C25); 3rd I.F. (C28) & (C29)
456 KC	Grid of 1st Det.	.1 mf.	B Range See Note A	Turn Rotor to Full Open	1st I.F. (C17) & (C18); 2nd I.F. (C24) & (C25)
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C15)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note B	Ant. Range B (C4) Int. Range B (C9)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C43) (C16 on 1A29) Rock Rotor—See Note C
RANGE C					
7000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C14)
6000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C3) Int. Range C (C8)
RANGE D					
22,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13) Ant. Range D (C2) Int. Range D (C7)
21,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Rock Rotor—See Note C
LOOP RANGE B					
1500 KC See Note D	None—See Note D		B Range	Turn Rotor to Max. Output	Loop Trimmer (C23) See Note E
LOOP RANGE C					
6000 KC See Note D	None—See Note D		C Range	Turn Rotor to Max. Output	Loop Trimmer (C22) See Note E
LOOP RANGE D					
21,000 KC See Note D	None—See Note D		D Range	Turn Rotor to Max. Output	Loop Trimmer (C21) Rock Rotor—See Note C

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—For all adjustments, with the exception of the 3 loop range adjustments, the pin tip should be in the external antenna hole of the Antenna Selection Socket—See illustration on page one.

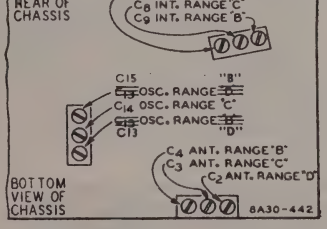
NOTE B—If the pointer is not at 1500 KC on the dial remove pointer from drive cord. Tune in a 1500 KC signal. Set pointer at the 1500 KC mark on the dial scale. Attach pointer to drive cord.

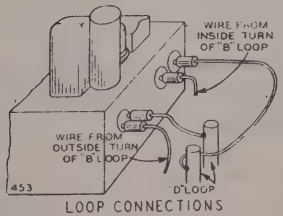
NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE D—Re-install set in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place signal generator so that this loop is between 3 and 10 feet from loop in cabinet. Insert pin tip in loop antenna hole of Antenna Selection Socket—See illustration on schematic page.

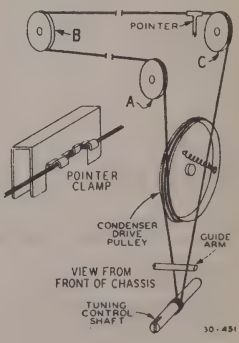
Note E (CONSOLE MODELS)—Turn knob of loop until output is maximum.

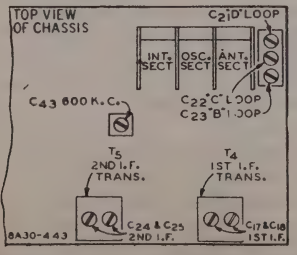
CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

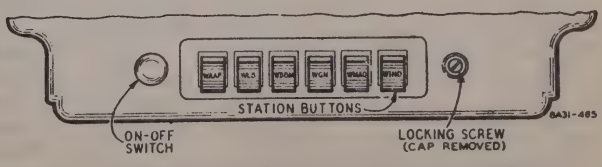




LOOP CONNECTIONS







CONVENTIONAL PUSH BUTTON ADJUSTMENTS

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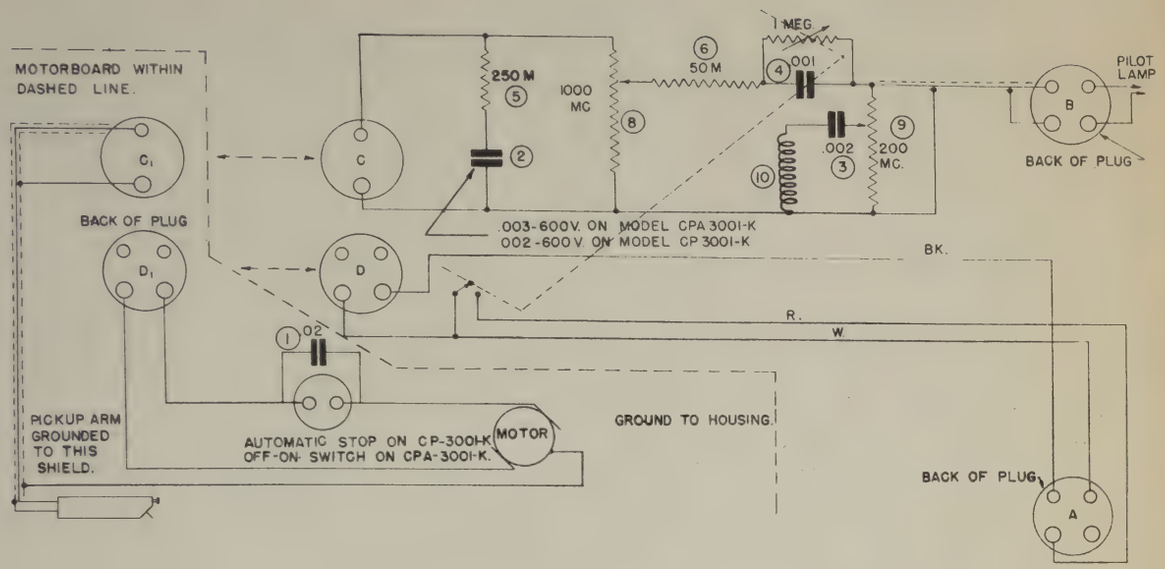
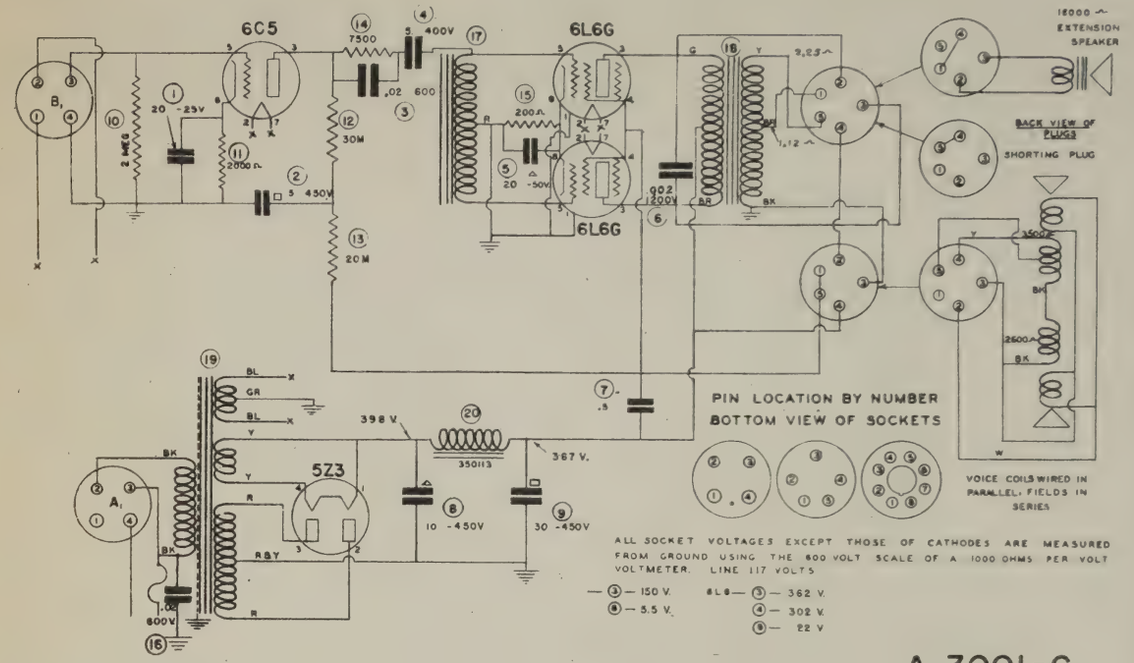
MODEL A-3001C

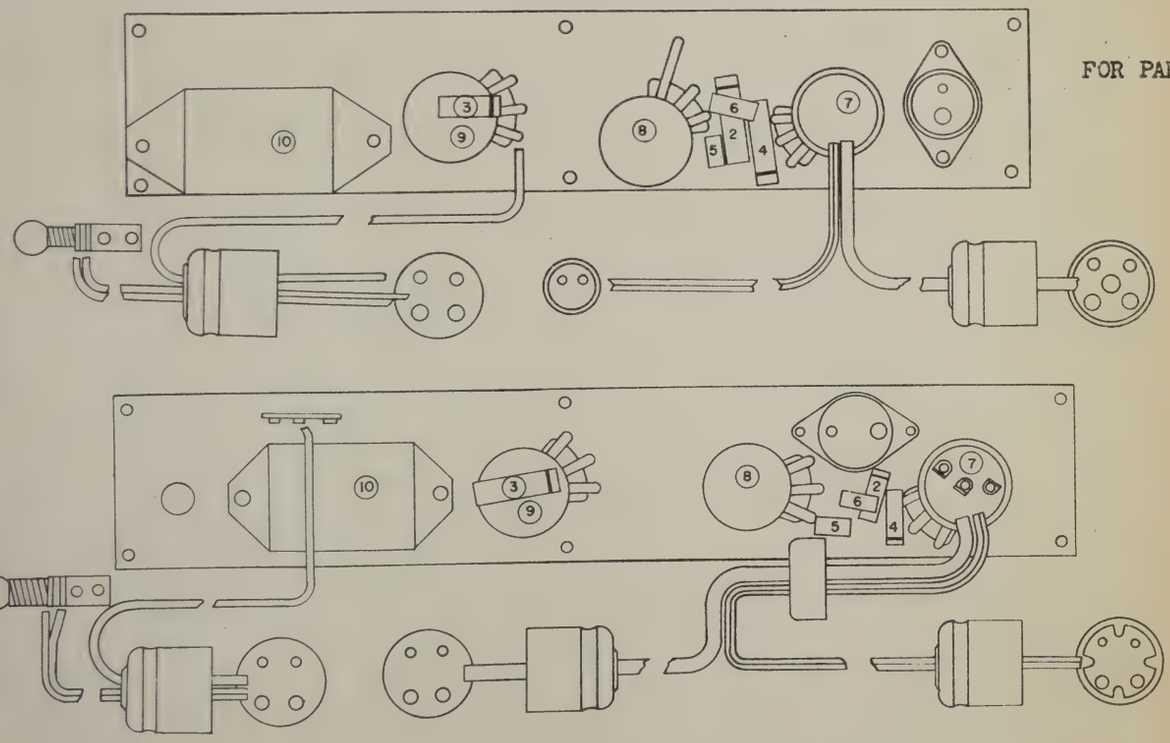
THE MAGNAVOX CO.





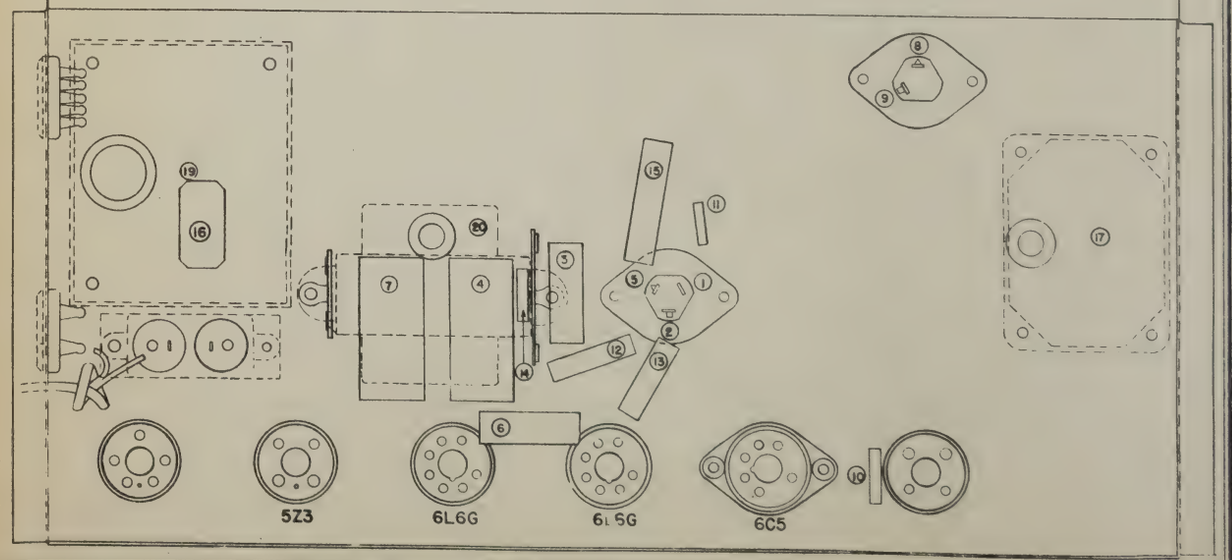
FOR PARTS LIST, SEE INDEX

A-3001-C



A pronounced hum in this amplifier may often be traced to an unbalance in 6L6G tubes. If substitution of new tubes fails to remedy the condition, the 6C5 tube should be replaced as a possible cure.

Primary voltage.....117 V. AC;
Power consumption.....134 watts;
Input impedance.....2 megohms;
Output impedance.....2.25 ohms;
Power output.....25 watts;



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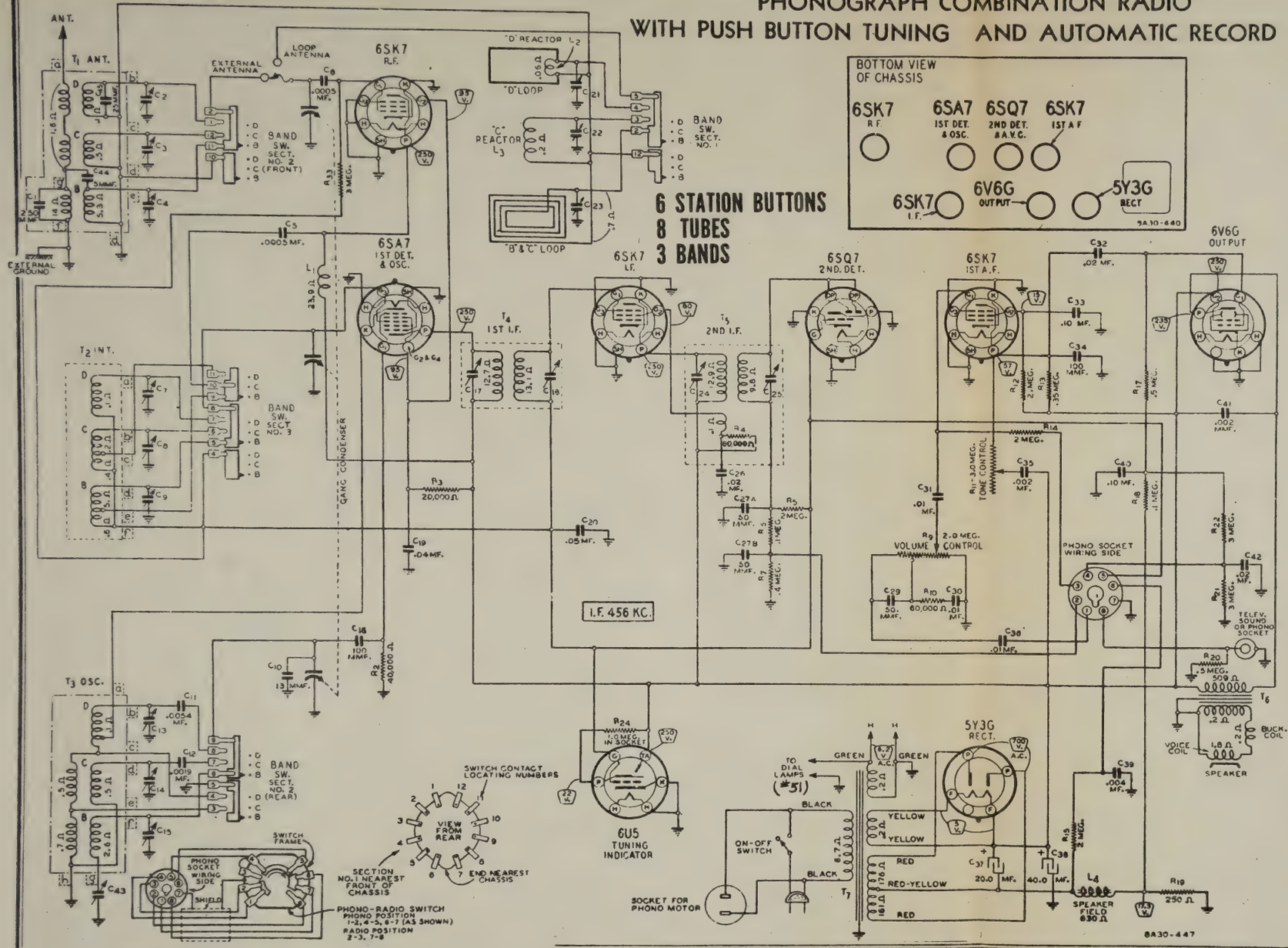
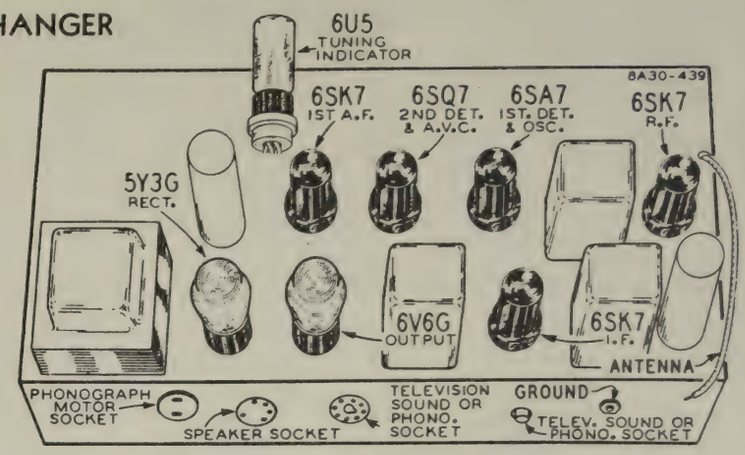
MODEL 04WG-804

MONTGOMERY-WARD & CO.
PHONOGRAPH COMBINATION RADIO
WITH PUSH BUTTON TUNING AND AUTOMATIC RECORD CHANGER

6 STATION BUTTONS
8 TUBES
3 BANDS





Antenna and Ground

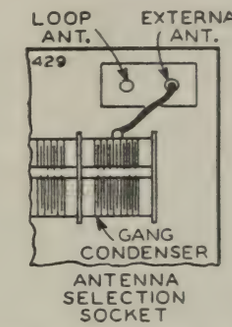
Two loop antennas are incorporated in the speaker chamber and may be used for broadcast band and short wave reception. For the reception of local or nearby stations, an outside antenna is usually not required. The use of the loop antenna may, in some locations, provide best broadcast band operation.

In general, however, more stations will be heard and noise will sometimes be reduced by using an outside antenna.

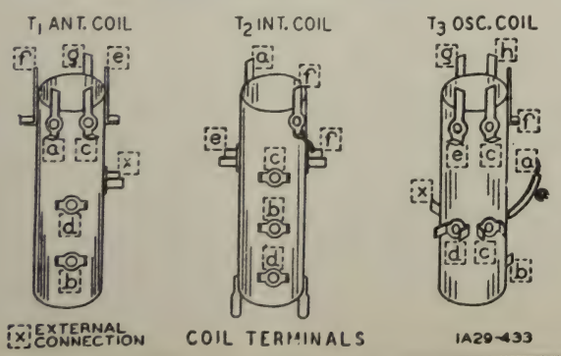
For best reception of short wave stations, an outside antenna is recommended.

A white wire will be found coming out of the chassis. Connect this wire to the outside antenna lead.

On the back panel of the chassis base is a screw (marked GND) under which the ground wire should be fastened.



ANTENNA SELECTION SOCKET—At the right front corner of the chassis base (from back of cabinet) is a 2 hole pin tip socket—See illustration. If it is desired to operate the radio using the loop antennas, the pin tip should be inserted in the hole farthest from the side of the chassis. If it is desired to operate the radio using an external antenna, insert the pin tip in the hole nearest the side of the chassis. The socket may be reached after removing the four wing nuts holding the cover over the opening in the cabinet back.



SPECIFICATIONS

Power Consumption - 71 Watts (At 117 volts 60 cycles)
88 Watts (Phonograph Operating)

Power Output - - - - - - 4.0 Watts Undistorted
5.0 Watts Maximum

Selectivity - - 30 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - - - - - 10" Electro-Dynamic

Receivers of this model which are to be used on 25 cycle, 230 volt, or other service are so marked on label.

Tuning Frequency Range

B Range	528 to 1730 KC
C Range	2200 to 7000 KC
D Range	7000 to 22000 KC

Sensitivity (For 0.5 Watt output)

B Range	1.0 Microvolt Average
C Range	1.0 Microvolt Average
D Range	3.0 Microvolts Average

Important—A good antenna and ground are essential for best operation of this radio. Connections should be clean and tight. Do not use an old outside antenna as in most cases it will be unsatisfactory.

Voltages at Sockets

Line Voltage—117.

Volume Control—Maximum.

Antenna Shorted to Ground.

Readings taken with 1000 ohm-per-volt meter. Plate and screen voltages are read on 500 volt scale.

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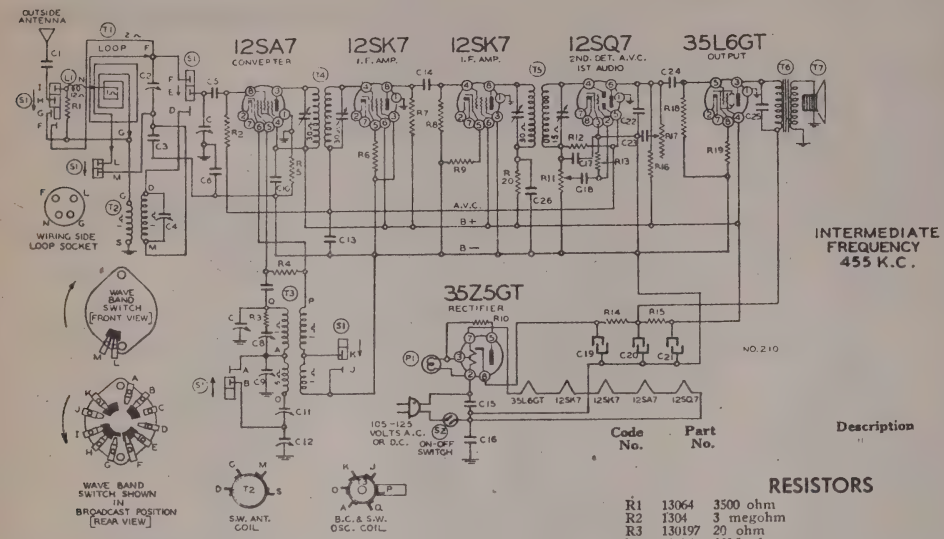
MODEL 14BR-695

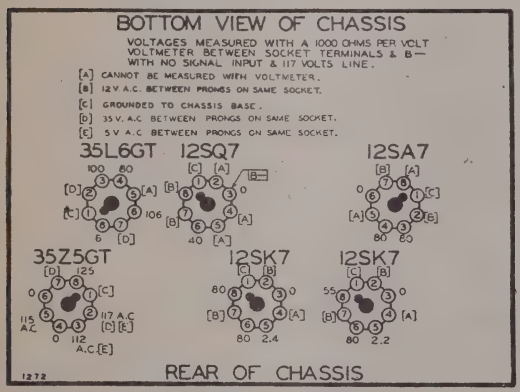
MONTGOMERY-WARD & CO.

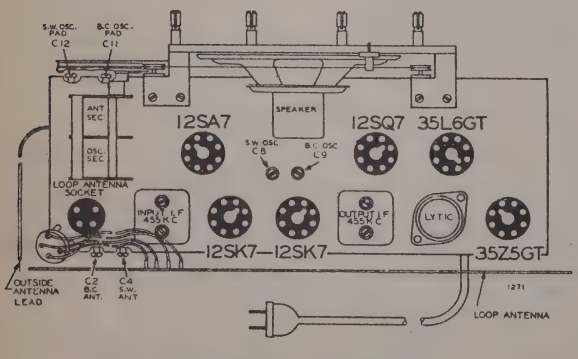


Code No.	Part No.	Description

RESISTORS

R1	13064	3500 ohm
R2	1304	3 megohm
R3	130197	20 ohm
R4	13076	30M ohm
R5	130100	150M ohm
R6	13097	200 ohm—½ w.
R7	13082	10M ohm—½ w.
R8	13019	1 megohm
R9	13083	300 ohm
R10	130215	25 ohm
R11	101215	1 megohm volume control
R12	1304	3 megohm
R13	130257	5 megohm
R14	130296	200 ohm—1 w.
R15	130287	1200 ohm—1 w.
R16	13011	250M ohm
R17	101216	1 megohm tone control
R18	1303	500M ohm
R19	130166	150 ohm
R20	13022	5M ohm—½ w.


BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH A 1000 OHMS PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & B— WITH NO SIGNAL INPUT & 117 VOLTS LINE.
[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] 12 V. A.C. BETWEEN PRONGS ON SAME SOCKET.
[C] GROUNDED TO CHASSIS BASE.
[D] 35 V. A.C. BETWEEN PRONGS ON SAME SOCKET.
[E] 5 V. A.C BETWEEN PRONGS ON SAME SOCKET.
35L6GT
12SQ7
12SA7
35Z5GT
12SK7
12SK7
REAR OF CHASSIS



FOR OTHER DATA SEE INDEX

CONDENSERS

C	102139	2 gang variable condenser
C1	10092	.001 x 600 v.
C2	124152	B.C. Antenna Trimmer
C3	1009	.05 x 200 v.
C4	124152	S.W. Antenna Trimmer
C5	1292	.0005 mica
C6	1001	.1 x 400 v.
C7	12960	.00015 mica
C8	124142	S.W. Oscillator trimmer
C9	124142	B.C. Oscillator trimmer
C10	1001	.1 x 400 v.
C11	124153	B.C. Oscillator pad
C12	124153	S.W. Oscillator pad
C13	1009	.05 x 200 v.
C14	1292	.0005 mica
C15	1001	.1 x 400 v.
C16	1001	.1 x 400 v.
C17	129158	.0002 mica
C18	10012	.003 x 600 v.
C19	11994	40 mfd. x 150 v. lytic
C20	11994	20 mfd. x 150 v. lytic
C21	11994	20 mfd. x 150 v. lytic
C22	1295	.0001 mica
C23	1007	.005 x 600 v.
C24	10011	.01 x 400 v.
C25	10026	.02 x 400 v.
C26	10013	.05 x 400 v.

C2 and C4 are in same unit C8 and C9 in same unit
C11 and C12 in same unit
C19, C20 and C21 in same unit

PARTS

T1	111217	Loop Antenna Assembly
T2	111219	S.W. Antenna coil
T3	110169	B.C. S.W. Oscillator Coil
T4	108169F	Input I.F. Coil—455 kc.
T5	108130F	Output I.F. Coil—455 kc.
T6	105104C	Output Transformer
T7	114224	5" P.M. Speaker
L1	1239	R.F. Choke coil
S1	125139	Wave band switch
S2		Switch on volume control
P1	107249	Pilot light

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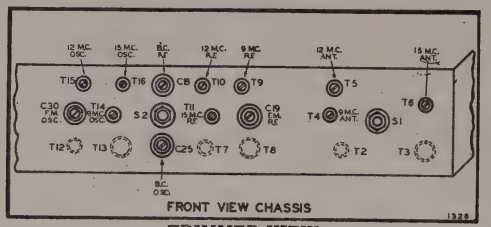
TECHNICAL DATA

POWER CONSUMPTION:
14BR-1400A....135 watts; 24BR-1401B....155 watts

Power Output - - - - - 10 Watts Undistorted
Sensitivity for 500 Milliwatt Output: 10 Microvolts Average
Selectivity - 27 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range Broadcast Band - - 540 to 1600 KC
31M Band - - - 9.1 to 10 MC
25M Band - - 11.4 to 12.1 MC
19M Band - - 14.9 to 15.4 MC
F. M. Band - - 41.5 to 50.5 MC
Intermediate Frequency - - - - - - {455 KC / 4300 KC
Speaker - - - - - 12 in. Electro Dynamic



FRONT VIEW CHASSIS
1328
TRIMMER VIEW

Broadcast and Short Wave Bands Alignment

- Tone control—Treble
- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted in Order Shown	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 No. 1	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top of T18	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top of T17	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C25 (See Trimmer View) C18 (See Trimmer on Top) C4	Osc. R. F. Ant.	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T7 Rotate Core T2 (See Iron Core Adjustment View)	R. F. Ant.	Adjust to maximum output

NOTE: The F. M., I. F. and R. F. band MUST be aligned before the three standard short wave bands can be properly aligned. The osc. and R. F. adjustments must be done simultaneously for each of the standard short wave bands.

31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) T14 (See Trimmer View) T9 (See Trimmer on Top) T4	Osc. R. F. Ant.	Adjust to maximum output
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15 (See Trimmer View) T10 (See Trimmer View) T5	Osc. R. F. Ant.	Adjust to maximum output
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16 (See Trimmer View) T11 (See Trimmer View) T6	Osc. R. F. Ant.	Adjust to maximum output

MODEL 04WG-804

MONTGOMERY-WARD & CO.

ALIGNMENT PROCEDURE

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.					1A29 ONLY: 1st I.F. (C19) & (C20); 2nd I.F. (C24) & (C25); 3rd I.F. (C28) & (C29)
456 KC	Grid of 1st Det.	.1 mf.	B Range See Note A	Turn Rotor to Full Open	1st I.F. (C17) & (C18); 2nd I.F. (C24) & (C25)
RANGE B					Oscillator Range B (C15)
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note B	Ant. Range B (C4) Int. Range B (C9)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C43) (C16 on 1A29) Rock Rotor—See Note C
RANGE C					
7000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C14)
6000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C3) Int. Range C (C8)
RANGE D					
22.000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
21,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C2) Int. Range D (C7) Rock Rotor—See Note C
LOOP RANGE B					
1500 KC See Note D	None—See Note D		B Range	Turn Rotor to Max. Output	Loop Trimmer (C23) See Note E
LOOP RANGE C					
6000 KC See Note D	None—See Note D		C Range	Turn Rotor to Max. Output	Loop Trimmer (C22) See Note E
LOOP RANGE D					
21,000 KC See Note D	None—See Note D		D Range	Turn Rotor to Max. Output	Loop Trimmer (C21) Rock Rotor—See Note C

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—For all adjustments, with the exception of the 3 loop range adjustments, the pin tip should be in the external antenna hole of the Antenna Selection Socket—See illustration on page one.

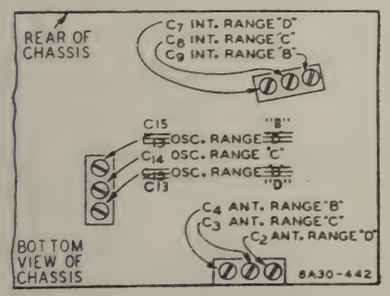
NOTE B—If the pointer is not at 1500 KC on the dial remove pointer from drive cord. Tune in a 1500 KC signal. Set pointer at the 1500 KC mark on the dial scale. Attach pointer to drive cord.

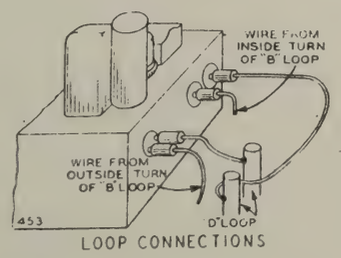
NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE D—Re-install set in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place signal generator so that this loop is between 3 and 10 feet from loop in cabinet. Insert pin tip in loop antenna hole of Antenna Selection Socket—See illustration on schematic page.

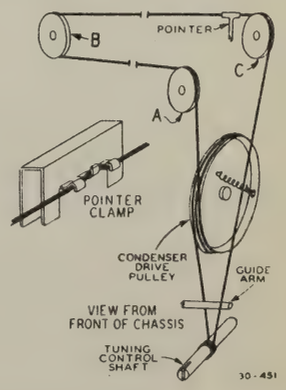
Note E (CONSOLE MODELS)—Turn knob of loop until output is maximum.

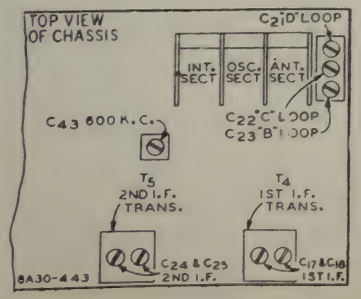
CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.





LOOP CONNECTIONS





CONVENTIONAL PUSH BUTTON ADJUSTMENTS

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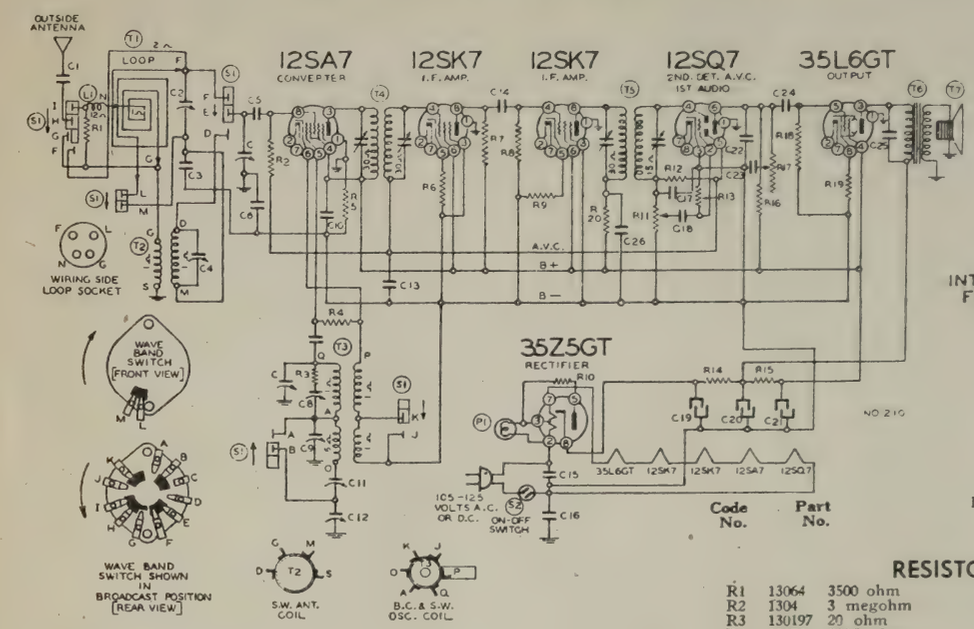
MODEL 14BR-695

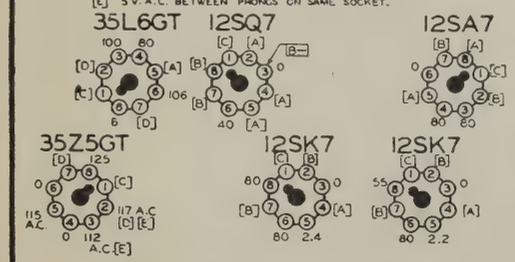
MONTGOMERY-WARD & CO.

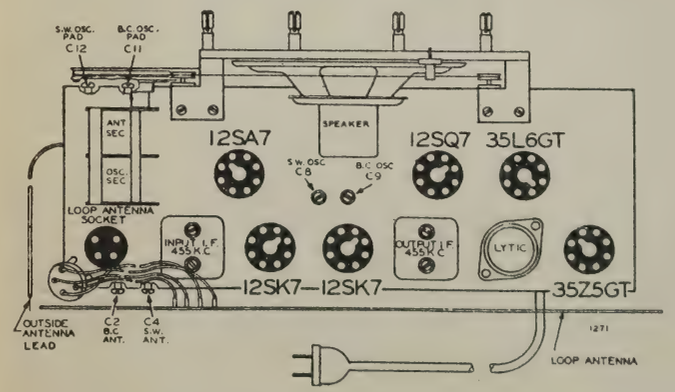


BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH A 1000 OHMS PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & B— WITH NO SIGNAL INPUT & 117 VOLTS LINE.

[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] 12 V.A.C. BETWEEN PRONGS ON SAME SOCKET.
[C] GROUNDED TO CHASSIS BASE.
[D] 35 V. A.C. BETWEEN PRONGS ON SAME SOCKET.
[E] 5 V.A.C. BETWEEN PRONGS ON SAME SOCKET.





FOR OTHER DATA SEE INDEX

	Code No.	Part No.	Description

RESISTORS

R1	13064		3500 ohm
R2	1304		3 megohm
R3	130197		20 ohm
R4	13076		30M ohm
R5	130100		150M ohm
R6	13097		200 ohm—½ w.
R7	13082		10M ohm—½ w.
R8	13019		1 megohm
R9	13083		300 ohm
R10	130215		25 ohm
R11	101215		1 megohm volume control
R12	1304		3 megohm
R13	130257		5 megohm
R14	130296		200 ohm—1 w.
R15	130287		1200 ohm—1 w.
R16	13011		250M ohm
R17	101216		1 megohm tone control
R18	1303		500M ohm
R19	130166		150 ohm
R20	13022		5M ohm—½ w.

CONDENSERS

C	102139	2 gang variable condenser
C1	10092	.001 x 600 v.
C2	124152	B.C. Antenna Trimmer
C3	1009	.05 x 200 v.
C4	124152	S.W. Antenna Trimmer
C5	1292	.0005 mica
C6	1001	.1 x 400 v.
C7	12960	.00015 mica
C8	124142	S.W. Oscillator trimmer
C9	124142	B.C. Oscillator trimmer
C10	1001	.1 x 400 v.
C11	124153	B.C. Oscillator pad
C12	124153	S.W. Oscillator pad
C13	1009	.05 x 200 v.
C14	1292	.0005 mica
C15	1001	.1 x 400 v.
C16	1001	.1 x 400 v.
C17	129158	.0002 mica
C18	10012	.003 x 600 v.
C19	11994	40 mfd. x 150 v. lytic
C20	11994	20 mfd. x 150 v. lytic
C21	11994	20 mfd. x 150 v. lytic
C22	1295	.0001 mica
C23	1007	.005 x 600 v.
C24	10011	.01 x 400 v.
C25	10026	.02 x 400 v.
C26	10013	.05 x 400 v.

C2 and C4 are in same unit C8 and C9 in same unit
C11 and C12 in same unit
C19, C20 and C21 in same unit

PARTS

T1	111217	Loop Antenna Assembly
T2	111219	S.W. Antenna coil
T3	110169	B.C. S.W. Oscillator Coil
T4	108169F	Input I.F. Coil—455 kc.
T5	108130F	Output I.F. Coil—455 kc.
T6	105104C	Output Transformer
T7	114224	5" P.M. Speaker
L1	1239	R.F. Choke coil
S1	125139	Wave band switch
S2		Switch on volume control
P1	107249	Pilot light

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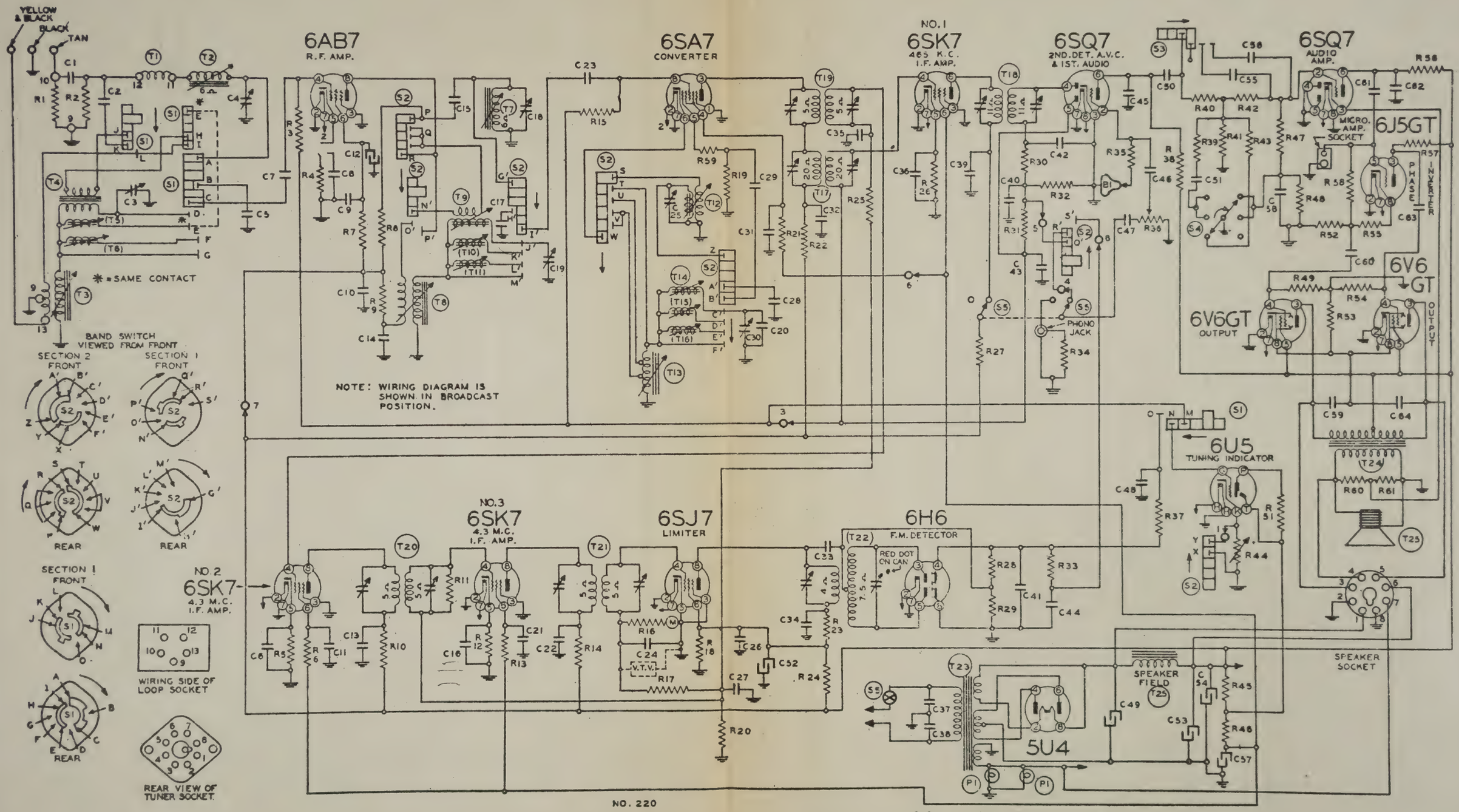
MODEL 14BR-1400A IS THE SAME AS MODEL 24BR-1401B EXCEPT THAT THE FORMER HAS NO RECORD CHANGER. SEE ALSO CHANGES IN PARTS LIST

MONTGOMERY-WARD & CO.

MODEL 14BR-1400A
MODEL 24BR-1401B



IF PEAKS: AM - 455 KC, FM - 4.3 MC

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F. M.—I. F.—R. F.—Alignment

CAUTION: A D.C. reading vacuum tube voltmeter must be used to make the following adjustments.

- Volume control—Minimum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:
- An all wave signal generator which will provide an accurately calibrated unmodulated signal at the test frequencies as listed.
- Vacuum Tube Voltmeter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf. and 100 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted in Order Shown	Trimmer Function	Adjustment
F. M. I. F.	4.3 Mc.	.1 MFD.	Grid of 6SK7 No. 3	F.M.	45 Mc.	Two Trimmers on Top of T21	Limiter I. F. Coil	Adjust to Maximum Voltage (See Note "A")
	4.3 Mc.	.1 MFD.	Grid of 6SA7	F.M.	45 Mc.	Two Trimmers on Top of T19	Input I. F. Coil	Adjust to Maximum Voltage (See Note "A" and "B")
	4.3 Mc.	.1 MFD.	Grid of 6SK7 No. 2	F.M.	45 Mc.	Two Trimmers on Top of T20	2nd I. F. Coil	Adjust to Maximum Voltage (See Note "A" and "C")
	4.3 Mc.	.1 MFD.	Grid of 6SJ7	F.M.	45 Mc.	Trimmer with red dot on top of T22	Disc. I. F. Coil	Adjust to zero voltage (See Note "D")
	4225 and 4375 K.C.	.1 MFD.	Grid of 6SJ7	F.M.	45 Mc.	Trimmer without red dot on top of T22	Disc. I. F. Coil	See Notes "D" and "E"
F. M. R. F.	50.5 Mc.	100 ohms	Doublet Antenna Lead	F.M.	50.5 Mc.	(See Trimmer View) C30 (See Trimmer View) C19 (See Trimmer View) C3	Osc. R. F. Ant.	Adjust to Maximum Voltage (See Note "A")

NOTE "A". Connect a D.C. reading vacuum tube voltmeter in parallel with C24. Use only enough signal to get a medium scale deflection.

NOTE "B". Before aligning this stage, one trimmer of T20 must be adjusted to maximum capacity and the other adjusted to minimum capacity.

NOTE "C". Do not realign or "Go over" the I.F. adjustments after the above procedure has been followed or an unsymmetrical wave shape will result.

NOTE "D". Connect across prongs 4 and 8 of 6H6 socket, a D.C. reading vacuum tube voltmeter.

NOTE "E". Adjust trimmer so that the same voltage reading will be obtained with the signal generator set at both 4225 K.C. and 4375 K.C. One of these frequencies will produce a negative voltage and the voltmeter leads must be reversed if a zero-center meter is not available.

FREQUENCY MODULATION (F.M.) BAND

F.M. stations are not operating in all communities as yet and since their transmitting range is seldom more than 50 miles you will not hear stations on this band unless you are near a transmitter.

OPERATING THE F.M. BAND

Turn the radio on in the usual manner and turn the band switch knob to the F.M. band—Tune the pointer slowly over the F.M. dial scale. If you hear a station tune it in correctly with the tuning eye.

TUNING EYE—F.M. BAND

The tuning eye is normally almost closed on the F.M. Band when not tuned to a station.

When tuning an F.M. station the eye will overlap as the pointer approaches the station from one side and will open when approaching from the other side. Midway between these two points the station will be tuned correctly and the eye will be nearly closed just as it is when not tuned to a station.

TUNING EYE ADJUSTMENT SCREW

The tuning eye is adjusted for proper operation at the factory, however, if the eye tube is ever replaced it may require readjustment. With the radio tuned to the F.M. band but not on a station, turn the adjustment screw on top of the chassis until the eye almost closes. This adjustment must be made with the 6SJ7 tube out of its socket.

MONTGOMERY-WARD & CO.

MODEL 14WG-683A
MODEL 14WG-683B

MODEL 14WG-683B

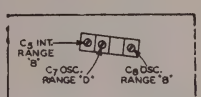
In the issue "B" chassis, a loading coil with an adjustable iron core is connected across the secondary winding of the shortwave loop aerial—See partial schematic circuit diagram below.

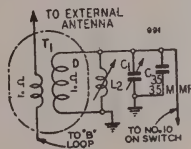
The interstage range "D" and interstage range "B" trimmers have been relocated—See trimmer illustrations below.

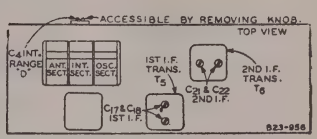
ADDITIONAL ALIGNMENT PROCEDURE

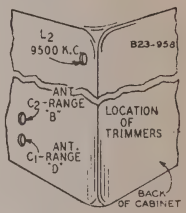
FIRST COMPLETE THE ALIGNMENT PROCEDURE THROUGH LOOP RANGE "B", AS GIVEN IN THE ALIGNMENT PROCEDURE ON THE OTHER SIDE OF THIS PAGE. THEN MAKE THE FOLLOWING ADJUSTMENTS:

SIGNAL GENERATOR			DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER OR DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION				
LOOP RANGE D 17,500 KC	External Antenna Clip	External Ground Clip	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Int. Range D (C4) Rock Rotor—See Note B
9,500 KC	Same as Above	Same as Above	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D Loading Coil









Supplement to Schematic

The following NEW PARTS are used in issue "B" models:

Part No.	Description	Selling Price
9A1437	L2 Loading Coil Assembly	$0.36
17A116	C4 Trimmer Condenser	.10

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 14WG-683A,B

GENERAL INFORMATION

ANTENNA

This radio is equipped with 2 built-in Airwave Loop Aerials. One of these is used for Broadcast Band reception. The other is used for reception on the Short Wave Band. For reception of local or powerful nearby stations, no other antenna or ground is usually required. Directional effects are obtained when using the Broadcast Band loop aerial. Rotate the radio until signal pickup is at a maximum and there is least interference from nearby stations.

More stations will be heard and noise will often be reduced by using an outside antenna and a good ground.

For locations in the city or close to broadcasting stations, the antenna should be 20 to 35 feet in length while for locations in the country or at a distance from the broadcasting stations, use a 35 to 60 foot antenna.

A GROUND CONNECTION IS REQUIRED if an external antenna is used. A ground connection may be obtained by connecting to a water pipe, radiator, or pipe driven into the ground.

The antenna and ground connections are made at the clips on the loop antenna. Pass the antenna and ground leads through the holes in the cabinet back. Connect the antenna lead to either clip and the ground lead to the other clip—See illustration.

TUBES AND DIAL LAMP

The tube types and position of the tubes and tube shields are shown in the illustration. All tubes must be in the sockets to operate the radio.

AC-DC Operation—The dial lamp must be in its socket to operate the radio.

CAUTION—If the dial lamp burns out, it should be replaced at once. Use ONLY a No. 47 dial lamp.

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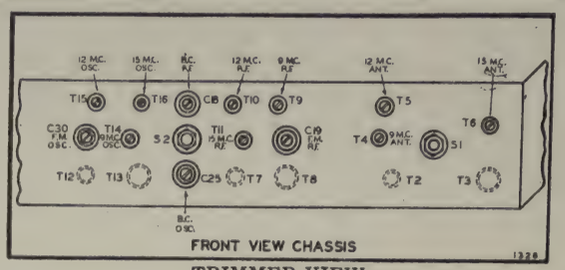
TECHNICAL DATA

POWER CONSUMPTION:
14BR-1400A....135 watts; 24BR-1401B....155 watts

Power Output - - - - - 10 Watts Undistorted
Sensitivity for 500 Milliwatt Output: 10 Microvolts Average
Selectivity - 27 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range Broadcast Band - - 540 to 1600 KC
31M Band - - - 9.1 to 10 MC
25M Band - - 11.4 to 12.1 MC
19M Band - - 14.9 to 15.4 MC
F. M. Band - - 41.5 to 50.5 MC
Intermediate Frequency - - - - - - {455 KC / 4300 KC
Speaker - - - - - 12 in. Electro Dynamic



FRONT VIEW CHASSIS
1228
TRIMMER VIEW

Broadcast and Short Wave Bands Alignment

- Tone control—Treble
- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted in Order Shown	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 No. 1	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top of T18	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top of T17	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C25 (See Trimmer View) C18 (See Trimmer on Top) C4	Osc. R. F. Ant.	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T7 Rotate Core T2 (See Iron Core Adjustment View)	R. F. Ant.	Adjust to maximum output

NOTE: The F. M., I. F. and R. F. band MUST be aligned before the three standard short wave bands can be properly aligned. The osc. and R. F. adjustments must be done simultaneously for each of the standard short wave bands.

31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) T14 (See Trimmer View) T9 (See Trimmer on Top) T4	Osc. R. F. Ant.	Adjust to maximum output
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15 (See Trimmer View) T10 (See Trimmer View) T5	Osc. R. F. Ant.	Adjust to maximum output
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16 (See Trimmer View) T11 (See Trimmer View) T6	Osc. R. F. Ant.	Adjust to maximum output

F. M.—I. F.—R. F.—Alignment

CAUTION: A D.C. reading vacuum tube voltmeter must be used to make the following adjustments.

- Volume control—Minimum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:
- An all wave signal generator which will provide an accurately calibrated unmodulated signal at the test frequencies as listed.
- Vacuum Tube Voltmeter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf. and 100 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted in Order Shown	Trimmer Function	Adjustment
F. M. I. F.	4.3 Mc.	.1 MFD.	Grid of 6SK7 No. 3	F.M.	45 Mc.	Two Trimmers on Top of T21	Limiter I. F. Coil	Adjust to Maximum Voltage (See Note "A")
	4.3 Mc.	.1 MFD.	Grid of 6SA7	F.M.	45 Mc.	Two Trimmers on Top of T19	Input I. F. Coil	Adjust to Maximum Voltage (See Note "A" and "B")
	4.3 Mc.	.1 MFD.	Grid of 6SK7 No. 2	F.M.	45 Mc.	Two Trimmers on Top of T20	2nd I. F. Coil	Adjust to Maximum Voltage (See Note "A" and "C")
	4.3 Mc.	.1 MFD.	Grid of 6SJ7	F.M.	45 Mc.	Trimmer with red dot on top of T22	Disc. I. F. Coil	Adjust to zero voltage (See Note "D")
	4225 and 4375 K.C.	.1 MFD.	Grid of 6SJ7	F.M.	45 Mc.	Trimmer without red dot on top of T22	Disc. I. F. Coil	See Notes "D" and "E"
F. M. R. F.	50.5 Mc.	100 ohms	Doublet Antenna Lead	F.M.	50.5 Mc.	(See Trimmer View) C30 (See Trimmer View) C19 (See Trimmer View) C3	Osc. R. F. Ant.	Adjust to Maximum Voltage (See Note "A")

NOTE "A". Connect a D.C. reading vacuum tube voltmeter in parallel with C24. Use only enough signal to get a medium scale deflection.

NOTE "B". Before aligning this stage, one trimmer of T20 must be adjusted to maximum capacity and the other adjusted to minimum capacity.

NOTE "C". Do not realign or "Go over" the I.F. adjustments after the above procedure has been followed or an unsymmetrical wave shape will result.

NOTE "D". Connect across prongs 4 and 8 of 6H6 socket, a D.C. reading vacuum tube voltmeter.

NOTE "E". Adjust trimmer so that the same voltage reading will be obtained with the signal generator set at both 4225 K.C. and 4375 K.C. One of these frequencies will produce a negative voltage and the voltmeter leads must be reversed if a zero-center meter is not available.

FREQUENCY MODULATION (F.M.) BAND

F.M. stations are not operating in all communities as yet and since their transmitting range is seldom more than 50 miles you will not hear stations on this band unless you are near a transmitter.

OPERATING THE F.M. BAND

Turn the radio on in the usual manner and turn the band switch knob to the F.M. band—Tune the pointer slowly over the F.M. dial scale. If you hear a station tune it in correctly with the tuning eye.

TUNING EYE—F.M. BAND

The tuning eye is normally almost closed on the F.M. Band when not tuned to a station.

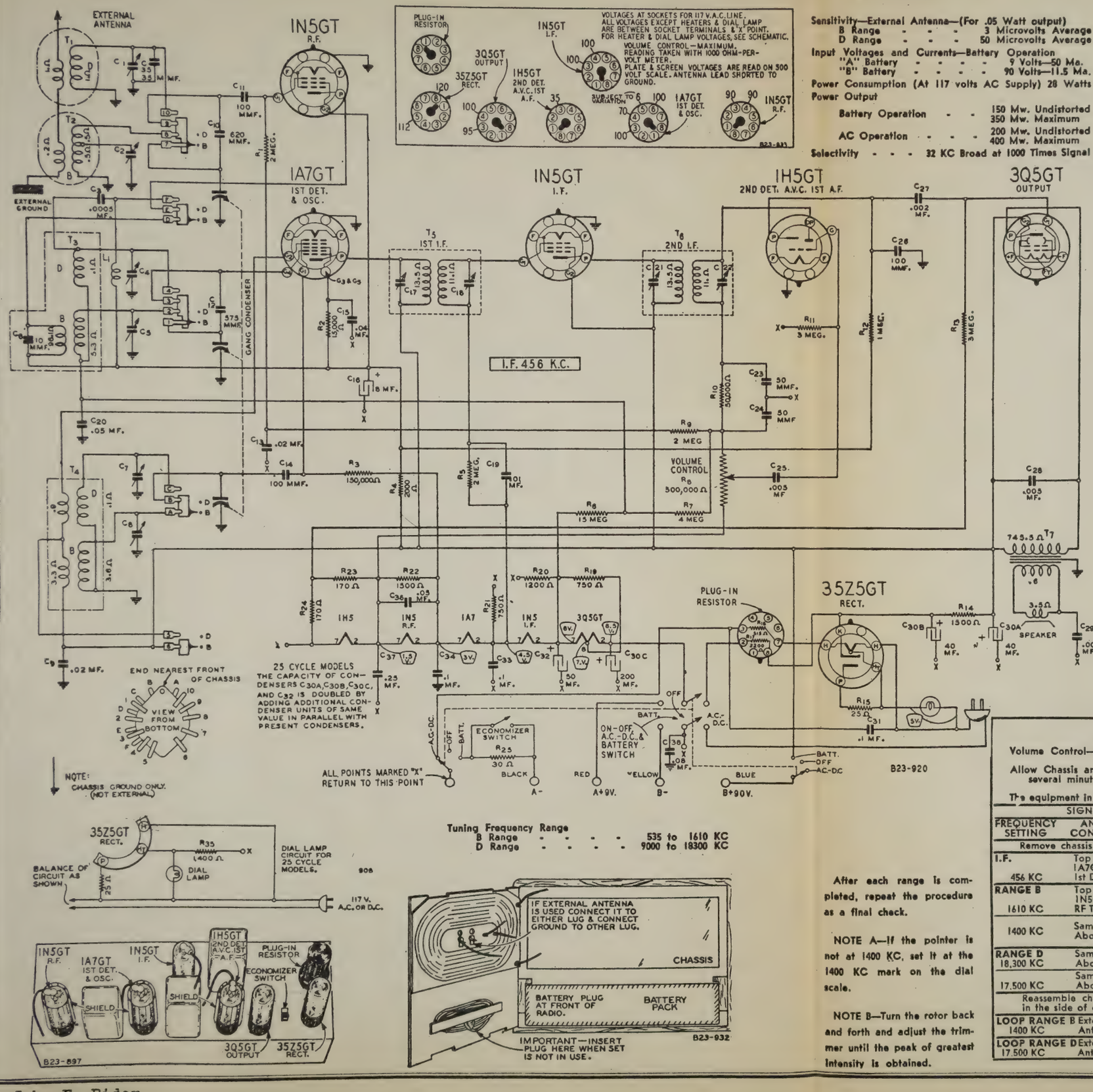
When tuning an F.M. station the eye will overlap as the pointer approaches the station from one side and will open when approaching from the other side. Midway between these two points the station will be tuned correctly and the eye will be nearly closed just as it is when not tuned to a station.

TUNING EYE ADJUSTMENT SCREW

The tuning eye is adjusted for proper operation at the factory, however, if the eye tube is ever replaced it may require readjustment. With the radio tuned to the F.M. band but not on a station, turn the adjustment screw on top of the chassis until the eye almost closes. This adjustment must be made with the 6SJ7 tube out of its socket.

MODEL 14WG-683A

MONTGOMERY-WARD & CO.



Sensitivity—External Antenna—(For .05 Watt output)

B Range	3 Microvolts Average
D Range	50 Microvolts Average

Input Voltages and Currents—Battery Operation

"A" Battery	9 Volts—50 Ma.
"B" Battery	90 Volts—11.5 Ma.

Power Consumption (At 117 volts AC Supply) 28 Watts

Power Output

Battery Operation	150 Mw. Undistorted 350 Mw. Maximum
AC Operation	200 Mw. Undistorted 400 Mw. Maximum

Selectivity — 32 KC Broad at 1000 Times Signal

Tuning Frequency Range

B Range	535 to 1610 KC
D Range	9000 to 18300 KC

IF EXTERNAL ANTENNA IS USED CONNECT IT TO EITHER LUG & CONNECT GROUND TO OTHER LUG.
CHASSIS
BATTERY PLUG AT FRONT OF RADIO.
BATTERY PACK
IMPORTANT—INSERT PLUG HERE WHEN SET IS NOT IN USE.
B23-932

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC, set it at the 1400 KC mark on the dial scale.

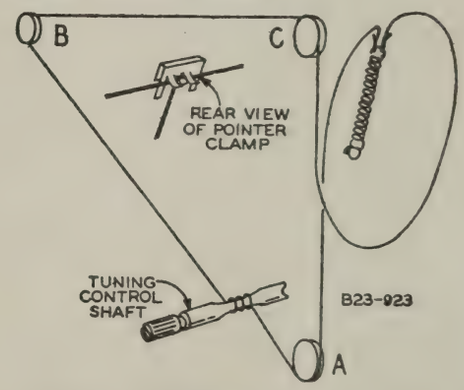
NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

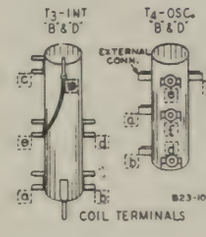
DRIVE CORD REPLACEMENT

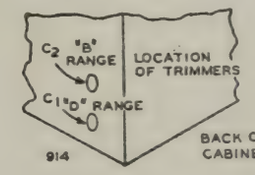
Turn gang condenser to full open position —See illustration. Using a new drive cord 33" in length, tie one end to tension spring. Pass the other end through hole in rim of drive pulley. Pull spring flush against inside of pulley rim. Wind cord ¼ turn around drive pulley toward front of chassis. Continue cord under chassis idler pulley "A." Wind 3 turns clockwise (from front of chassis) around tuning control shaft. Turns should progress away from chassis.

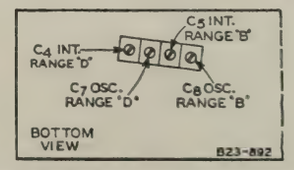
Pass cord around idler pulleys "B" and "C" as shown in illustration.

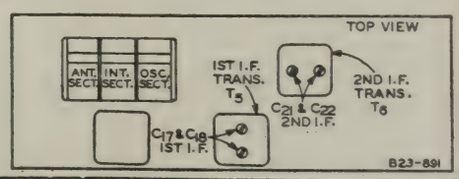
Continue cord ¾ turn counter-clockwise (from gang end of chassis) around drive pulley. Turn should be on right side of pulley groove (from front of chassis). Pass cord through hole in pulley rim and tie to end of tension spring. Secure free end of tension spring to hook on pulley.











ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

SIGNAL GENERATOR						
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER OR DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM
Remove chassis from cabinet—disconnect the 3 loop leads at terminal strip on chassis.						
I.F. 456 KC	Top Grid 1A7GT 1st Det.	Point "X" {1H5GT—2nd Det. Prong No. 7}	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C21) & (C22) 1st I.F. (C17) & (C18)
RANGE B 1610 KC	Top Grid 1N5GT RF Tube	Same as Above	.1 mf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C8)
1400 KC	Same as Above	Same as Above	.1 mf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note A	Int. Range B (C5)
RANGE D 18,300 KC	Same as Above	Same as Above	.1 mf.	D Range	Turn Rotor to Full Open	Oscillator Range D (C7)
17,500 KC	Same as Above	Same as Above	.1 mf.	D Range	Turn Rotor to Max. Output	Int. Range D (C4) Rock Rotor—See Note B
Reassemble chassis in the cabinet. Resolder loop leads. Both antenna terminals are reached through openings in the side of cabinet.						
LOOP RANGE B 1400 KC	External Antenna Clip	External Ground Clip	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C2)
LOOP RANGE D 17,500 KC	External Antenna Clip	External Ground Clip	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1)

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MONTGOMERY-WARD & CO.

BATTERY OPERATION

The following battery pack is required:

Battery Pack Catalog No. 62-5015

Note the position of the prongs on the battery cable plug and the holes in the socket on the battery. Then insert the plug in the socket. Place the pack in the cabinet with the socket facing toward the front of the cabinet.

Wind the line cord around the reel on the back cover of the cabinet. Insert the line cord plug in the hole in the bottom of the reel.

Economizer Switch — When the battery pack is new, push the Economizer Switch on top of the chassis toward the front of the chassis.

When the battery pack has been in use for approximately 100 hours and reception becomes weak, push the Economizer Switch toward the back of the chassis.

The position of the Economizer Switch does not affect the radio when operating on AC or DC.

AC-DC OPERATION

Unwind power line cord from reel and pass cord through opening at lower right hand corner of back.

Check Your Line Voltage—Unless otherwise marked, this radio must be operated on a power supply of 105-125 volts AC, 50 to 60 cycles only, or 105-125 volts DC.

Radios for 25 cycle AC operation are so marked.

When using the radio on AC, if there appears to be excessive hum, reverse the plug. Leave the plug inserted the way which gives the least hum.

110 Volt DC Operation—Insert plug so that prong on same side as *ribbed* side of *cord* is on the positive side of the line. *CAUTION*—If polarity of line is not known, insert plug; if set does not operate after one minute, reverse plug.

REMOVING CHASSIS FROM CABINET

Pull off the 3 control knobs. Remove the spring nut from the band switch shaft. With the band switch in the "BC" position, lift the band switch lever off the shaft. Unscrew the 2 nuts at the back of the chassis and the bolt from the front. CAUTION—Do not push on bolts while unscrewing nuts, as they will tear cabinet covering. Disconnect chassis leads and pull chassis out of the cabinet.

REPLACEMENT PARTS LIST

MISCELLANEOUS

Part No.	Description	Selling Price
12A395	5¼" P.M. Dynamic Speaker complete with Output Transformer	$2.98
	Cone and Voice Coil Assembly (Specify part number and letters stamped on the above speaker)	1.06
	Output Transformer for above Speaker	1.06
14X286	Grille Cloth for Speaker	.10
10A382	Knob (Off Switch—AC-DC—Battery Switch)	.06
10A383	Knob (Tuning Control)	.06
10A384	Knob (Volume Control)	.06
3A303	Tube or Resistor Socket—Octal (8 Prong)	.06
30X44	Grid Caps — Doz.	.06
32X174	Tube Shield	.06
13X328	Line Cord and Plug Assembly	.18
2A204	Off Switch—AC-DC—Battery Switch	.46
2A205	Band Change Switch	.46
2A175	Economizer Switch	.10
28X265	Phosphor Bronze Ground Plate (Under 2nd I.F. Can)	.06
13X430	"A" and "B" Battery Cable and Plug Assembly	.22
28X286	Plug Button — Ea.	.06

TRANSFORMERS AND COILS

9A1431	T1	Loop Aerial Assembly (Short Wave Band)	$0.36
9A1435	T2	Loop Aerial Assembly (Broadcast Band)	.60
9A1440	T3	R.F. Interstage Transformer and Can Assembly complete with 10 mmf. Condenser	.78
9A1436	T4	Oscillator Coil Assembly	.66
9A1438	T5	1st I.F. Transformer and Can Assembly	.58
9A1439	T6	2nd I.F. Transformer and Can Assembly	.58
	T7	Output Transformer (See "Miscellaneous")	
9A1115	L1	Plate Reactor	.58

CONDENSERS

17A132	C1	2-25 mmf.	Loop Range "D"	Trimmer	$0.12
	C2	2-25 mmf.	Loop Range "B"		
B66501	C3	.0005 mf.	200 Volts Tubular		.06
17A171	C4	2.5-25 mmf.	Interstage Range "D"	Trimmer	.30
	C5	2.5-25 mmf.	Interstage Range "B"		
	C7	2.5-25 mmf.	Oscillator Range "D"		
	C8	4-40 mmf.	Oscillator Range "B"		
47X111	C6	10 mmf.	Molded		.06
D66203	C9	.02 mf.	400 Volts Tubular		.06
46X337	C10	620 mmf.	Polystyrene		.12
47X57	C11,C14,C26	100 mmf.	Molded		.06
46X336	C12	575 mmf.	Polystyrene		.12
B66203	C13	.02 mf.	200 Volts Tubular		.06
B66403	C15	.04 mf.	200 Volts Tubular		.06
45X293	C16	8 mf.	200 Volts Dry Electrolytic		.22
	C17, C18	Part of 1st I.F. Assembly			
B66103	C19	.01 mf.	200 Volts Tubular		.06
B66503	C20,C36	.05 mf.	200 Volts Tubular		.06
	C21, C22	Part of 2nd I.F. Assembly			
47X56	C23,C24	50 mmf.	Molded		.06
B66502	C25,C29	.005 mf.	200 Volts Tubular		.06
B66202	C27	.002 mf.	200 Volts Tubular		.06
D66502	C28	.005 mf.	400 Volts Tubular		.06
45X307	C30A	40 mf.	150 Volts Dry Electrolytic		
	C30B	40 mf.	150 Volts (2 USED ON 25		
	C30C	200 mf.	35 Volts CYCLE MODELS)		.58
D66104	C31,C34	.10 mf.	400 Volts Tubular		.10
45X244	C32	50 mf.	30 Volts Dry Electrolytic (2 USED ON 25 CYCLE MODELS)		.28
B66104	C33	.10 mf.	200 Volts Tubular		.06
47X53	C35	35 mmf.	Molded		.06
B66254	C37	.25 mf.	200 Volts Tubular		.10
D66803	C38	.08 mf.	400 Volts Tubular		.06
14A147		3 Section Gang Condenser complete with Drive Pulley			1.56

RESISTORS

B95205	R1,R5,R9	2.0 Megohm	0.5 Watt Carbon	$0.06
B95153	R2	15,000 Ohm	0.5 Watt Carbon	.06
B95154	R3	150,000 Ohm	0.5 Watt Carbon	.06
B95202	R4	2,000 Ohm	0.5 Watt Carbon	.06
B95156	R6	15.0 Megohm	0.5 Watt Carbon	.06
B95405	R7	4.0 Megohm	0.5 Watt Carbon	.06
36X308	R8	500,000 Ohm	Volume Control	.30
B95503	R10	50,000 Ohm	0.5 Watt Carbon	.06
B95305	R11,R13	3.0 Megohm	0.5 Watt Carbon	.06
B95105	R12	1.0 Megohm	0.5 Watt Carbon	.06
B95152	R14	1,500 Ohm	0.5 Watt Carbon	.06
B95250	R15	25 Ohm	0.5 Watt Carbon	.06
43X114	R16	515 Ohm	12 Watt Wire Wound	.34
	R17	2,200 Ohm	5 Watt	
B94751	R19,R21	750 Ohm	0.5 Watt Carbon	.08
B94122	R20	1,200 Ohm	0.5 Watt Carbon	.08
B94152	R22	1,500 Ohm	0.5 Watt Carbon	.08
B94171	R23,R24	170 Ohm	0.5 Watt Carbon	.08
B94300	R25	30 Ohm	0.5 Watt Carbon	.08
43X104	R35	1,400 Ohm	12 Watt Wire Wound (25 CYCLE MODELS ONLY)	.36

DIAL AND DRIVE ASSEMBLY

26A309	Dial Mounting Plate Assembly complete with Idler Studs and Pulleys less Dial Scale	.36
58X535	Dial Scale	.06
17X64	Celluloid Crystal	.10
28X56	Clamp Buttons (To Mount Dial Scale) — Doz.	.06
4X620	Escutcheon for Dial	.50
15X192	Pointer for Dial Scale	.10
	33" Drive Cord (18 lb. test)	.04
28X95	Tension Spring for Drive Cord — Doz.	.16
26X359	Tuning Control Shaft	.06
75X833	Bracket for Above Shaft	.04
19X192	"C" Washers for above Shaft	.06
26A310	Lever Assembly for Band Switch	.22
4X622	Escutcheon for Band Switch	.16
7A140	Dial Lamp Socket and Cable Assembly	.12
7A103	Dial Lamp (No. 47)	.10

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ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER OR DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F. 456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C16) & (C17) 1st I.F. (C14) & (C15)
WAVE TRAP 456 KC	Antenna Lead	200 mmf.	B Range	600 KC	Wave Trap (C5) Adjust for MINIMUM Output
RANGE B				Turn Rotor to Full Closed Position. Pointer should be at low frequency end mark on scale—See Note A.	
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor until dial pointer is at 1500 KC	Oscillator Range B (C11)
1500 KC	Antenna Lead	200 mmf.	B Range	Leave Rotor at above setting	Ant. Range B (C3)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C9) Rock Rotor—See Note B
RANGE D 18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C8)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—The low frequency end mark is a small dot at the left side of the short wave scale under the "5." of the number 5.8 and to the right of the "C" of the letters MC. If the pointer is not at this mark on the dial, move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

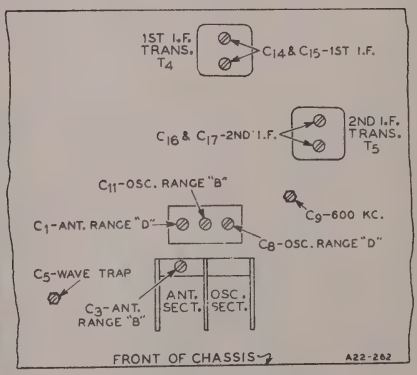

Fig. 2—Location of Trimmers

Rack and Pinion Assembly

If it is ever necessary to re-assemble the automatic tuning unit, proceed as follows: The pinion gear shaft should be held in such a position that the flat portion is vertical or turned slightly counter-clockwise from the vertical as shown in Fig. 5.

The lower rack should be meshed with the pinion gear so that the 8th tooth from the front on each side of the rack is in line with the axis of the pinion gear shaft—See Fig. 5. The upper rack should then be lined up with the lower rack and meshed with the pinion gear. The 8th tooth from the front on each side of the upper rack will then line up with the axis of the pinion gear shaft.

The rear and side brackets can then be mounted on the rack and pinion assembly.

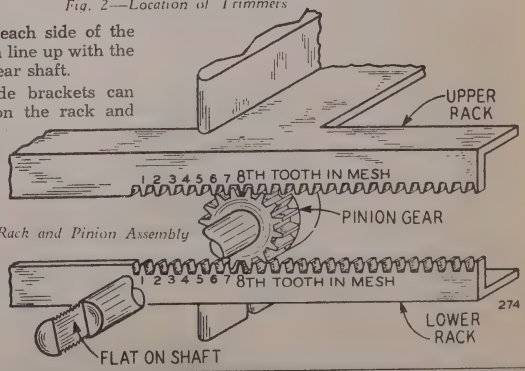

Fig. 5—Rack and Pinion Assembly

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MONTGOMERY-WARD & CO.

MODEL 14WG-683A
MODEL 14WG-683B

MODEL 14WG-683B

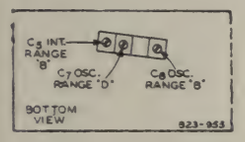
In the issue "B" chassis, a loading coil with an adjustable iron core is connected across the secondary winding of the shortwave loop aerial—See partial schematic circuit diagram below.

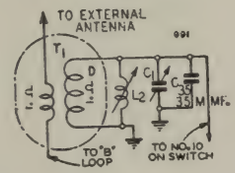
The interstage range "D" and interstage range "B" trimmers have been relocated—See trimmer illustrations below.

ADDITIONAL ALIGNMENT PROCEDURE

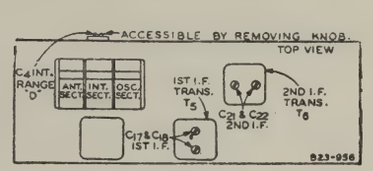
FIRST COMPLETE THE ALIGNMENT PROCEDURE THROUGH LOOP RANGE "B", AS GIVEN IN THE ALIGNMENT PROCEDURE ON THE OTHER SIDE OF THIS PAGE. THEN MAKE THE FOLLOWING ADJUSTMENTS:

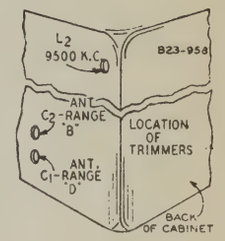
SIGNAL GENERATOR			DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER OR DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION				
LOOP RANGE D 17,500 KC	External Antenna Clip	External Ground Clip	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Int. Range D (C4) Rock Rotor—See Note B
9,500 KC	Same as Above	Same as Above	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D Loading Coil





Supplement to Schematic





The following NEW PARTS are used in issue "B" models:

Part No.	Description	Selling Price
9A1437	L2 Loading Coil Assembly	$0.36
17A116	C4 Trimmer Condenser	.10

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MODEL 14WG-683A,B

GENERAL INFORMATION

ANTENNA

This radio is equipped with 2 built-in Airwave Loop Aerials. One of these is used for Broadcast Band reception. The other is used for reception on the Short Wave Band. For reception of local or powerful nearby stations, no other antenna or ground is usually required. Directional effects are obtained when using the Broadcast Band loop aerial. Rotate the radio until signal pickup is at a maximum and there is least interference from nearby stations.

More stations will be heard and noise will often be reduced by using an outside antenna and a good ground.

For locations in the city or close to broadcasting stations, the antenna should be 20 to 35 feet in length while for locations in the country or at a distance from the broadcasting stations, use a 35 to 60 foot antenna.

A GROUND CONNECTION IS REQUIRED if an external antenna is used. A ground connection may be obtained by connecting to a water pipe, radiator, or pipe driven into the ground.

The antenna and ground connections are made at the clips on the loop antenna. Pass the antenna and ground leads through the holes in the cabinet back. Connect the antenna lead to either clip and the ground lead to the other clip—See illustration.

TUBES AND DIAL LAMP

The tube types and position of the tubes and tube shields are shown in the illustration. All tubes must be in the sockets to operate the radio.

AC-DC Operation—The dial lamp must be in its socket to operate the radio.

CAUTION—If the dial lamp burns out, it should be replaced at once. Use ONLY a No. 47 dial lamp.

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MODEL 14WG-683A

MONTGOMERY-WARD & CO.

BATTERY OPERATION

The following battery pack is required:

Battery Pack Catalog No. 62-5015

Note the position of the prongs on the battery cable plug and the holes in the socket on the battery. Then insert the plug in the socket. Place the pack in the cabinet with the socket facing toward the front of the cabinet.

Wind the line cord around the reel on the back cover of the cabinet. Insert the line cord plug in the hole in the bottom of the reel.

Economizer Switch—When the battery pack is new, push the Economizer Switch on top of the chassis toward the front of the chassis.

When the battery pack has been in use for approximately 100 hours and reception becomes weak, push the Economizer Switch toward the back of the chassis.

The position of the Economizer Switch does not affect the radio when operating on AC or DC.

AC-DC OPERATION

Unwind power line cord from reel and pass cord through opening at lower right hand corner of back.

Check Your Line Voltage—Unless otherwise marked, this radio must be operated on a power supply of 105-125 volts AC, 50 to 60 cycles only, or 105-125 volts DC.

Radios for 25 cycle AC operation are so marked.

When using the radio on AC, if there appears to be excessive hum, reverse the plug. Leave the plug inserted the way which gives the least hum.

110 Volt DC Operation—Insert plug so that prong on same side as *ribbed* side of *cord* is on the positive side of the line. *CAUTION*—If polarity of line is not known, insert plug; if set does not operate after one minute, reverse plug.

REMOVING CHASSIS FROM CABINET

Pull off the 3 control knobs. Remove the spring nut from the band switch shaft. With the band switch in the "BC" position, lift the band switch lever off the shaft. Unscrew the 2 nuts at the back of the chassis and the bolt from the front. CAUTION—Do not push on bolts while unscrewing nuts, as they will tear cabinet covering. Disconnect chassis leads and pull chassis out of the cabinet.

REPLACEMENT PARTS LIST

Part No.	Description	Selling Price
	MISCELLANEOUS	
12A395	5¼" P.M. Dynamic Speaker complete with Output Transformer	$2.98
	Cone and Voice Coil Assembly (Specify part number and letters stamped on the above speaker)	1.06
	Output Transformer for above Speaker	1.06
14X286	Grille Cloth for Speaker	.10
10A382	Knob (Off Switch—AC-DC—Battery Switch)	.06
10A383	Knob (Tuning Control)	.06
10A384	Knob (Volume Control)	.06
3A303	Tube or Resistor Socket—Octal (8 Prong)	.06
30X44	Grid Caps	Doz. .06
32X174	Tube Shield	.06
13X328	Line Cord and Plug Assembly	.18
2A204	Off Switch—AC-DC—Battery Switch	.46
2A205	Band Change Switch	.46
2A175	Economizer Switch	.10
28X265	Phosphor Bronze Ground Plate (Under 2nd I.F. Can)	.06
13X430	"A" and "B" Battery Cable and Plug Assembly	.22
28X286	Plug Button	Ea. .06
	TRANSFORMERS AND COILS	
9A1431	T1 Loop Aerial Assembly (Short Wave Band)	$0.36
9A1435	T2 Loop Aerial Assembly (Broadcast Band)	.60
9A1440	T3 R.F. Interstage Transformer and Can Assembly complete with 10 mmf. Condenser	.78
9A1436	T4 Oscillator Coil Assembly	.66
9A1438	T5 1st I.F. Transformer and Can Assembly	.58
9A1439	T6 2nd I.F. Transformer and Can Assembly	.58
	T7 Output Transformer (See "Miscellaneous")	
9A1115	L1 Plate Reactor	.58
	CONDENSERS	
17A132	C1, C2 2-25 mmf. Loop Range "D", "B" Trimmer	$0.12
B66501	C3 .0005 mf. 200 Volts Tubular	.06
17A171	C4, C5, C7, C8 2.5-25 mmf. Interstage Range "D", "B"; 2.5-25 mmf. Oscillator Range "D"; 4-40 mmf. Oscillator Range "B" Trimmer	.30
47X111	C6 10 mmf. Molded	.06
D66203	C9 .02 mf. 400 Volts Tubular	.06
46X337	C10 620 mmf. Polystyrene	.12
47X57	C11, C14, C26 100 mmf. Molded	.06
46X336	C12 575 mmf. Polystyrene	.12
B66203	C13 .02 mf. 200 Volts Tubular	.06
B66403	C15 .04 mf. 200 Volts Tubular	.06
45X293	C16 8 mf. 200 Volts Dry Electrolytic	.22
	C17, C18 Part of 1st I.F. Assembly	
B66103	C19 .01 mf. 200 Volts Tubular	.06
B66503	C20, C36 .05 mf. 200 Volts Tubular	.06
	C21, C22 Part of 2nd I.F. Assembly	
47X56	C23, C24 50 mmf. Molded	.06
B66502	C25, C29 .005 mf. 200 Volts Tubular	.06
B66202	C27 .002 mf. 200 Volts Tubular	.06
D66502	C28 .005 mf. 400 Volts Tubular	.06
45X307	C30A, C30B, C30C 40 mf., 40 mf., 200 mf. 150 Volts, 150 Volts, 35 Volts Dry Electrolytic (2 USED ON 25 CYCLE MODELS)	.58
D66104	C31, C34 .10 mf. 400 Volts Tubular	.10
45X244	C32 50 mf. 30 Volts Dry Electrolytic (2 USED ON 25 CYCLE MODELS)	.28
B66104	C33 .10 mf. 200 Volts Tubular	.06
47X53	C35 35 mmf. Molded	.06
B66254	C37 .25 mf. 200 Volts Tubular	.10
D66803	C38 .08 mf. 400 Volts Tubular	.06
14A147	3 Section Gang Condenser complete with Drive Pulley	1.56
	RESISTORS	
B95205	R1, R5, R9 2.0 Megohm 0.5 Watt Carbon	$0.06
B95153	R2 15,000 Ohm 0.5 Watt Carbon	.06
B95154	R3 150,000 Ohm 0.5 Watt Carbon	.06
B95202	R4 2,000 Ohm 0.5 Watt Carbon	.06
B95156	R6 15.0 Megohm 0.5 Watt Carbon	.06
B95405	R7 4.0 Megohm 0.5 Watt Carbon	.06
36X308	R8 500,000 Ohm Volume Control	.30
B95503	R10 50,000 Ohm 0.5 Watt Carbon	.06
B95305	R11, R13 3.0 Megohm 0.5 Watt Carbon	.06
B95105	R12 1.0 Megohm 0.5 Watt Carbon	.06
B95152	R14 1,500 Ohm 0.5 Watt Carbon	.06
B95250	R15 25 Ohm 0.5 Watt Carbon	.06
43X114	R16 515 Ohm 12 Watt; R17 2,200 Ohm 5 Watt Wire Wound	.34
B94751	R19, R21 750 Ohm 0.5 Watt Carbon	.08
B94122	R20 1,200 Ohm 0.5 Watt Carbon	.08
B94152	R22 1,500 Ohm 0.5 Watt Carbon	.08
B94171	R23, R24 170 Ohm 0.5 Watt Carbon	.08
B94300	R25 30 Ohm 0.5 Watt Carbon	.08
43X104	R35 1,400 Ohm 12 Watt Wire Wound (25 CYCLE MODELS ONLY)	.36
	DIAL AND DRIVE ASSEMBLY	
26A309	Dial Mounting Plate Assembly complete with Idler Studs and Pulleys less Dial Scale	.36
58X535	Dial Scale	.06
17X64	Celluloid Crystal	.10
28X56	Clamp Buttons (To Mount Dial Scale)	Doz. .06
4X620	Escutcheon for Dial	.60
15X192	Pointer for Dial Scale	.10
	33" Drive Cord (18 lb. test)	.04
28X95	Tension Spring for Drive Cord	Doz. .16
26X359	Tuning Control Shaft	.06
25X833	Bracket for Above Shaft	.04
19X192	"C" Washers for above Shaft	.06
26A310	Lever Assembly for Band Switch	.22
4X622	Escutcheon for Band Switch	.16
7A140	Dial Lamp Socket and Cable Assembly	.12
7A103	Dial Lamp (No. 47)	.10

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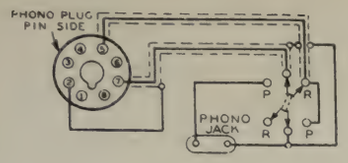
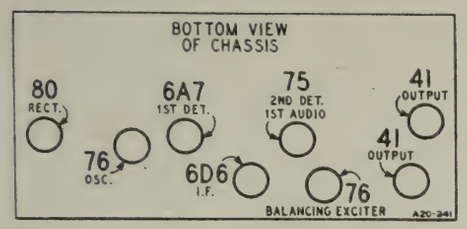
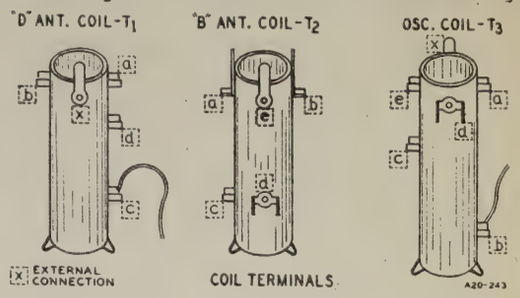




Power Consumption -- 65 Watts (At 117 volts 60 cycles)

Power Output - - - - - - - 3.0 Watts Undistorted, 4.0 Watts Maximum

Selectivity - - 40 KC Broad at 1000 times Signal



Sensitivity (For 0.5 watt output)

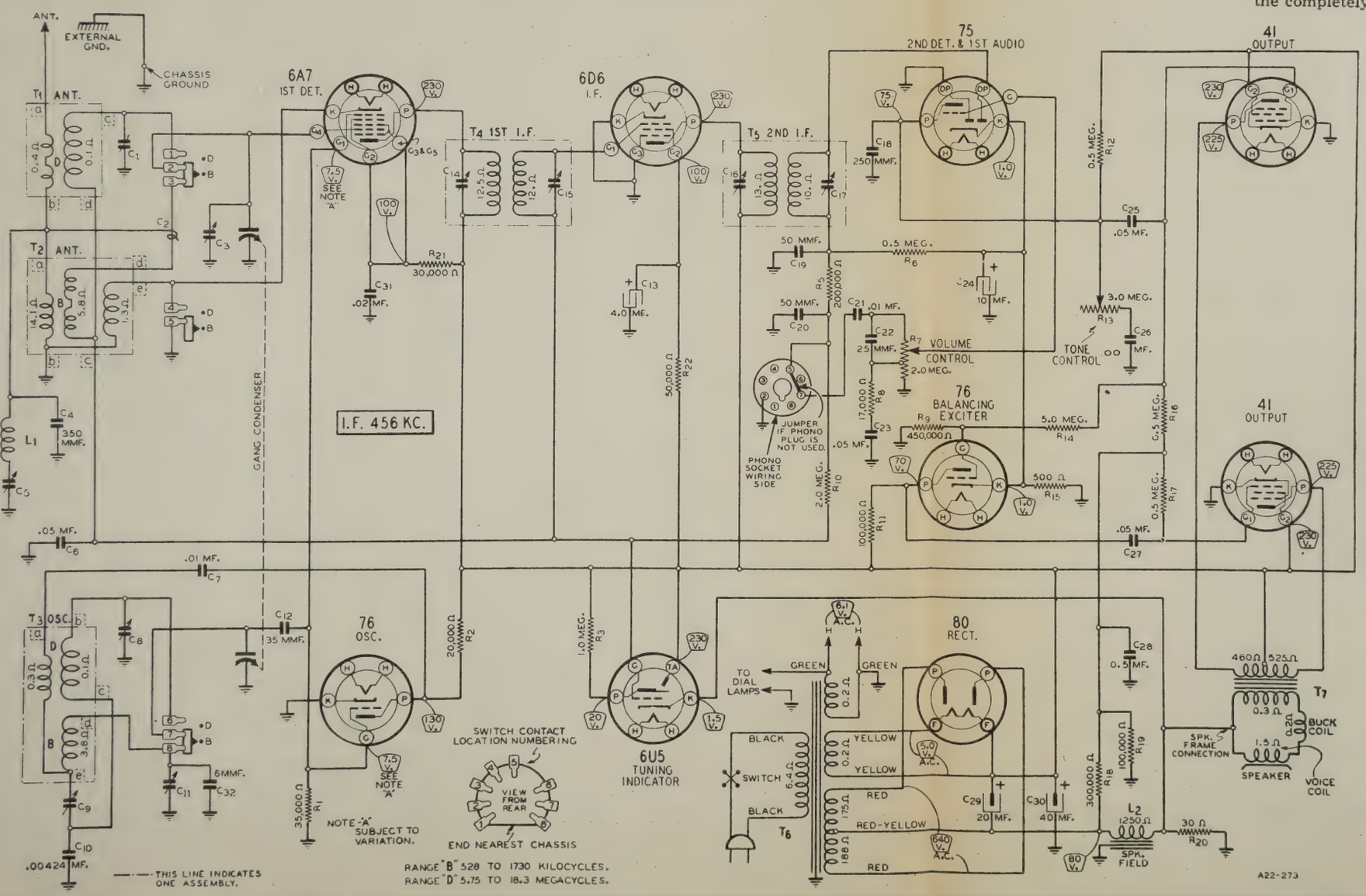
B Range.....25 Microvolts Average

D Range.....40 Microvolts Average

Tuning Frequency Range

B Range..... 528 to 1730 KC (Kilocycles)

D Range.....5750 to 18300 KC (Kilocycles)

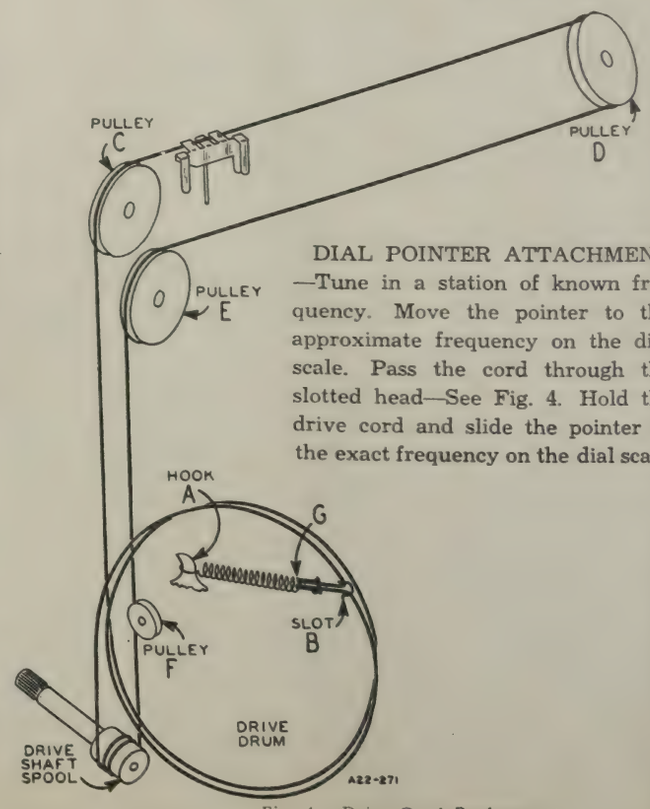


Drive Cord Replacement

Tie a knot with a small loop at one end of the new drive cord. Tie the other end to the tension spring, leaving a distance of 64⅛ inches between the knots.

Turn the gang condenser to the full open position. Secure the free end of the spring over hook A—See Fig. 4. Turn the gang condenser to the completely closed position.

Pass the cord through slot B and, guiding the cord in the groove of the drive drum, turn the gang condenser to the full open position. Hook the cord in slot B and turn the gang condenser to the completely closed position. Unhook the cord from slot B and pass over pulleys C, D, and E as shown. Pass the cord in front of idler pulley F. Wind 2½ turns counterclockwise (from front of chassis) around the drive shaft spool, progressing away from the chassis. Pass cord up and over the drive drum. Guiding the cord in the groove of the drive drum, turn the gang condenser to the full open position. If necessary, stretch the tension spring and pull the drive cord taut. Pass drive cord through slot B and secure the loop to the tension spring at point G.



DIAL POINTER ATTACHMENT —Tune in a station of known frequency. Move the pointer to the approximate frequency on the dial scale. Pass the cord through the slotted head—See Fig. 4. Hold the drive cord and slide the pointer to the exact frequency on the dial scale.

Fig. 4—Drive Cord Replacement

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MODEL 62-910

MONTGOMERY-WARD & CO.

GENERAL

32X110	Tube Shield	.10
32X111	Tube Shield Base	.10
2X289	Felt Washers (Used behind knob.)	Doz. .10
8X73	Rubber Cushions (Chassis Mounting)	Ea. .10
30X14	Grid Clip only	Doz. .10
4A92	Terminal Strip (3 Lugs Insulated—1 Mounting Foot)	.10
4A89	Terminal Strip (1 Lug Insulated—1 Mounting Foot)	.10
4A98	Terminal Strip (6 Lugs—4 Lugs Insulated)	.10
4A99	Terminal Strip (2 Lugs—1 Lug Insulated)	.10
13X80	Line Cord and Plug Assembly	.50
2A138	Band Change Switch	.60

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A1033	T1	Antenna Transformer Assembly—"D" Range	$0.45
9A1032	T2	Antenna Transformer Assembly—"B" Range	.75
9A1034	T3	Oscillator Coil Assembly	.75
9A1026	T4	1st I.F. Transformer and Can Assembly	1.25
9A1027	T5	2nd I.F. Transformer and Can Assembly	1.20
53X193	T6	117 Volt, 60 Cycle, Standard Power Transformer	3.55
53X194	T6	117 Volt, 25 Cycle, Standard Power Transformer	5.95
53X195	T6	117-234 Volt, 40-60 Cycle, Universal Power Transformer	4.60
	T7	Output Transformer (See "Speakers")	
9A1028	L1	Wave Trap Coil Assembly	.30

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C6, C23	.05 mf.	180	$0.15
46X124	C7, C21	.01 mf.	180	.15
46X236	C10	.00424 mf.	180	.30
46X103	C25, C27	.05 mf.	240	.15
46X114	C26	.004 mf.	600	.15
46X206	C28	.50 mf.	180	.25
46X223	C31	.02 mf.	240	.10

ELECTROLYTIC

45X247	C13	4 mf.	250 Dry	.40
45X239	C24	10 mf.	25 Dry	.30
44X41	C29	20 mf.	350 Wet	.75
44X42	C30	40 mf.	250 Wet	.80

MOLDED

47X95	C4	350 mmf.	.10
47X53	C12	35 mmf.	.10
47X65	C18	250 mmf.	.15
47X72	C22	25 mmf.	.10

TRIMMER

17A99	C1	2-25 mmf.	Antenna Range "D"	.25
	C8	2-25 mmf.	Oscillator Range "D"	
	C11	2-25 mmf.	Oscillator Range "B"	
Part of Gang Condenser	C3		Antenna Range "B"	
17A95	C5	75-125 mmf.	Wave Trap	.25
17A81	C9	300-600 mmf.	600 KC Padder	.30
17A57	C14	50-120 mmf.	1st I.F.	.35
	C15	50-120 mmf.		
17A80	C16	50-120 mmf.	2nd I.F.	.30
	C17	85-185 mmf.		

MISCELLANEOUS

17X112	C19	50 mmf.	Mica—Dual Condenser	.10
	C20	50 mmf.		
17A103	C32	6 mmf.	Compensating Capacitor	.25
14A97		2 Section Gang Condenser less Dial and Drive Assembly		2.00

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A84353	R1	35,000 Ohm	0.2	$0.15
B84203	R2	20,000 Ohm	0.5	.15
	R3	1 Megohm	(See "Sockets")	
A85204	R5	200,000 Ohm	0.2	.10
A84504	R6	500,000 Ohm	0.2	.15
A84173	R8	17,000 Ohm	0.2	.15
A83454	R9	450,000 Ohm	0.2	.20
A84205	R10	2 Megohm	0.2	.15
A85104	R11	100,000 Ohm	0.2	.10
A85504	R12, R16, R17	500,000 Ohm	0.2	.10
A83505	R14	5 Megohm	0.2	.20
A84501	R15	500 Ohm	0.2	.15
A84304	R18	300,000 Ohm	0.2	.15
A84104	R19	100,000 Ohm	0.2	.15
A84300	R20	30 Ohm	0.2	.15
B84303	R21	30,000 Ohm	0.5	.15
A84503	R22	50,000 Ohm	0.2	.15

VARIABLE

36X255	R7	2 Megohm	On-Off Switch and Volume Control	.80
40X235	R13	3 Megohm	Tone Control	.50

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A288	Tube Socket (7 prong)	$0.15
3A284	Tube or Speaker Socket (6 prong)	.10
3A283	Tube Socket (5 prong)	.10
3A282	Tube Socket (4 prong)	.10
3A289	Tube Socket (5 prong) for 76 Osc. Tube	.10
3A290	Phono Socket (3 prong)	.10
13X348	Tuning Eye Tube Socket and Cable Assembly complete with 1.0 Megohm Resistor—R3	.45

SPEAKER

When ordering parts for speakers, specify part number of speaker and letters preceding part number stamped on the speaker.

12A321	10" Electro-Dynamic Speaker complete with Output Transformer (T7)	5.50
	Cone and Voice Coil Assembly for above Speaker	2.40
	Field Coil for above Speaker	1.60
	Output Transformer only (T7)	1.80

KNOBS

Specify Name of Knob and Name and Chassis No. of Radio

	On-Off Switch and Volume Control Knob	.10
	Tone Control Knob	.10
	Tuning Control Knob	.10
	Band Switch Knob	.10
10A199	Station Buttons Ea.	.10

AUTOMATIC TUNING ASSEMBLY

Part No.	Description	List Price
25A340	Automatic Tuning Push Button Assembly complete less Gang Condenser, Drive Drum, Dial Mounting Plate, and Push Buttons	$4.15
25A356	Side Bracket for Tuning Assembly complete with Idler Pulley and Shaft	.20
24X353	Idler Pulley for above Shaft	.10
28X168	Hair Pin Spring for above Pulley Doz.	.10
25A344	Side Bracket for Tuning Assembly complete with Support Stud for Gang Condenser	.15
25X583	Support Bracket for Gang Condenser	.10
25X579	Front Bracket for Tuning Assembly	.25
25X578	Rear Bracket for Tuning Assembly	.10
25A341	Station Button Plunger complete with Setting Screw and Rubber Bumper	.35
20X296	Setting Screw for above Station Button Plunger	.10
8X64	Rubber Bumper for above Station Button Plunger Doz.	.10
28X149	Tension Spring for above Station Button Plunger Doz.	.45
24X372	Upper Rack Casting	.15
25A343	Lower Rack Casting complete with Tension Springs	.25
25A345	Gear Shaft complete with 2 Gears	.40
24X376	Coupling Sleeve for Gang Condenser	.10
26A98	Call Letter Sheets and Celluloid Tabs	.20

DIAL AND DRIVE ASSEMBLY

No. 10 DIAL—Models using this dial may be identified by the felt dial background.
No. 11 DIAL—Models using this dial may be identified by the paper dial background.
The following parts are common to No. 10 and 11 dials unless otherwise indicated.

Part No.	Description	List Price
26A164	Dial Mounting Plate complete with 3 Idler Pulleys, Tuning Eye Tube Clamp, and Brace (No. 10 Dial)	$1.05
26A142	Dial Mounting Plate complete with 3 Idler Pulleys, Tuning Eye Tube Clamp, and Brace (No. 11 Dial)	.95
26X301	Tuning Knob Shaft only	.10
24X377	Wooden Spool for above Shaft	.10
19X67	Horse Shoe Washers for above Shaft and Drive Drum Doz.	.10
19X62	Flat Washer for above Shaft Doz.	.10
25X580	Bracket for above Shaft	.10
24X374	Drive Drum for Gang Condenser	.10
19X153	Washers for Drive Drum (With "D" Shaped Hole) Doz.	.15
	70" Drive Cord	.10
28X174	Tension Spring for Drive Cord Doz.	.25
	Dial Glass (Specify Name and Chassis Number of Radio)	.30
7X23	Felt Dial Background (No. 10 Dial)	.10
58X369	Paper Dial Background (No. 11 Dial)	.10
17X30	Plain Glass Crystal	.10
30X108	Clamp for Dial Glass (Right)	.10
30X109	Clamp for Dial Glass (Left)	.10
15X135	Dial Pointer	.20
7A82	Dial Lamp Socket Assembly (2 Sockets with Wire)	.20
	Dial Lamp (No. 51)	.20

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
13X298	30" Phono Cable Assembly Complete (Includes Plug, Double-Tip Phono Jack, Switch, and Knob)	$2.70
6A218	Plug (8 Prong) Only of Phono Cable	.15
3A12	Phono Jack Only of Phono Cable	.10
2A50	Phono Switch Only of Phono Cable	.70
10A90	Knob Only of Phono Cable	.20

Prices Subject to Change Without Notice.

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Drive Cord Replacement

LATE MODELS—Tie a knot with a small loop at one end of the new drive cord. Slide a 1¾ inch length of fabric tubing on the cord. The free end of the drive cord should be tied to the tension spring in such a manner that there is a distance of 56⅜ inches between the knots.

Turn the gang condenser to full open position.

Place the looped end of the drive cord over the hook on condenser drive drum A—See Fig. 2. Bring the cord up through the slot in the drum rim and pass to the right (from back of chassis) and around pulley B. Then bring the cord to the left and over pulley C. See that the fabric tubing is now between pulleys B and C. Continue cord down to control shaft D and wind 3½ turns counter-clockwise (from back of chassis) on shaft D. Bring cord up to and over pulley E. Bring cord down to top of drive drum A and wind one turn clockwise around the drum rim.

Pass the remaining drive cord and tension spring through the slot in the drum. Place free end of spring over the hook on the condenser drive drum.

EARLY MODELS—The procedure is the same as for the late models with the following exceptions:

The distance between the knots on the drive cord should be 49¼ inches.

Leaving shaft D (Fig. 3), the drive cord is brought directly to the top of drive drum A and then continued as in late models.

ATTACHING DIAL POINTER—Tune in a 1500 KC signal. Move the pointer to the 1500 KC mark on the dial and clamp it tightly over the fabric tubing on the cord.

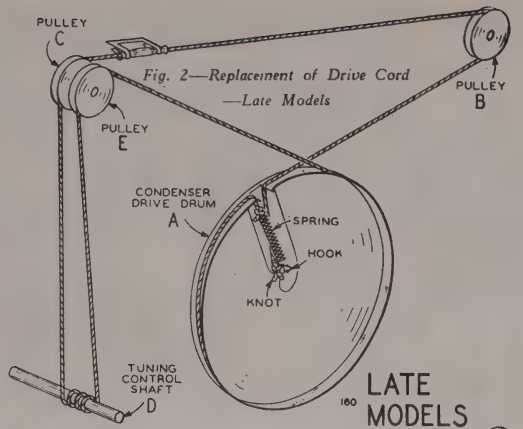


Fig. 2—Replacement of Drive Cord —Late Models

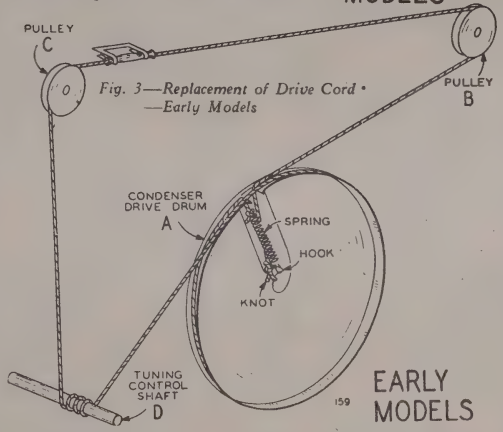
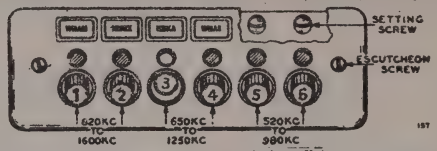


Fig. 3—Replacement of Drive Cord —Early Models

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram. On the back panel of the chassis base is a round knockout 1⅝ inches in diameter. An octal base socket is then mounted in this knockout opening. In the case of the early models a 1⅝ inch hole must be drilled in the back panel.

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.



Frequencies Covered by Each Button

The frequency range of each station button is shown in Fig. 2. Any station within the range of a button may be set. Although, in some cases, it may be possible to set a certain station on several buttons, it is better to set the stations so that the kilocycle numbers decrease from buttons 1 to 6.

Setting a Station Button

Select a station from the list you have prepared, preferably the station with the highest kilocycle number, and tune in this station with the tuning knob in the usual way. Determine what program is being broadcast.

At each side of the escutcheon plate is an escutcheon screw—See Fig. 2. Remove the escutcheon plate by unscrewing these two screws. Be careful to avoid scratching the plate.

When this is done, the setting screws above the six buttons will be exposed.

Turn the band switch knob to the PUSH BUTTON TUNING position —See Fig. 2. The station tuned in previously will probably disappear.

If the kilocycle number of the station tuned in is within the range of button No. 1, push this button in. The same station or a different station may be heard.

With a small screw driver, slowly turn the setting screw above button No. 1 in or out until the desired station (the one previously tuned in) is heard. Turning the screw in (clockwise) will tune in stations with higher kilocycle numbers while turning the screw out (counter-clockwise) will tune in stations with lower kilocycle numbers. Be sure not to tune in some other station broadcasting the same program. Using the tuning eye as a guide, accurately tune in this station. The station is now set on this button.

To determine whether the correct station has been set, turn the band switch knob back to the BROADCAST position. The same station should be heard (provided the tuning knob has not been turned). If it is not, turn the band switch knob to the PUSH BUTTON TUNING position again and retune with the setting screw.

Remove the station call letter tab from the sheets provided and push the tab all the way to the bottom of the rectangular space above the correct station button opening in the escutcheon plate. Then cover the call letter tab with one of the clear celluloid tabs.

Proceed in the same manner to set stations on any of the remaining buttons. Use blank tabs above buttons on which stations are not set.

After all of the stations have been set, carefully replace the escutcheon plate.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons. The old call letter tab may be removed by sticking a pin through the notch in the celluloid tab and through the call letter tab.

MONTGOMERY-WARD & CO. MODEL 62-910

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER OR DIAL SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F. 456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C16) & (C17) 1st I.F. (C14) & (C15)
WAVE TRAP 456 KC	Antenna Lead	200 mmf.	B Range	600 KC	Wave Trap (C5) Adjust for MINIMUM Output
RANGE B				Turn Rotor to Full Closed Position. Pointer should be at low frequency end mark on scale—See Note A.	
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor until dial pointer is at 1500 KC	Oscillator Range B (C11)
1500 KC	Antenna Lead	200 mmf.	B Range	Leave Rotor at above setting	Ant. Range B (C3)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C9) Rock Rotor—See Note B
RANGE D 18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C8)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—The low frequency end mark is a small dot at the left side of the short wave scale under the "5." of the number 5.8 and to the right of the "C" of the letters MC. If the pointer is not at this mark on the dial, move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

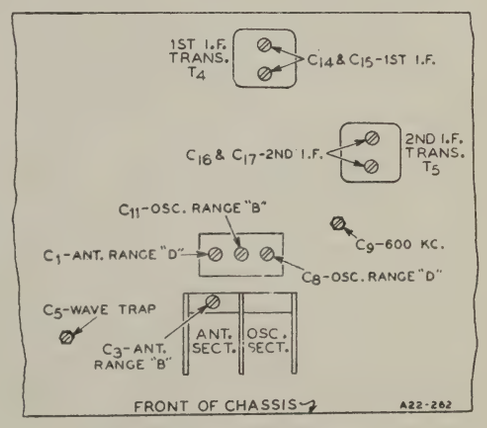


Fig. 2—Location of Trimmers

Rack and Pinion Assembly

If it is ever necessary to re-assemble the automatic tuning unit, proceed as follows: The pinion gear shaft should be held in such a position that the flat portion is vertical or turned slightly counter-clockwise from the vertical as shown in Fig. 5.

The lower rack should be meshed with the pinion gear so that the 8th tooth from the front on each side of the rack is in line with the axis of the pinion gear shaft—See Fig. 5. The upper rack should then be lined up with the lower rack and meshed with the pinion gear. The 8th tooth from the front on each side of the upper rack will then line up with the axis of the pinion gear shaft.

The rear and side brackets can then be mounted on the rack and pinion assembly.

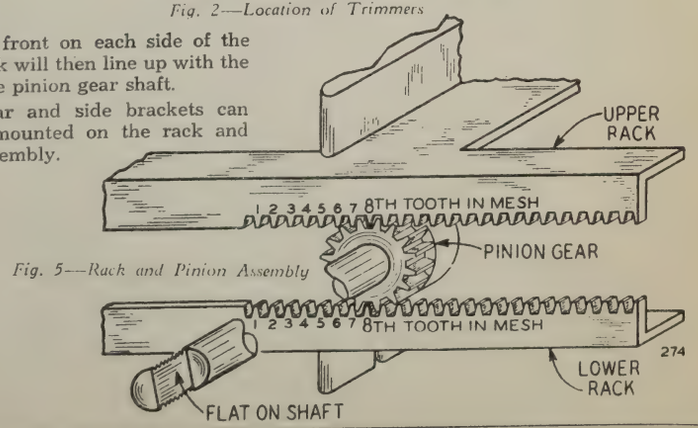


Fig. 5—Rack and Pinion Assembly

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MODEL 62-910 MONTGOMERY-WARD & CO.

GENERAL

32X110	Tube Shield		.10
32X111	Tube Shield Base		.10
2X289	Felt Washers (Used behind knob.)	Doz.	.10
8X73	Rubber Cushions (Chassis Mounting)	Ea.	.10
30X14	Grid Clip only	Doz.	.10
4A92	Terminal Strip (3 Lugs Insulated—1 Mounting Foot)		.10
4A89	Terminal Strip (1 Lug Insulated—1 Mounting Foot)		.10
4A98	Terminal Strip (6 Lugs—4 Lugs Insulated)		.10
4A99	Terminal Strip (2 Lugs—1 Lug Insulated)		.10
13X80	Line Cord and Plug Assembly		.50
2A138	Band Change Switch		.60

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A1033	T1	Antenna Transformer Assembly—"D" Range	$0.45
9A1032	T2	Antenna Transformer Assembly—"B" Range	.75
9A1034	T3	Oscillator Coil Assembly	.75
9A1026	T4	1st I.F. Transformer and Can Assembly	1.25
9A1027	T5	2nd I.F. Transformer and Can Assembly	1.20
53X193	T6	117 Volt, 60 Cycle, Standard Power Transformer	3.55
53X194	T6	117 Volt, 25 Cycle, Standard Power Transformer	5.95
53X195	T6	117-234 Volt, 40-60 Cycle, Universal Power Transformer	4.60
	T7	Output Transformer (See "Speakers")	
9A1028	L1	Wave Trap Coil Assembly	.30

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
46X80	C6, C23	.05 mf.	180	$0.15
46X124	C7, C21	.01 mf.	180	.15
46X236	C10	.00424 mf.	180	.30
46X103	C25, C27	.05 mf.	240	.15
46X114	C26	.004 mf.	600	.15
46X206	C28	.50 mf.	180	.25
46X223	C31	.02 mf.	240	.10

ELECTROLYTIC

45X247	C13	4 mf.	250 Dry	.40
45X239	C24	10 mf.	25 Dry	.30
44X41	C29	20 mf.	350 Wet	.75
44X42	C30	40 mf.	250 Wet	.80

MOLDED

47X95	C4	350 mmf.	.10
47X53	C12	35 mmf.	.10
47X65	C18	250 mmf.	.15
47X72	C22	25 mmf.	.10

TRIMMER

17A99	C1	2-25 mmf.	Antenna Range "D"	.25
	C8	2-25 mmf.	Oscillator Range "D"	
	C11	2-25 mmf.	Oscillator Range "B"	
Part of Gang Condenser	C3		Antenna Range "B"	
17A95	C5	75-125 mmf.	Wave Trap	.25
17A81	C9	300-600 mmf.	600 KC Padder	.30
17A57	C14	50-120 mmf.	1st I.F.	.35
	C15	50-120 mmf.		
17A80	C16	50-120 mmf.	2nd I.F.	.30
	C17	85-185 mmf.		

MISCELLANEOUS

17X112	C19	50 mmf.	Mica—Dual Condenser	.10
	C20	50 mmf.		
17A103	C32	6 mmf.	Compensating Capacitor	.25
14A97		2 Section Gang Condenser less Dial and Drive Assembly		2.00

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A84353	R1	35,000 Ohm	0.2	$0.15
B84203	R2	20,000 Ohm	0.5	.15
	R3	1 Megohm	(See "Sockets")	
A85204	R5	200,000 Ohm	0.2	.10
A84504	R6	500,000 Ohm	0.2	.15
A84173	R8	17,000 Ohm	0.2	.15
A83454	R9	450,000 Ohm	0.2	.20
A84205	R10	2 Megohm	0.2	.15
A85104	R11	100,000 Ohm	0.2	.10
A85504	R12, R16, R17	500,000 Ohm	0.2	.10
A83505	R14	5 Megohm	0.2	.20
A84501	R15	500 Ohm	0.2	.15
A84304	R18	300,000 Ohm	0.2	.15
A84104	R19	100,000 Ohm	0.2	.15
A84300	R20	30 Ohm	0.2	.15
B84303	R21	30,000 Ohm	0.5	.15
A84503	R22	50,000 Ohm	0.2	.15

VARIABLE

36X255	R7	2 Megohm	On-Off Switch and Volume Control	.80
40X235	R13	3 Megohm	Tone Control	.50

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A288	Tube Socket (7 prong)	$0.15
3A284	Tube or Speaker Socket (6 prong)	.10
3A283	Tube Socket (5 prong)	.10
3A282	Tube Socket (4 prong)	.10
3A289	Tube Socket (5 prong) for 76 Osc. Tube	.10
3A290	Phono Socket (3 prong)	.10
13X348	Tuning Eye Tube Socket and Cable Assembly complete with 1.0 Megohm Resistor—R3	.45

SPEAKER

When ordering parts for speakers, specify part number of speaker and letters preceding part number stamped on the speaker.

12A321	10" Electro-Dynamic Speaker complete with Output Transformer (T7)	5.50
	Cone and Voice Coil Assembly for above Speaker	2.48
	Field Coil for above Speaker	1.60
	Output Transformer only (T7)	1.80

KNOBS

Specify Name of Knob and Name and Chassis No. of Radio 10A199	On-Off Switch and Volume Control Knob		.10
	Tone Control Knob		.10
	Tuning Control Knob		.10
	Band Switch Knob		.10
	Station Buttons	Ea.	.10

AUTOMATIC TUNING ASSEMBLY

Part No.	Description	List Price
25A340	Automatic Tuning Push Button Assembly complete less Gang Condenser, Drive Drum, Dial Mounting Plate, and Push Buttons	$4.15
25A356	Side Bracket for Tuning Assembly complete with Idler Pulley and Shaft	.20
24X353	Idler Pulley for above Shaft	.10
28X168	Hair Pin Spring for above Pulley Doz.	.10
25A344	Side Bracket for Tuning Assembly complete with Support Stud for Gang Condenser	.15
25X583	Support Bracket for Gang Condenser	.10
25X579	Front Bracket for Tuning Assembly	.25
25X578	Rear Bracket for Tuning Assembly	.10
25A341	Station Button Plunger complete with Setting Screw and Rubber Bumper	.35
20X296	Setting Screw for above Station Button Plunger	.10
8X64	Rubber Bumper for above Station Button Plunger Doz.	.10
28X149	Tension Spring for above Station Button Plunger Doz.	.45
24X372	Upper Rack Casting	.15
25A343	Lower Rack Casting complete with Tension Springs	.25
25A345	Gear Shaft complete with 2 Gears	.40
24X376	Coupling Sleeve for Gang Condenser	.10
26A98	Call Letter Sheets and Celluloid Tabs	.20

DIAL AND DRIVE ASSEMBLY

No. 10 DIAL—Models using this dial may be identified by the felt dial background.
No. 11 DIAL—Models using this dial may be identified by the paper dial background.
The following parts are common to No. 10 and 11 dials unless otherwise indicated.

Part No.	Description	List Price
26A164	Dial Mounting Plate complete with 3 Idler Pulleys, Tuning Eye Tube Clamp, and Brace (No. 10 Dial)	$1.05
26A142	Dial Mounting Plate complete with 3 Idler Pulleys, Tuning Eye Tube Clamp, and Brace (No. 11 Dial)	.95
26X301	Tuning Knob Shaft only	.10
24X377	Wooden Spool for above Shaft	.10
19X67	Horse Shoe Washers for above Shaft and Drive Drum Doz.	.10
19X62	Flat Washer for above Shaft Doz.	.10
25X580	Bracket for above Shaft	.10
24X374	Drive Drum for Gang Condenser	.10
19X153	Washers for Drive Drum (With "D" Shaped Hole) Doz.	.15
	70" Drive Cord	.10
28X174	Tension Spring for Drive Cord Doz.	.25
	Dial Glass (Specify Name and Chassis Number of Radio)	.30
7X23	Felt Dial Background (No. 10 Dial)	.10
58X369	Paper Dial Background (No. 11 Dial)	.10
17X30	Plain Glass Crystal	.10
30X108	Clamp for Dial Glass (Right)	.10
30X109	Clamp for Dial Glass (Left)	.10
15X135	Dial Pointer	.20
7A82	Dial Lamp Socket Assembly (2 Sockets with Wire)	.20
	Dial Lamp (No. 51)	.20

PHONO ATTACHMENT PARTS

Part No.	Description	List Price
13X298	30" Phono Cable Assembly Complete (Includes Plug, Double-Tip Phono Jack, Switch, and Knob)	$2.70
6A218	Plug (8 Prong) Only of Phono Cable	.15
3A12	Phono Jack Only of Phono Cable	.10
2A50	Phono Switch Only of Phono Cable	.70
10A90	Knob Only of Phono Cable	.20

Prices Subject to Change Without Notice.

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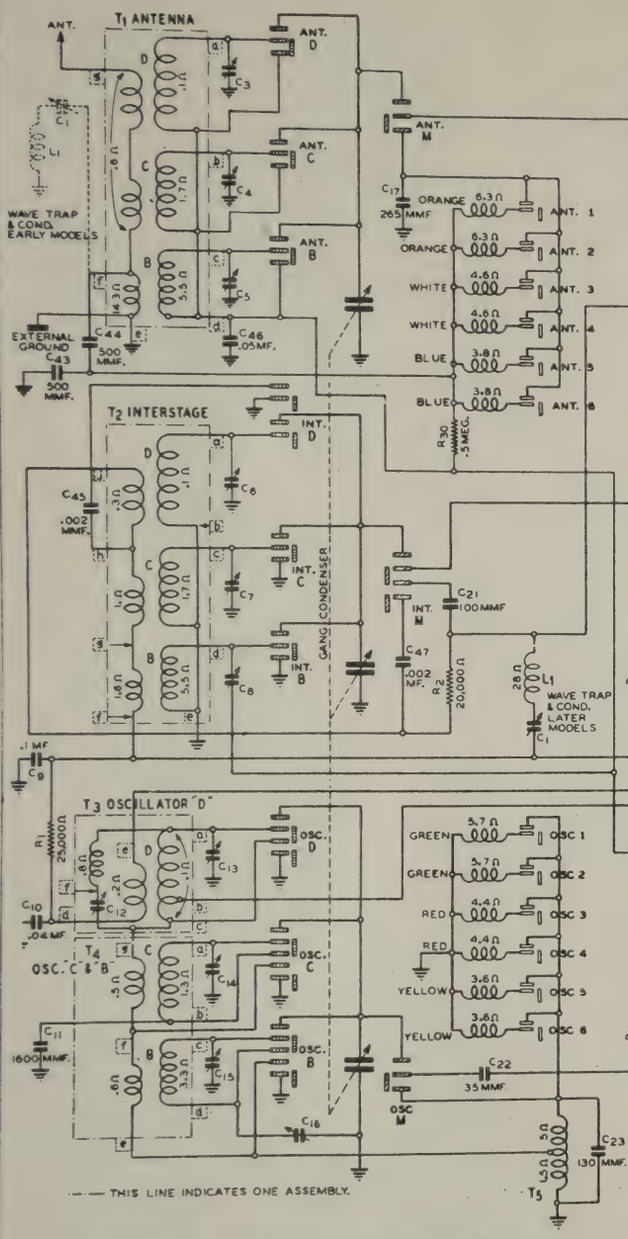
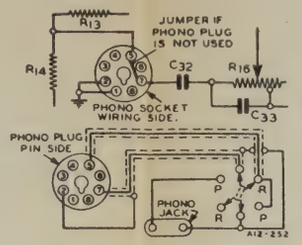
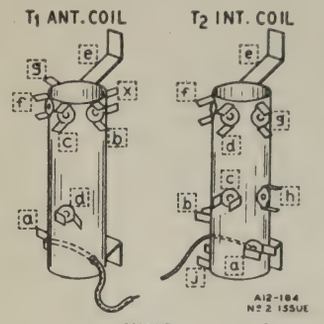
MODELS 93WG-1102,
93WG-1110

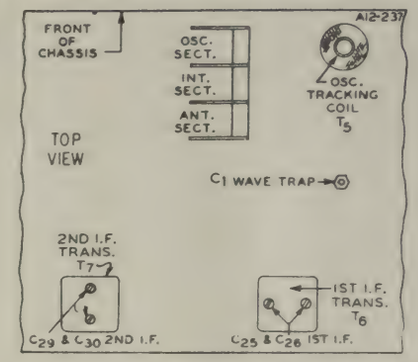
MONTGOMERY-WARD & CO.

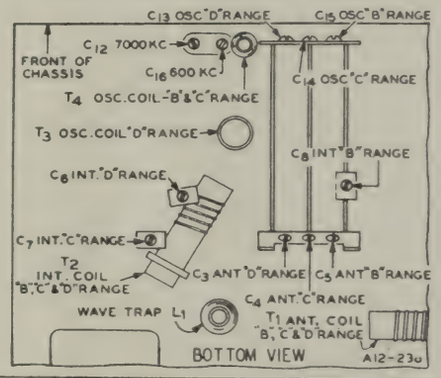
FOR OTHER DATA SEE INDEX

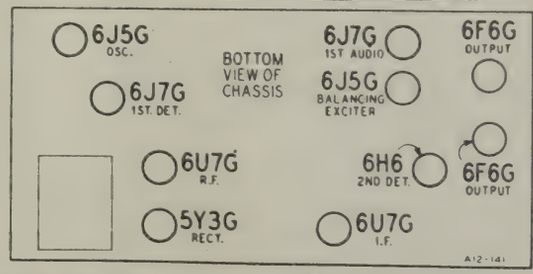


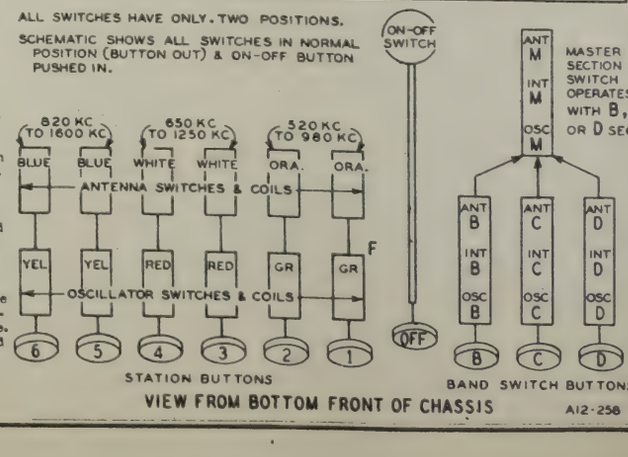







FRONT OF CHASSIS
C12 7000 KC
C16 600 KC
C13 OSC "D" RANGE
C15 OSC "B" RANGE
C14 OSC "C" RANGE
T4 OSC. COIL "B" & "C" RANGE
T3 OSC. COIL "D" RANGE
C8 INT. "B" RANGE
C6 INT. "D" RANGE
C7 INT. "C" RANGE
T2 INT. COIL "B", "C" & "D" RANGE
C3 ANT "D" RANGE
C5 ANT "B" RANGE
C4 ANT "C" RANGE
WAVE TRAP L1
T1 ANT. COIL B, C & D RANGE
BOTTOM VIEW
A12-230




ALL SWITCHES HAVE ONLY TWO POSITIONS.
SCHEMATIC SHOWS ALL SWITCHES IN NORMAL POSITION (BUTTON OUT) & ON-OFF BUTTON PUSHED IN.
ON-OFF SWITCH
ANT M
INT M
OSC M
MASTER SECTION OF SWITCH OPERATES WITH B, C OR D SECT
820 KC TO 1600 KC
650 KC TO 1250 KC
520 KC TO 980 KC
BLUE BLUE WHITE WHITE ORA. ORA.
ANTENNA SWITCHES & COILS
YEL YEL RED RED GR GR
OSCILLATOR SWITCHES & COILS
6 5 4 3 2 1
OFF
ANT B INT B OSC B
ANT C INT C OSC C
ANT D INT D OSC D
B C D
STATION BUTTONS
BAND SWITCH BUTTONS
VIEW FROM BOTTOM FRONT OF CHASSIS
A12-258

ISSUE NUMBER CHANGES

The last digit of the number on the chassis number label identifies the radio as to the issue number.

ISSUE NO. 1

The information contained in the Service Manual, with the exception of the Replacement Parts List and Schematic Circuit Diagram, applies with minor changes to all chassis issues, 1 through 6. The Replacement Parts List and Schematic Circuit Diagram, however, apply only to No. 1 issue chassis.

ISSUE NOS. 2 and 3

MECHANICAL CHANGES -- The station button plunger has a length of 7-3/16 inches.

The locking plate for the station button plungers has been redesigned and now employs two side arms mounted in rubber cushioned hinge brackets which are attached to the rear bracket of the tuner assembly by two screws.

ELECTRICAL CHANGES -- The Schematic Circuit Diagram (Fig.3) is that of Issue Nos. 2 through 6. The AVC voltage is fed to the grid of the R.F. tube through the manual and automatic tuning coils. Formerly, it was applied directly to the grid of the R.F. tube through a 1 Megohm resistor.

The operating voltages of several of the tubes have been changed. Correct values are shown on the schematic in this supplement.

ISSUE NOS. 4 and 5

MECHANICAL CHANGES -- The antenna coil (T1) and Wave Trap Coil (L1) have been moved from the top of the chassis base to a position just in back of the band switch underneath the chassis base.

The Wave Trap Trimmer (C1) has been moved from its former position near the 1st I.F. Transformer (T6) to a position near the 6U7G R.F. tube.

ELECTRICAL CHANGES -- The Wave Trap Coil (L1) and Trimmer Condenser (C1) have been removed from the antenna circuit and are now connected in the interstage circuit - See Fig. 3.

ISSUE NO. 6

ELECTRICAL CHANGES -- The Tone Control, formerly in the 1st audio plate has been put in the diode circuit - See Fig. 3. A 1 Megohm Tone Control (R22) and a .02 mf. (C37) condenser were used in the audio plate. A 3 Megohm Tone Control (R32) and a .001 mf. (C49) condenser are used in the diode circuit.

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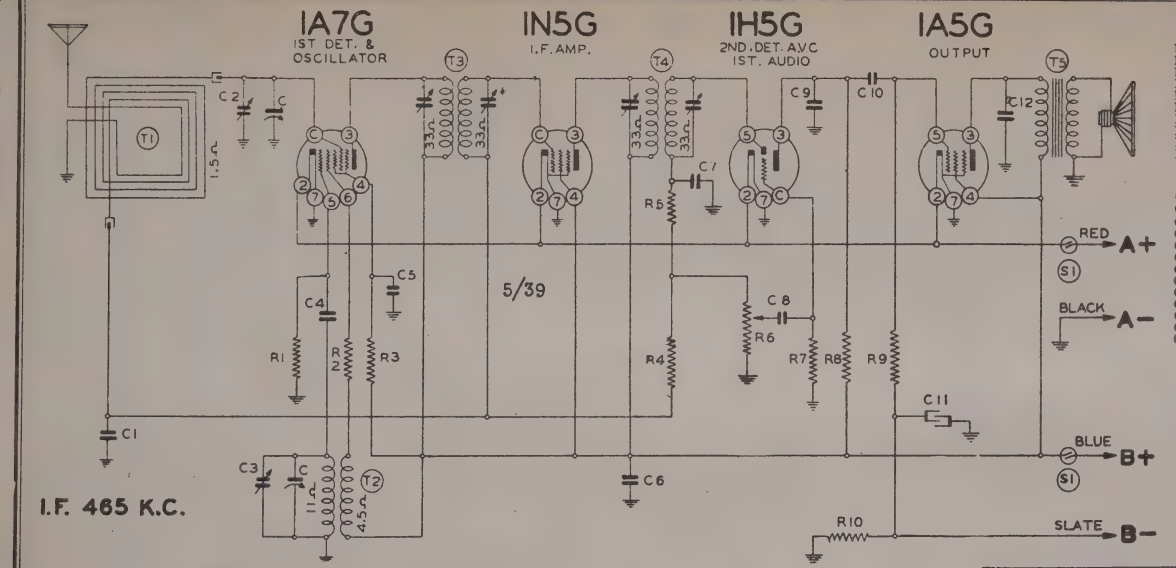


RESISTORS

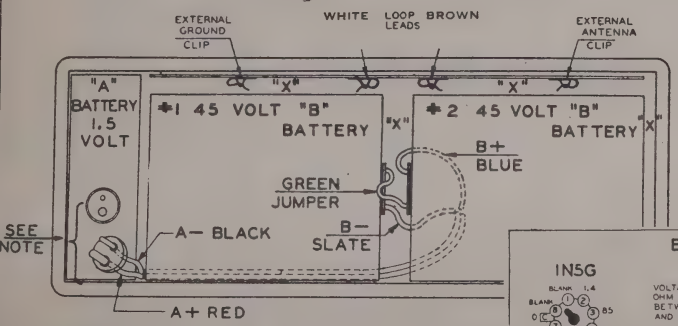
R1	1309	200M ohm—½ w. 20%
R2	13018	4M ohm—½ w. 20%
R3	130209	40M ohm—½ w. 20%
R4	13038	2 megohm—½ w. 20%
R5	13020	100M ohm—½ w. 20%
R6	101173	1 megohm volume control
R7	130257	5. megohm—½ w. 25%
R8	13037	750M ohm—½ w. 20%
R9	13038	2 megohm—½ w. 20%
R10	13070	500 ohm—½ w. 10%

CONDENSERS

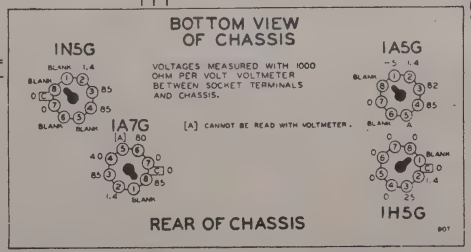
C	102108	2 gang variable condenser
C1	10022	.05 x 200 v. 25%
C2		R. F. Trimmer on Gang
C3		Oscillator Trimmer on Gang
C4	12912	.00025 mica—20%
C5	1009	.05 x 200 v. 25%
C6	1006	.25 x 200 v. 20%
C7	12912	.00025 Mica 20%
C8	10025	.002 x 600 v. 25%
C9	12912	.00025 Mica 20%
C10	10078	.01 x 200 v. 25%
C11	11975	10 mfd. x 25 w. v. lytic
C12	10025	.002 x 600 v. 25%

PARTS

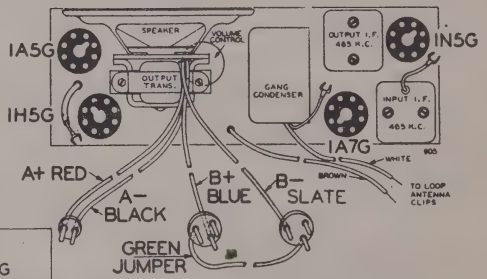
T1 Loop Antenna Complete
T2 B. C. Oscillator Coil
T3 Input I. F. Coil
T4 Output I. F. Coil
T5 6" Speaker with output transformer
S1 D.P.S.T. On-off switch on volume cont



NOTE: The "A" battery should be placed in the cabinet so that the plug-in socket on the top of the battery is nearer to the side of the cabinet which is faced down than to the side of the cabinet which is facing up. Also, the "A" battery should be pushed all the way into the cabinet so that it fits between the left end of the radio chassis and the side of the cabinet.



At right-Top View of Chassis



When aligning IF and Osc. - disconnect loop and connect 1 meg. resistor bet. loop leads from chassis. Trim osc. at 1650 Kc- To align loop, reconnect same and remove 1 meg. resistor. Trim at 1400 KC.

PHILCO RADIO & TELEVISION CORP.

Model 42-788T is a special service eleven (11) tube A. C. operated super-heterodyne radio employing nine (9) tuning bands. Four standard scales are mounted on the left of the grille. These cover the complete radio spectrum from 540 K. C. to 22 megacycles. The standard scales are tuned by a variable condenser which has tuning ratios of 80 to 1 for vernier tuning and 16 to 1 for coarse tuning. Five spread band scales on the right of the grille are designed to spread the short wave frequencies more than 20 times farther apart. This spread band tuning section of the radio is tuned by a three (3) gang permeability tuner with shunt aligning compensators for each spread band.

ALIGNING R. F. AND I. F. COMPENSATING CONDENSERS

EQUIPMENT REQUIRED

Signal Generator: In order to properly adjust the various R. F. and I. F. padders of this receiver, a calibrated signal generator such as Philco Model 070 is required. The signal generator covers the frequencies necessary for adjusting the radio.

Aligning Indicating Device: A Vacuum Tube Voltmeter or Audio Output Meter, such as Philco Models 027 and 028, is required. Procedures for connecting these instruments are listed below.

Aligning Tools: Fiber handle screwdriver, Philco Part No. 45-2610 and Aligning Wrench, Part No. 7696.

CONNECTING ALIGNING INSTRUMENTS

Signal Generator: The signal generator is connected to the receiver as indicated in the tabulations below under "output connections to receiver." A Dummy Antenna is also required. This is listed under column, "Dummy Antenna, Note A."

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator it should be connected to the A. V. C. circuit as follows:

1. Connect the negative (—) terminal of the voltmeter through a 2 meg. resistor to any grid return connection in the A. V. C. circuit.

2. Connect the positive (+) terminal to the chassis ground terminal.

Audio Output Meter: If this type of meter is used as an aligning indicator, it should be connected to the plate and screen terminals of one of the 6V6EG tubes. Adjust the meter to the 0 to 30 volt A. C. scale.

After connecting the aligning meters, adjust the compensators in the order shown in the tabulation below. Locations of the compensators are shown in the schematic diagram. If the aligning meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

ADJUSTING NORMAL TUNING RANGES

Operations In Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	Tuning Condenser Stator Lug Middle Section	.1 mfd.	455 K. C.	580 K. C.	Vol. Max. Band Selector "Brdcst"	45A, 45C, 50A, 50B, 51A	Note D
2	Antenna and Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max. Band Selector "Brdcst"	34A	Note B Roll Gang
3	Antenna and Ground	200 mmfd.	580 K. C.	580 K. C.	Vol. Max.	34B	Roll Gang
4	Antenna and Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max.	34A	Roll Gang
5	Antenna and Ground	400 ohms	6.0 M. C.	6.0 M. C.	Vol. Max. Band Selector "S.W.2"	34C	Roll Gang
6	Antenna and Ground	400 ohms	20 M. C.	20 M. C.	Vol. Max. Band Selector "S.W.3"	38A, 22A, 8A	Note C

NOTE—S.W.1 Tuning Band requires no adjustment.

ADJUSTING BAND SPREAD TUNING RANGES

Mechanical Adjustments: Before the padders of the band spread tuning ranges are adjusted, the iron cores of the antenna, R. F. and oscillator transformers must be mechanically set as follows:

1. Turn the band spread tuning control to the extreme counter-clockwise position (lowest frequency).

2. Adjust location of "OSC" iron cores so that the end of the iron core is flush with the end of the transformer. With the "OSC" iron core in this position the antenna R. F. cores will be correctly located.

3. When installing a new oscillator transformer or core, make sure that the iron core slides freely in the transformer. It is important to do this to eliminate backlash in the tuning mechanism. If adjusment is necessary slightly move transformer in the direction required.

After mechanically setting the transformers and iron cores, adjust the padders as given in the following tabulation:

Operations In Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	Antenna and Ground	400 ohms	9.7 M. C.	9.7 M. C.	Band Selector Position "31M" on Dial	38B, 22B, 8B	Note E—Note F
2	Antenna and Ground	400 ohms	11.7 M. C.	11.7 M. C.	Band Selector Position "25M" on Dial	38C, 22C, 8C	Note F
3	Antenna and Ground	400 ohms	15.2 M. C.	15.2 M. C.	Band Selector Position "19M" on Dial	44A, 27A, 11A	Note F
4	Antenna and Ground	400 ohms	17.8 M. C.	17.8 M. C.	Band Selector Position "16M" on Dial	44B, 27B, 11B	Note F
5	Antenna and Ground	400 ohms	21.5 M. C.	21.5 M. C.	Band Selector Position "13M" on Dial	44C, 27C, 11C	Note F

NOTE A—The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as spcified in each step of the above procedure.

NOTE B—DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity) set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale.

NOTE C—When adjusting "OSC" compensator be sure to tune in the fundamental signal (20 MC) instead of the image signal. If the compensator is correctly adjusted, the image signal will be found by turning the signal generator dial 910 KC above the fundamental signal, which will be 20,910 MC.

NOTE D—Before adjusting padders 45A, 45C, 50A, 50B, 51A, turn padder 45B to full clockwise position (all the way out). After the padders are adjusted to maximum, then adjust padder 45B for maximum.

NOTE E—Before adjusting padders, turn the band spread tuning knob to its extreme counter-clockwise position. Set the band spread dial pointer on the first MARK on the left edge (low frequency end) of the 31 meter scale.

NOTE F—To make sure that the dial reads properly after adjusting the compensator with the signal generator as outlined above, a known station on each band near the adjusting frequency should be tuned in with the spread band tuning control. If the dial reading is incorrect, adjust the oscillator compensators on each band until the stations are heard at the correct points on the dial. After adjusting the oscillator compensators to the correct frequency of the known station, the "antenna" and "R. F." compensators should be adjusted to maximum signal.

ALTERNATIVE METHOD—Locate a known station near the center of each spread band and "Zero Beat" the signal generator with it at the time of aligning band. This makes available a signal of adjustable strength and known frequency. This method will be found to be simpler when conditions make its use possible because it is much easier to align a receiver to a strong signal.

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Drive Cord Replacement

LATE MODELS—Tie a knot with a small loop at one end of the new drive cord. Slide a 1¾ inch length of fabric tubing on the cord. The free end of the drive cord should be tied to the tension spring in such a manner that there is a distance of 56⅜ inches between the knots.

Turn the gang condenser to full open position.

Place the looped end of the drive cord over the hook on condenser drive drum A—See Fig. 2. Bring the cord up through the slot in the drum rim and pass to the right (from back of chassis) and around pulley B. Then bring the cord to the left and over pulley C. See that the fabric tubing is now between pulleys B and C. Continue cord down to control shaft D and wind 3½ turns counter-clockwise (from back of chassis) on shaft D. Bring cord up to and over pulley E. Bring cord down to top of drive drum A and wind one turn clockwise around the drum rim.

Pass the remaining drive cord and tension spring through the slot in the drum. Place free end of spring over the hook on the condenser drive drum.

EARLY MODELS—The procedure is the same as for the late models with the following exceptions:

The distance between the knots on the drive cord should be 49¼ inches.

Leaving shaft D (Fig. 3), the drive cord is brought directly to the top of drive drum A and then continued as in late models.

ATTACHING DIAL POINTER—Tune in a 1500 KC signal. Move the pointer to the 1500 KC mark on the dial and clamp it tightly over the fabric tubing on the cord.

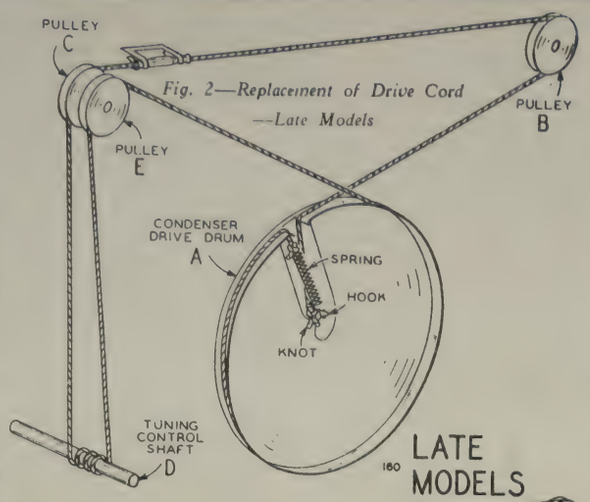


Fig. 2—Replacement of Drive Cord —Late Models

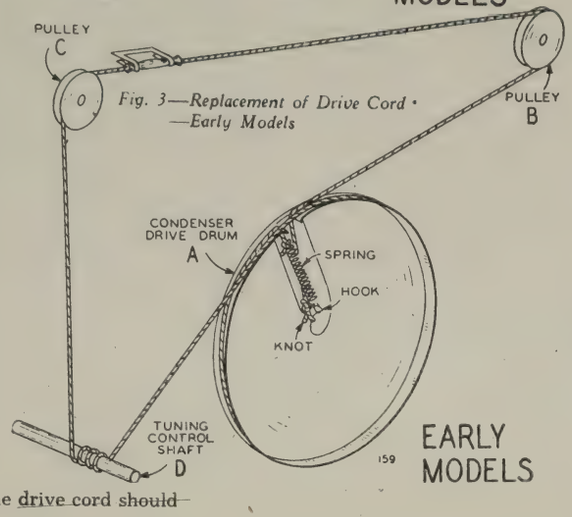
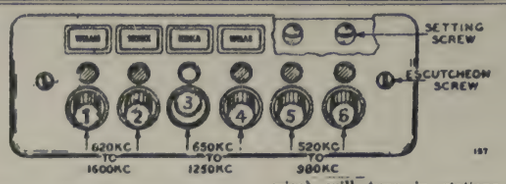


Fig. 3—Replacement of Drive Cord —Early Models

Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram. On the back panel of the chassis base is a round knockout 1%4 inches in diameter. An octal base socket is then mounted in this knockout opening. In the case of the early models a 1%4 inch hole must be drilled in the back panel.

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.



Frequencies Covered by Each Button

The frequency range of each station button is shown in Fig. 2. Any station within the range of a button may be set. Although, in some cases, it may be possible to set a certain station on several buttons, it is better to set the stations so that the kilocycle numbers decrease from buttons 1 to 6.

Setting a Station Button

Select a station from the list you have prepared, preferably the station with the highest kilocycle number, and tune in this station with the tuning knob in the usual way. Determine what program is being broadcast.

At each side of the escutcheon plate is an escutcheon screw—See Fig. 2. Remove the escutcheon plate by unscrewing these two screws. Be careful to avoid scratching the plate.

When this is done, the setting screws above the six buttons will be exposed.

Turn the band switch knob to the PUSH BUTTON TUNING position —See Fig. 2. The station tuned in previously will probably disappear.

If the kilocycle number of the station tuned in is within the range of button No. 1, push this button in. The same station or a different station may be heard.

With a small screw driver, slowly turn the setting screw above button No. 1 in or out until the desired station (the one previously tuned in) is heard. Turning the screw in (clockwise) will tune in stations with higher kilocycle numbers while turning the screw out (counter-clockwise) will tune in stations with lower kilocycle numbers. Be sure not to tune in some other station broadcasting the same program. Using the tuning eye as a guide, *accurately* tune in this station. The station is now set on this button.

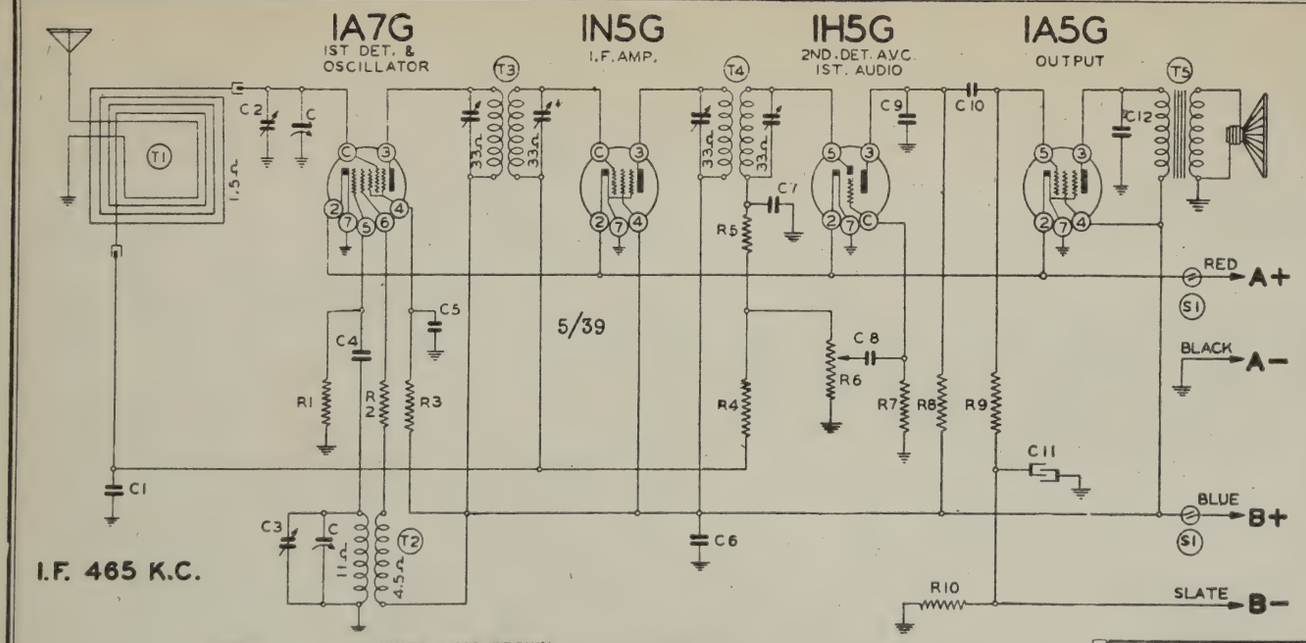
To determine whether the correct station has been set, turn the band switch knob back to the BROADCAST position. The same station should be heard (provided the tuning knob has not been turned). If it is not, turn the band switch knob to the PUSH BUTTON TUNING position again and retune with the setting screw.

Remove the station call letter tab from the sheets provided and push the tab all the way to the bottom of the rectangular space above the correct station button opening in the escutcheon plate. Then cover the call letter tab with one of the clear celluloid tabs.

Proceed in the same manner to set stations on any of the remaining buttons. Use blank tabs above buttons on which stations are not set.

After all of the stations have been set, carefully replace the escutcheon plate.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons. The old call letter tab may be removed by sticking a pin through the notch in the celluloid tab and through the call letter tab.



RESISTORS

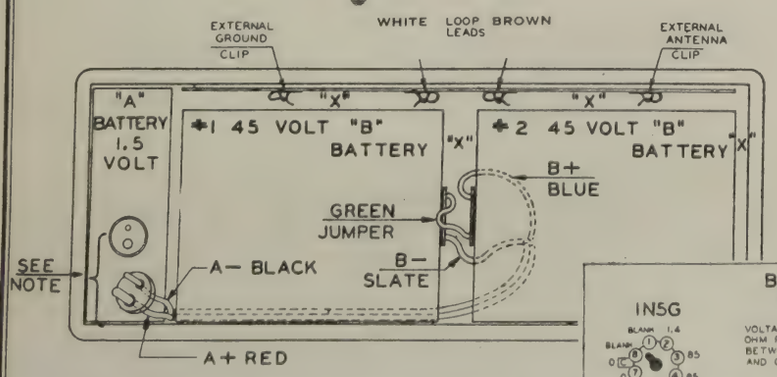
R1	1309	200M ohm—½ w. 20%
R2	13018	4M ohm—½ w. 20%
R3	130208	40M ohm—½ w. 20%
R4	13038	2 megohm—½ w. 20%
R5	13020	100M ohm—½ w. 20%
R6	101173	1 megohm volume control
R7	130257	.5 megohm—½ w. 25%
R8	13037	750M ohm—½ w. 20%
R9	13038	2 megohm—½ w. 20%
R10	13070	500 ohm—½ w. 10%

CONDENSERS

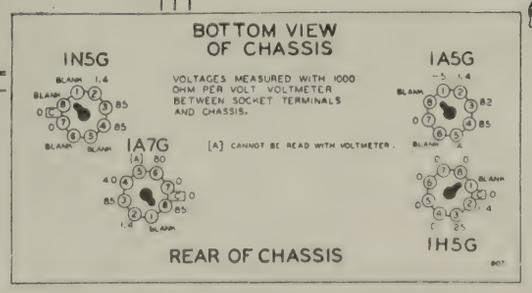
C	102108	2 gang variable condenser
C1	10022	.05 x 200 v. 25%
C2		R. F. Trimmer on Gang
C3		Oscillator Trimmer on Gang
C4	12912	.00025 mica—20%
C5	1009	.05 x 200 v. 25%
C6	1006	.25 x 200 v. 20%
C7	12912	.00025 Mica 20%
C8	10025	.002 x 600 v. 25%
C9	12912	.00025 Mica 20%
C10	10078	.01 x 200 v. 25%
C11	11975	10 mfd. x 25 w. v. lytic
C12	10025	.002 x 600 v. 25%

PARTS

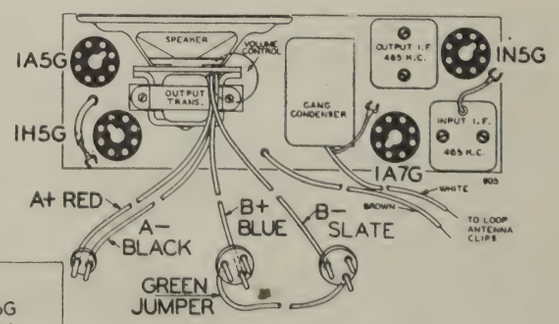
T1	Loop Antenna Complete
T2	B. C. Oscillator Coil
T3	Input I. F. Coil
T4	Output I. F. Coil
T5	6" Speaker with output transformer
S1	D.P.S.T. On-off switch on volume cont



NOTE: The "A" battery should be placed in the cabinet so that the plug-in socket on the top of the battery is nearer to the side of the cabinet which is faced down than to the side of the cabinet which is facing up. Also, the "A" battery should be pushed all the way into the cabinet so that it fits between the left end of the radio chassis and the side of the cabinet.



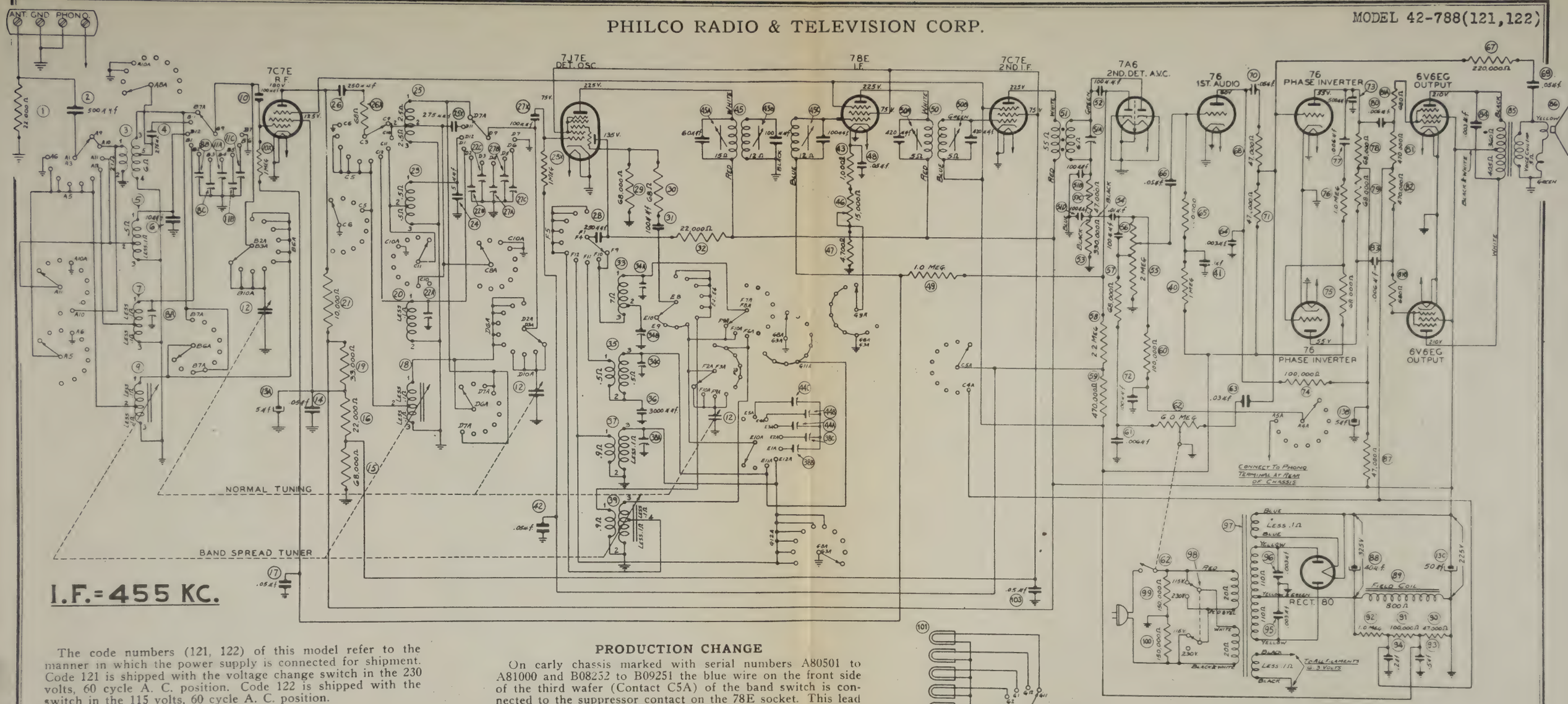
At right-Top View of Chassis



When aligning IF and Osc. - disconnect loop and connect 1 meg. resistor bet. loop leads from chassis. Trim osc. at 1650 Kc- To align loop, reconnect same and remove 1 meg. resistor. Trim at 1400 KC.

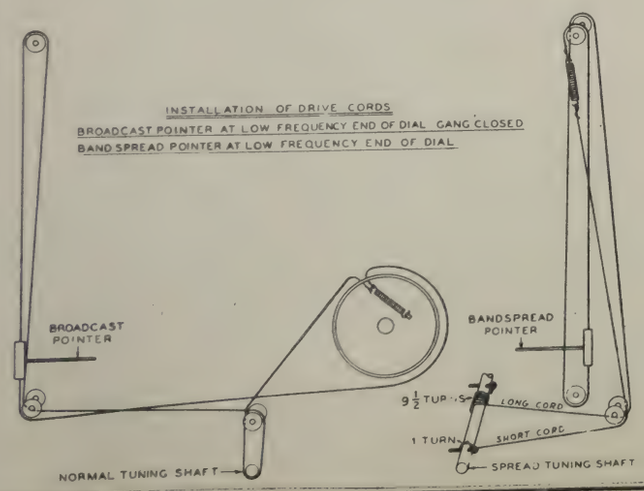
PHILCO RADIO & TELEVISION CORP.

MODEL 42-788(121,122)



I.F.=455 KC.

The code numbers (121, 122) of this model refer to the manner in which the power supply is connected for shipment. Code 121 is shipped with the voltage change switch in the 230 volts, 60 cycle A. C. position. Code 122 is shipped with the switch in the 115 volts, 60 cycle A. C. position.



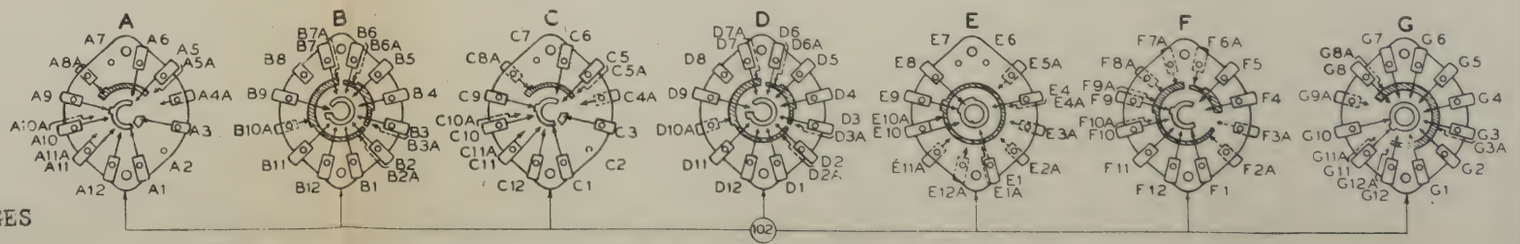
PRODUCTION CHANGE

On early chassis marked with serial numbers A80501 to A81000 and B08252 to B09251 the blue wire on the front side of the third wafer (Contact C5A) of the band switch is connected to the suppressor contact on the 78E socket. This lead should be removed from the suppressor contact and connected to the junction of Resistor 28X and Condenser 42 as shown in the diagram. The resistor and condenser are connected to a lug on the wire panel adjacent to them. See Fig. 3.

ADJUSTING SENSITIVITY OF RECEIVER

Sensitivity control No. 46 on diagram is used for adjusting the overall sensitivity of the receiver. In noisy locations it may be desirable to reduce the sensitivity of the receiver by turning the control counter-clockwise.

FOR OTHER CHANGES SEE INDEX



NOTE SWITCHES SHOWN FROM REAR BOTTOM VIEW OF CHASSIS, IN POSITION NO.1 BROADCAST. SHADED ROTOR IS AT FRONT OF SWITCH WAFER. UNSHADED ROTOR IS AT REAR OF SWITCH WAFER. LETTER INDICATES POSITION OF SWITCH WAFERS FROM FRONT OF CHASSIS

Power Supply: 115 or 230 volts A. C., 50 to 60 cycle, 90 watts.

TUNING RANGES:

Standard Tuning—540 to 1720 K. C.; 1.45 to 2.6 M. C.; 2.3 to 7.3 M. C.; 7.2 to 22 M. C.

Spread Band Tuning—9.34 to 9.9 M. C.; 11.34 to 12 M. C. 14.78 to 15.6 M. C.; 17.38 to 18.2 M. C.; 21.14 to 21.8 M. C.

Audio Output—8.2 watts.

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MECHANICAL ADJUSTMENTS—BAND SPREAD TUNING MECHANISM

1. Adjustment of Tuning Shaft

End play can be removed by adjusting the rear bearing No. (A), Fig. (1). Care should be taken when adjusting the screw so that shaft does not turn too tightly. In making this adjustment, the screw driver can be inserted in the chassis in line with shaft.

2. Removing Tuning Shaft

(a) Remove tuning knob shaft and coupling.
(b) Loosen lock nut on rear bearing and remove adjusting screw and ball bearing.
(c) Remove cotter pin from stop assembly.
(d) Unscrew carriage as shaft is pulled out through front of R. F. tuner and chassis.
(e) When installing new shaft (B) adjust positions of stop assembly and carriage, before inserting cotter pin, so that the carriage (C) is approximately 5 turns from the stop assembly (D) with shaft in extreme counterclockwise position from front. The stop assembly is rotated until all washers are in contact. The bottom washer should be located between the stops nearest together.

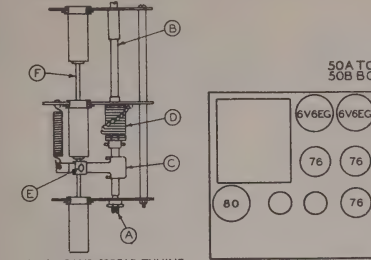
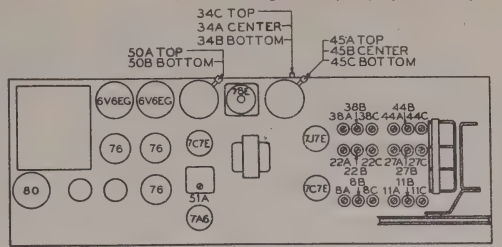


FIG. 1—BAND SPREAD TUNING MECHANISM



TUBE AND COMPENSATOR LOCATIONS—TOP OF CHASSIS

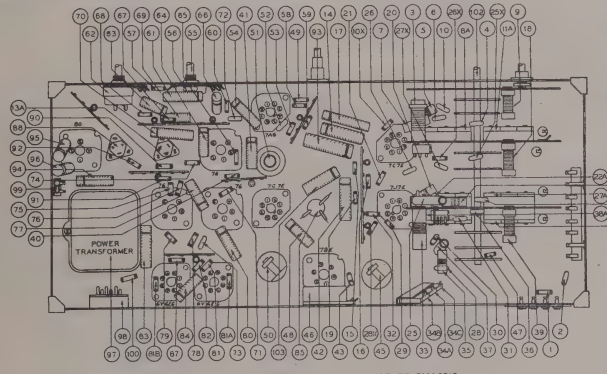


FIG. 3—PART LOCATIONS, UNDERSIDE OF CHASSIS

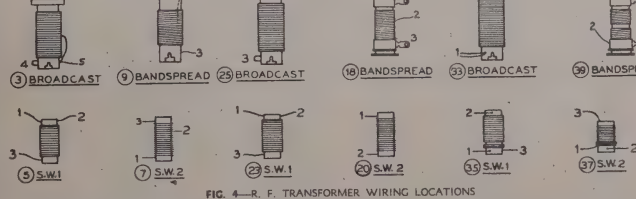


FIG. 4—R. F. TRANSFORMER WIRING LOCATIONS

3. Adjusting Band Spread Tuning Core Assembly

(a) Cores are correctly located when the rear of the oscillator core (blue identification) is flush with the rear of oscillator transformer and the tuning shaft is in extreme counterclockwise position.
(b) The carriage clamp (E) must not be tightened excessively as this will bend the tuning core rod (F) and cause backlash.

REPLACEMENT PARTS—MODEL 42-788

Sch. No.	Description	Part No.
1.	Resistor (22,000 ohms)	33-322339
2.	Mica Condenser (500 mmfd)	60-150357
3.	Aerial Transformer (Broadcast, SW1)	32-3677
4.	Mica Condenser (275 mmfd)	20-027511
5.	Aerial Transformer (SW-2)	32-3679
6.	Mica Condenser (10 mmfd)	60-010337
7.	Aerial Transformer (SW-3)	32-3682
8A.	Compensator (Short Wave—Aerial)	31-6356
8B.	Compensator (Aerial—31M Band), Part of 8A	
8C.	Compensator (Aerial—25M Band), Part of 8A	
9.	Band Spread Aerial Transformer Mtg. Clip Iron Core Assembly	32-3670 57-0985 76-1281
10.	Mica Condenser (100 mmfd)	60-110457
10X.	Resistor (1 megohm)	
11A.	Compensator (Aerial—19M Band)	31-6357
11B.	Compensator (Aerial—16M Band), Part of 11A	
11C.	Compensator (Aerial—12M Band), Part of 11A	
12.	Tuning Condenser Coupling Assembly Drive Cord (Tuning Cond.) Spring Drive Drum Rubber Grommet (Mtg. Cond.) Vernier Tuning Shaft Mtg. Screw	31-2466 31-2291 31-2468 28-8913 31-2453 27-4556 31-2467 W-2196
13A.	Electrolytic Condenser (5 mfd)	30-2512
13B.	Electrolytic Condenser (5 mfd), Part of 13A	
13C.	Electrolytic Condenser (50 mfd), Part of 13A Mtg. Plate	56-1643
14.	Condenser (.05 mfd, 400 volts)	30-4518
15.	Resistor (68,000 ohms)	33-368339
16.	Resistor (22,000 ohms)	33-322339
17.	Condenser (.05 mfds, 200 volts)	30-4609
18.	Band Spread R. F. Transformer Mtg. Clip Tuning Cores	32-3671 57-0985 76-1281
19.	Resistor (33,000 ohms)	33-333339
20.	R. F. Transformer (S. W. 3)	32-3683
21.	Resistor (10,000 ohms)	33-310339
22A.	Compensator (R. F.—Short Wave 3)	31-6356
22B.	Compensator (R. F.—31M Band), Part of 22A	
22C.	Compensator (R. F.—25M Band), Part of 22A	
23.	R. F. Transformer (S. W. 2)	32-3680
24.	Mica Condenser (5 mmfd)	60-050357
25.	R. F. Transformer (Broadcast—S. W. 1)	32-3676
25X.	Mica Condenser (275 mmfd)	20-027511
26.	Mica Condenser (250 mmfd)	60-125457
26X.	Resistor (68 ohms)	33-368339
27A.	Compensator (R. F.—19M Band)	31-6357
27B.	Compensator (R. F.—16M Band), Part of 27A	
27C.	Compensator (R. F.—12M Band), Part of 27A	
27X.	Mica Condenser (100 mmfd)	60-110457
28.	Mica Condenser (250 mmfd)	60-125457
28X.	Resistor (1 megohm)	33-510339
29.	Resistor (68,000 ohms)	33-368339
30.	Resistor (68 ohms)	33-068339
31.	Mica Condenser (100 mmfd)	60-110457
32.	Resistor (22,000 ohms)	33-322339
33.	Oscillator Transformer (Broadcast S. W. 1)	32-3663
34A.	Compensator (OSC. Broadcast)	31-6350
34B.	Compensator, (OSC. 540 KC Broadcast), Part of 34A	
34C.	Compensator (OSC. S. W. 2), Part of 34A	
35.	Oscillator Transformer (S. W. 2)	32-3681
36.	Mica Condenser (3,000 mmfd)	60-230174
37.	Oscillator Transformer (S. W. 3)	32-3684
38A.	Compensator (OSC. S. W. 3)	31-6419
38B.	Compensator (OSC. 31M Band), Part of 38A	
38C.	Compensator (OSC. 25M Band), Part of 38A	
39.	Oscillator Transformer (Band Spread) Mtg. Clip Tuning Core	32-3676 57-0985 76-1281
40.	Resistor (220,000 ohms)	33-422339
41.	Condenser (.1 mfd, 400 volts)	30-4527
42.	Condenser (.06 mfd, 200 volts)	30-4609
43.	Resistor (1000 ohms)	33-210339
44A.	Compensator (OSC. 19M Band)	31-6420
44B.	Compensator (OSC. 16M Band), Part of 44A	
44C.	Compensator (OSC. 13M Band), Part of 44A	
45.	1st I. F. Transformer	32-3443
45A.	Primary Compensator (Iron Core—Part of 45)	
45B.	Secondary Compensator (Iron Core—Part of 45)	
45C.	Tertiary Compensator (Iron Core—Part of 45)	
46.	Sensitivity Control Mtg. Nut	33-5401 W-2157
47.	Resistor (4700 ohms)	33-247339
48.	Condenser (.05 mfd, 200 volts)	30-4519
49.	Resistor (1 megohm)	33-510339
50.	2nd I. F. Transformer	32-3444
50A.	Primary Compensator (Iron Core—Part of 50)	
50B.	Secondary Compensator (Iron Core—Part of 50)	
51.	3rd I. F. Transformer	32-3445
51A.	Secondary Compensator, Part of 51	
51B.	Condenser (100 mmfd), Part of 51A	
51C.	Resistor (47,000 ohms), Part of 51	
51D.	Condenser (100 mmfd), Part of 51A	
52.	Mica Condenser (100 mmfd)	60-110457
53.	Resistor ($30,000 ohms)	33-433339
54.	Condenser (.01 mfd, 400 volts)	30-4572
55.	Volume Control Mtg. Nut	33-5399 W-2157
56.	Mica Condenser (100 mmfd)	60-110457
57.	Resistor (68,000 ohms)	33-368339
58.	Resistor (2.2 megohms)	33-522339
59.	Resistor (470,000 ohms)	33-447339
60.	Resistor (100,000 ohms)	33-410339
61.	Condenser (.006 mfd, 400 volts)	30-4591
62.	Tone Control and Power Switch Mtg. Nut	33-5400 W-2157
63.	Condenser (.03 mfd, 400 volts)	30-4517
64.	Condenser (.003 mfd, 600 volts)	30-4582
65.	Resistor (220,000 ohms)	33-422339
66.	Condenser (.05 mfd, 200 volts)	30-4519
67.	Resistor (47,000 ohms)	33-447339
68.	Condenser (.05 mfd, 200 volts)	30-4519
70.	Condenser (.06 mfd, 200 volts)	30-4609
71	Resistor (47,000 ohms)	33-347339
72.	Mica Condenser (100 mmfd)	60-110457
73.	Mica Condenser (500 mmfd)	60-150357
74.	Resistor (100,000 ohms)	33-410339
75.	Resistor (68,000 ohms)	33-368339
76.	Resistor (1 megohm)	33-510339
77.	Condenser (.006 mfd, 400 volts)	30-4610
78.	Resistor (68,000 ohms)	33-368339
79.	Resistor (68,000 ohms)	33-368339
80.	Condenser (.006 mfd, 400 volts)	30-4610
81.	Resistor (470,000 ohms)	33-447339
81A.	Resistor (680 ohms)	33-168339
81B.	Resistor (680 ohms)	33-168339
82.	Resistor (470,000 ohms)	33-447339
83.	Condenser (.006 mfd, 400 volts)	30-4610
84.	Condenser (.003 mfd, 600 volts)	30-4582
85.	Output Transformer	32-8111
86.	Speaker Cone Assembly (For Speaker 36-1459) Cable	36-1460 36-1456 41-3535
87.	Resistor (47,000 ohms)	33-347339
88.	Electrolytic Condenser (40 mfd) Cardboard Tube Mtg. Plate	30-2511 27-9502 27-9508
89.	Field Coil (Replace Speaker 36-1459)	
90.	Resistor (47,000 ohms)	33-347339
91.	Resistor (100,000 ohms)	33-410339
92.	Resistor (1 megohm)	33-510339
93.	Condenser (.5 mfd, 100 volts)	61-0137
94.	Condenser (.3 mfd, 200 volts)	30-4567
95.	Condenser (.003 mfd, 1500 volts)	30-4604
96.	Condenser (.003 mfd, 1500 volts)	30-4603
97.	Power Transformer (115-230 volts, 60 cycle)	32-8109
	Power Transformer (115 volts, 25 cycles)	32-8031
98.	Power Changeover Switch	42-1569
99.	Resistor (150,000 ohms)	33-415339
100.	Resistor (150,000 ohms)	33-415339
101.	Dial Lamps Socket Assembly	34-2064 76-1414
102.	Band Switch Assembly	42-1661
103.	Condenser (.05 mfd, 400 volts)	30-4518
	Cable (Power)	L-3274
	Cabinet	104798
	Cabinet Back Mtg. Screw	27-9615 W-2076
	Dial Assembly (Standard Tuning)	76-1253
	Dial Assembly (Band Spread)	76-1252
	Dial Clamp	56-1794
	Dial Pointer Mtg. Screw	56-1804 W-2331
	Knob (Tuning)	27-4862
	Knob (Tuning)	27-4530
	Knob (Volume—Band Switch)	27-4322
	Plug (Power)	L-3275
	Rubber Grommet (Chassis Mtg.)	27-4564
	Rubber Washer (Chassis Mtg.)	27-4571
	Screw (Chassis Mtg.)	W-1345
	Socket (7E Tube)	27-6035
	Socket (7E Tube)	27-6036
	Socket (80 Tube)	27-6044
	Socket (6V6EG Tube)	27-6055
	Socket (12E Tube)	27-6129
	Socket (7C7E, 7A8 Tube) Mtg. Eyelets	27-6158-2 W-1650
	Tuning Drive Shaft (Band Spread—Outside Chassis)	76-1248
	Rubber Disc Mtg. Screw	27-4272 W-2296
	Tuning Drive Shaft (Band Spread—Inside R. F. Unit)	76-1243
	Shaft Bushing (Threaded)	56-2152
	Carriage (Tuning Cores)	56-2145
	Core Clamp	56-2151
	Screw	97-0054
	Cotter Pin	W-2196
	Drive Cord (Band Spread—Short Section)	31-2469
	Drive Cord (Band Spread—Long Section)	31-2470
	Spring	28-8751
	Tube Shield Base	28-2726
	Tube Shield (7E Tube)	28-2725
	Wire Panel (4 lug)	38-9809
	Wire Panel (2 lug)	38-9777
	Wire Panel (8 lug)	38-9817
	Wire Panel (6 lug)	38-9929

PHILCO RADIO & TELEVISION CORP.

MODELS 42-842, 42-843, 42-844
MODELS 42-853, 42-854

CONNECTING ALIGNING INSTRUMENTS

AUDIO OUTPUT METER: If an audio output meter is used, connect it across the plate and screen terminals of the output tubes. Adjust the meters to use the 0 to 10 scale. Terminal No. 1 on the rear of the chassis which connects to the speaker is also provided for connecting the audio output meter. If this terminal is used, the lowest scale of the meter should be used when aligning.

VACUUM TUBE VOLTMETER: If a vacuum tube voltmeter is used as an aligning indicator, the negative (—) terminal is connected to the A. V. C. circuit of the receiver through a 2 megohm resistor. The positive (+) terminal is connected to the chassis or ground.

SIGNAL GENERATOR: When adjusting the "I. F." padders the high side of the signal generator is connected through a .1 mfd. condenser to the loop tuning condenser stator lug which connects to the grid of the first detector tube. The ground or low side of the signal generator is connected to the chassis of the receiver.

When aligning the R. F. padders of the portable models a loop aerial is made from a few turns of wire and connected to the signal generator output terminals. The signal generator is then placed a few feet from the set. The loop aerial of the receiver should be assembled in the cabinet together with the battery when adjusting the R. F. padders.

MODELS 42-842, 42-843, 42-844

These models may be adjusted when operated by battery or 115 volts A.C.-D.C. power.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators	
1	See Paragraph on Signal Generator above	455 K.C.	540 K.C.	Vol. Max.	26A, 25A, 25B, 15A, 15B	Note A
2	Use Loop on Generator as above	1500 K.C.	1500 K.C.	Vol. Max.	4B, 4A	
3	Use Loop on Generator as above	580 K.C.	580 K.C.	Vol. Max.	7A, Note B	Roll Tuning Condenser to Max.
4	Use Loop on Generator as above	Repeat Operation 2	Repeat Operation 2	Repeat Operation 2		

NOTE A: DIAL CALIBRATION — Before adjusting the R. F. padders the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the tuning condenser in the closed position (maximum capacity), set the dial pointer on the small dot below 540 K.C.

NOTE B — Roll tuning condenser as compensator 7A is being adjusted until maximum output is indicated on output meter.

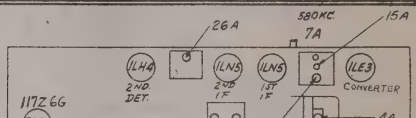


FIG. 1. LOCATIONS OF COMPENSATORS.

MODELS 42-853, 42-854

These models may be adjusted when operated by battery or 115 volts A.C.-D.C. power.

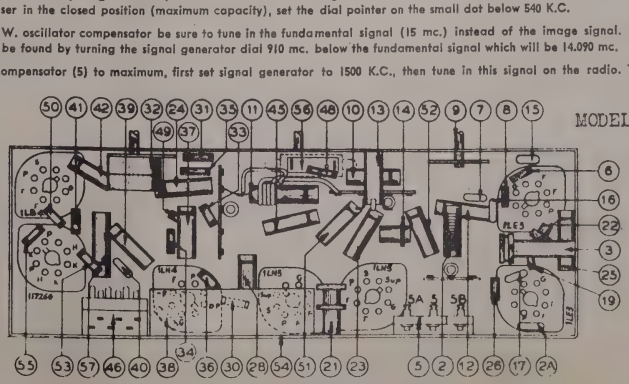
Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators	
1.	See paragraph on Signal Generator above	455 K.C.	540 K.C.	Vol. Max. Band—Broadcast	20A, 20B, 27A, 27B, 29A	Note A
2.	Loop on Generator	15 mc.	15 mc.	Band—S.W.	4B, 4A	Note B
3.	Loop on Generator	1600 K.C.	1600 K.C.	Band—Broadcast	5A	
4.	Loop on Generator	1500 K.C.	1500 K.C.	Band—Broadcast	5	Note C
5.	Loop on Generator	580 K.C.	580 K.C.	Band—Broadcast	5B	Roll Tuning Condenser
	Repeat operation 3					

NOTE A: DIAL CALIBRATION — Before adjusting the R. F. padders the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the tuning condenser in the closed position (maximum capacity), set the dial pointer on the small dot below 540 K.C.

NOTE B: When adjusting the S. W. oscillator compensator be sure to tune in the fundamental signal (15 mc.) instead of the image signal. If the compensator is correctly adjusted, the image signal will be found by turning the signal generator dial 910 mc. below the fundamental signal which will be 14.090 mc.

NOTE C: To adjust the aerial compensator (5) to maximum, first set signal generator to 1500 K.C., then tune in this signal on the radio. The aerial compensator is then adjusted to maximum output.

MODELS 42-853, 42-854



LOCATION OF PARTS, UNDERSIDE OF CHASSIS

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PHILCO RADIO & TELEVISION CORP.

MODEL 42-788

Model 42-788T is a special service eleven (11) tube A. C. operated super-heterodyne radio employing nine (9) tuning bands. Four standard scales are mounted on the left of the grille. These cover the complete radio spectrum from 540 K. C. to 22 megacycles. The standard scales are tuned by a variable condenser which has tuning ratios of 80 to 1 for vernier tuning and 16 to 1 for coarse tuning. Five spread band scales on the right of the grille are designed to spread the short wave frequencies more than 20 times farther apart. This spread band tuning section of the radio is tuned by a three (3) gang permeability tuner with shunt aligning compensators for each spread band.

ALIGNING R. F. AND I. F. COMPENSATING CONDENSERS

EQUIPMENT REQUIRED

Signal Generator: In order to properly adjust the various R. F. and I. F. padders of this receiver, a calibrated signal generator such as Philco Model 070 is required. The signal generator covers the frequencies necessary for adjusting the radio.

Aligning Indicating Device: A Vacuum Tube Voltmeter or Audio Output Meter, such as Philco Models 027 and 028, is required. Procedures for connecting these instruments are listed below.

Aligning Tools: Fiber handle screwdriver, Philco Part No. 45-2610 and Aligning Wrench, Part No. 7696.

CONNECTING ALIGNING INSTRUMENTS

Signal Generator: The signal generator is connected to the receiver as indicated in the tabulations below under "output connections to receiver." A Dummy Antenna is also required. This is listed under column, "Dummy Antenna, Note A."

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator it should be connected to the A. V. C. circuit as follows:

1. Connect the negative (—) terminal of the voltmeter through a 2 meg. resistor to any grid return connection in the A. V. C. circuit.

2. Connect the positive (+) terminal to the chassis ground terminal.

Audio Output Meter: If this type of meter is used as an aligning indicator, it should be connected to the plate and screen terminals of one of the 6V6EG tubes. Adjust the meter to the 0 to 30 volt A. C. scale.

After connecting the aligning meters, adjust the compensators in the order shown in the tabulation below. Locations of the compensators are shown in the schematic diagram. If the aligning meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

ADJUSTING NORMAL TUNING RANGES

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	Tuning Condenser Stator Lug Middle Section	.1 mfd.	455 K. C.	580 K. C.	Vol. Max. Band Selector "Brdcst"	45A, 45C, 50A, 50B, 51A	Note D
2	Antenna and Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max. Band Selector "Brdcst"	34A	Note B Roll Gang
3	Antenna and Ground	200 mmfd.	580 K. C.	580 K. C.	Vol. Max.	34B	Roll Gang
4	Antenna and Ground	200 mmfd.	1500 K. C.	1500 K. C.	Vol. Max.	34A	Roll Gang
5	Antenna and Ground	400 ohms	6.0 M. C.	6.0 M. C.	Vol. Max. Band Selector "S.W.2"	34C	Roll Gang
6	Antenna and Ground	400 ohms	20 M. C.	20 M. C.	Vol. Max. Band Selector "S.W.3"	38A, 22A, 8A	Note C

NOTE—S.W.1 Tuning Band requires no adjustment.

ADJUSTING BAND SPREAD TUNING RANGES

Mechanical Adjustments: Before the padders of the band spread tuning ranges are adjusted, the iron cores of the antenna, R. F. and oscillator transformers must be mechanically set as follows:

1. Turn the band spread tuning control to the extreme counter-clockwise position (lowest frequency).

2. Adjust location of "OSC" iron cores so that the end of the iron core is flush with the end of the transformer. With the "OSC" iron core in this position the antenna R. F. cores will be correctly located.

3. When installing a new oscillator transformer or core, make sure that the iron core slides freely in the transformer. It is important to do this to eliminate backlash in the tuning mechanism. If adjusment is necessary slightly move transformer in the direction required.

After mechanically setting the transformers and iron cores, adjust the padders as given in the following tabulation:

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	Antenna and Ground	400 ohms	9.7 M. C.	9.7 M. C.	Band Selector Position "31M" on Dial	38B, 22B, 8B	Note E—Note F
2	Antenna and Ground	400 ohms	11.7 M. C.	11.7 M. C.	Band Selector Position "25M" on Dial	38C, 22C, 8C	Note F
3	Antenna and Ground	400 ohms	15.2 M. C.	15.2 M. C.	Band Selector Position "19M" on Dial	44A, 27A, 11A	Note F
4	Antenna and Ground	400 ohms	17.8 M. C.	17.8 M. C.	Band Selector Position "16M" on Dial	44B, 27B, 11B	Note F
5	Antenna and Ground	400 ohms	21.5 M. C.	21.5 M. C.	Band Selector Position "13M" on Dial	44C, 27C, 11C	Note F

NOTE A—The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B—DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity) set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale.

NOTE C—When adjusting "OSC" compensator be sure to tune in the fundamental signal (20 MC) instead of the image signal. If the compensator is correctly adjusted, the image signal will be found by turning the signal generator dial 910 KC above the fundamental signal, which will be 20.910 MC.

NOTE D—Before adjusting padders 45A, 45C, 50A, 50B, 51A, turn padder 45B to full clockwise position (all the way out). After the padders are adjusted to maximum, then adjust padder 45B for maximum.

NOTE E—Before adjusting padders, turn the band spread tuning knob to its extreme counter-clockwise position. Set the band spread dial pointer on the first MARK on the left edge (low frequency end) of the 31 meter scale.

NOTE F—To make sure that the dial reads properly after adjusting the compensator with the signal generator as outlined above, a known station on each band near the adjusting frequency should be tuned in with the spread band tuning control. If the dial reading is incorrect, adjust the oscillator compensators on each band until the stations are heard at the correct points on the dial. After adjusting the oscillator compensators to the correct frequency of the known station, the "antenna" and "R. F." compensators should be adjusted to maximum signal.

ALTERNATIVE METHOD—Locate a known station near the center of each spread band and "Zero Beat" the signal generator with it at the time of aligning band. This makes available a signal of adjustable strength and known frequency. This method will be found to be simpler when conditions make its use possible because it is much easier to align a receiver to a strong signal.

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MODEL 42-788

PHILCO RADIO & TELEVISION CORP.

3. Adjusting Band Spread Tuning Core Assembly
(a) Cores are correctly located when the rear of the oscillator core is flush with the rear of the oscillator transformer and the tuning shaft is in extreme counterclockwise position.
(b) The carrage clamp (E) must not be tightened excessively as this will bend the tuning core rod (F) and cause backlash.

REPLACEMENT PARTS—MODEL 42-788

Sch. No.	Description	Part No.	Sch. No.	Description	Part No.
1.	Resistor (22,000 ohms)	33-4223339	55.	Volume Control	33-5389
2.	Mica Condenser (500 mmfd)	60-150257		Mfg. Nut	W-2157
3.	Compensator (Oscillator Adjust. SW1)	20-027611	56.	Mica Condenser (100 mmfd)	60-150257
4.	Mica Condenser (275 mmfd)	20-027611	57.	Resistor (68,000 ohms)	33-4223339
5.	Aerial Transformer (SW-1)	32-3682	58.	Resistor (22,000 ohms)	33-4223239
6.	Aerial Transformer (SW-2 Aerial)	32-3683	59.	Resistor (100,000 ohms)	33-4410339
7.	Aerial Transformer (SW-3)	32-3682	60.	Resistor (2.2 megohms)	33-4522239
8A.	Compensator (Aerial—31M Band), Part of 8A	31-4886	61.	Tone Control (.006 mfd. 600 volt)	30-4591
8B.	Compensator (Aerial—25M Band), Part of 8A		62.	Power Switch (Part of 56)	30-4512
8C.	Compensator (Aerial—19M Band), Part of 8A			Mfg. Nut	W-2157
9.	Mfg. Clip	32-3670	63.	Choke (8 mfd. 400 volts)	30-4521
	Iron Core Assembly	57-10985	64.	Condenser (.002 mfd. 600 volts)	30-4512
	Aerial Trans. Assembly	76-1251	65.	Resistor (220 ohms)	33-4223239
10.	Mica Condenser (500 mmfd)	60-150257	66.	Condenser (.002 mfd. 600 volts)	30-4512
10X.	Compensator (Aerial—31M Band)	31-4887	67.	Resistor (220,000 ohms)	33-4247339
11A.	Compensator (Aerial—19M Band), Part of 11A		68.	Resistor (47,000 ohms)	33-4247339
11C.	Compensator (Aerial—13M Band), Part of 11A		69.	Condenser (.05 mfd. 200 volts)	30-4508
12.	Mfg. Clip	31-2466	70.	Condenser (.006 mfd. 600 volts)	30-4609
	Coupling Assembly	31-2291	71.	Mica Condenser (500 mmfd)	60-150257
	Drive Cord (Tuning Cond.)	31-2448	72.	Mica Condenser (500 mmfd)	60-150257
	Drum	31-2454	73.	Resistor (6,000 ohms)	33-4168339
	Drive Drum	31-2453	74.	Resistor (1 megohm)	33-4510339
	Rubber Grommet (Mfg. Cond.)	31-4566	75.	Resistor (68,000 ohms)	33-4223339
	Mfg. Screw	27-4566	76.	Resistor (1 megohm)	33-4510339
	Mfg. Screw	W-2196	77.	Resistor (68,000 ohms)	33-4223339
13A.	Electrolytic Condenser (5 mfd)	30-2512	78.	Resistor (220,000 ohms)	33-4247339
13B.	Electrolytic Condenser (60 mfd), Part of 13A		79.	Resistor (470,000 ohms)	33-4247439
13C.	Electrolytic Condenser (60 mfd), Part of 13A		80.	Resistor (680 ohms)	33-4268339
	Mfg. Nut	56-1643	81.	Resistor (470,000 ohms)	33-4247439
14.	Condenser (.05 mfd. 400 volts)	30-4518	81A.	Resistor (470,000 ohms)	33-4247439
15.	Resistor (68,000 ohms)	33-4223339	82.	Resistor (470,000 ohms)	33-4247439
16.	Resistor (68,000 ohms)	33-4223339	83.	Condenser (.006 mfd. 600 volts)	30-4609
17.	Condenser (.05 mfd. 200 volts)	30-4609	84.	Condenser (.002 mfd. 600 volts)	30-4512
18.	Band Spread R. F. Transformer	32-3681	85.	Output Transformer	32-3111
	Mfg. Screw	27-3566	86.	Speaker	32-3111
	Tuning Cores	76-1281		Cone Assembly (For Speaker 36-1459)	36-1106
19.	Resistor (330 ohms)	33-4233339	87.	Cable	41-3535
20.	Band Transformer (Short Wave 3)	32-3683	88.	Hardboard Tube	31-2555
21.	Resistor (10,000 ohms)	33-4310339		Electrolytic Condenser (40 mfd)	30-2511
21A.	Band Transformer (Short Wave 2)	32-3684		Hardboard Tube	27-8566
22B.	Compensator (R. F.—31M Band), Part of 22A			Mfg. Nut	W-2196
22C.	Compensator (R. F.—25M Band), Part of 22A			Pilot Coil (Replace Speaker 36-1459)	32-3680
24.	Mica Condenser (5 mmfd)	60-050357	90.	Resistor (68,000 ohms)	33-4223339
25.	Mica Condenser (250 mmfd)	60-150357	91.	Resistor (100,000 ohms)	33-4247339
25X.	Trimmer (Broadcast—S. W. 1)	20-027615	92.	Condenser (.002 mfd. 1500 volts)	30-4512
26.	Mica Condenser (250 mmfd)	60-150357	93.	Condenser (.006 mfd. 1500 volts)	30-4609
27A.	Compensator (R. F.—19M Band)	31-4888	94.	Condenser (2 mfd. 300 volts)	30-4537
27B.	Compensator (R. F.—16M Band), Part of 27A		95.	Condenser (.002 mfd. 1500 volts)	30-4512
27C.	Compensator (R. F.—13M Band), Part of 27A		96.	Power Transformer (105-125 volts, 60 cycle)	32-3109
27K.	Mica Condenser (160 mmfd)	60-150457		Power Transformer (115-230 volts, 50 cycles)	32-3108
28X.	Mica Condenser (250 mmfd)	60-150457	97.	Power Transformer (115-230 volts, 60 cycle)	32-3109
29.	Resistor (68,000 ohms)	33-4223339	98.	Resistor (150,000 ohms)	33-4151339
30.	Resistor (68 ohms)	33-4068339	100.	Resistor (150,000 ohms)	33-4151339
31.	Mica Condenser (250 mmfd)	60-150357	101.	Dial Lamp	34-4115
32.	Resistor (22,000 ohms)	33-4223339		Socket Assembly	76-1414
33.	Oscillator Transformer (Broadcast S. W. 1)	31-4889	102.	Hardboard Tube Assembly	31-2555
34A.	Oscillator Transformer (Broadcast)		103.	Condenser (.05 mfd. 400 volts)	30-4518
34B.	Oscillator Transformer (OSC. 580 KC Broadcast).			Cable (Power)	L-3174
34C.	Compensator (OSC. S. W. 2), Part of 34A			Cabinet	27-9535
35.	Oscillator Transformer (S. W. 2)	32-3685		Cabinet Back	27-9536
36.	Oscillator Transformer (S. W. 3)	32-3686		Mfg. Screw	W-2078
37.	Oscillator Transformer (S. W. 2)	32-3684		Dial Assembly (Standard Tuning)	54-1790
38A.	Compensator (OSC. S. W. 3)	31-4619		Dial Assembly (Band Spread)	54-1789
38B.	Compensator (OSC. 31M Band), Part of 38A			Dial Pointer	54-1796
38C.	Compensator (OSC. 25M Band), Part of 38A			Mfg. Screw	W-353
39.	Oscillator Transformer (Band Spread)	32-3678		Knob (Tuning)	27-4482
	Tuning Core	76-1281		Knob (Volume—Band Switch)	27-4483
40.	Resistor (220,000 ohms)	33-4247339		Knob (Tone)	27-4484
41.	Condenser (.05 mfd. 400 volts)	30-4518		Rubber Grommet (Chassis Mtg.)	27-4574
42.	Condenser (.05 mfd. 200 volts)	30-4609		Rubber Washer (Chassis Mtg.)	27-4571
43.	Resistor (68,000 ohms)	33-4223339		Mfg. Screw (Knob)	W-2105
44A.	Compensator (OSC. 19M Band)	31-4620		Socket (7S Tube)	27-8035
44B.	Compensator (OSC. 16M Band), Part of 44A			Socket (6V6EG Tube)	27-8084
44C.	Compensator (OSC. 13M Band), Part of 44A			Socket (7T8 Tube)	27-8179
45.	1st I. F. Transformer	32-3443		Socket (6SA7 Tube)	27-8084
45A.	Primary Compensator (Iron Core—Part of 45)			Mfg. Eyelets	W-1560
45B.	Secondary Compensator (Iron Core—Part of 45)			Tuning Shaft (Band Spread—Outside Section)	76-1246
46.	Sensitivity Control	33-5401		Rubber Disc	27-4228
	Mfg. Nut	W-2157		Mfg. Nut	W-2196
47.	Resistor (100 ohms)	33-4210339		Tuning Drive Shaft (Band Spread—Inside R. F. Tail)	76-1241
48.	Condenser (.05 mfd. 200 volts)	30-4519		Shaft Bushing (Threaded)	27-4573
49.	Resistor (1 megohm)	33-5104339		Carriage (Tuning Cores)	76-1242
50.	2nd I. F. Transformer	32-3444		Core Clamp	56-2151
50A.	Primary Compensator (Iron Core—Part of 50)			Screw	27-9533
50B.	Secondary Compensator (Iron Core—Part of 50)			Cotter Pin	W-2194
51.	3rd I. F. Transformer	32-3445		Drive Cord (Band Spread—Short Section)	31-3468
51A.	Primary Compensator, Part of 51			Drive Cord (Band Spread—Long Section)	31-3467
51B.	Secondary Compensator (Iron Core) Part of 51A			Spring	W-2251
51C.	Resistor (47,000 ohms), Part of 51			Tube Shield (7SE Tube)	27-8036
51D.	Condenser (.01 mfd. 400 volts), Part of 51A			Wire Panel (4 lug)	38-3905
52.	Mfg. Nut	60-110457		Wire Panel (5 lug)	38-3917
53.	Resistor (330,000 ohms)	33-4333339		Wire Panel (6 lug)	38-3925
54.	Condenser (.01 mfd. 400 volts)	30-4672			

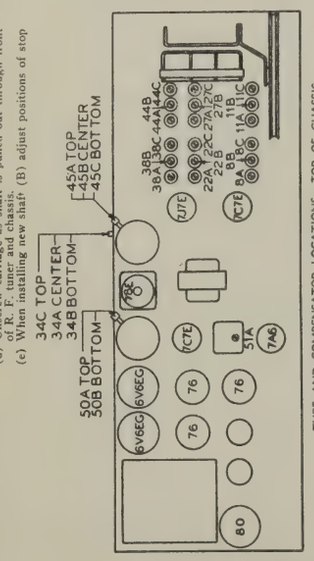
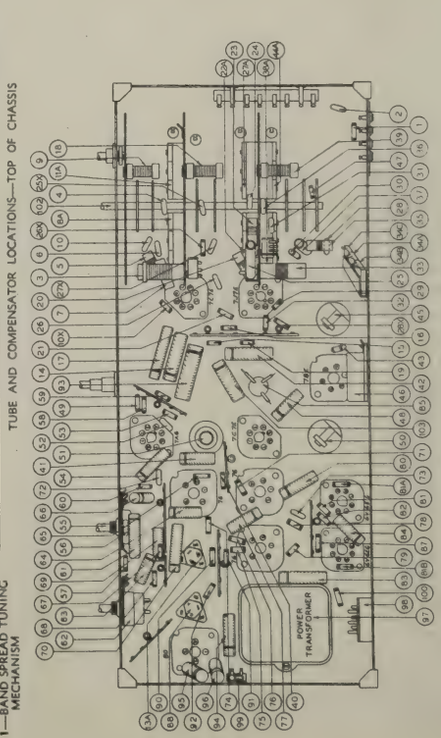

MECHANICAL ADJUSTMENTS—BAND SPREAD TUNING MECHANISM
1. Adjustment of Tuning Shaft
(a) Tuning shaft is adjusted by adjusting the rear bearing No. (A). Fig. (1). Care should be taken when adjusting the screw so that shaft does not turn too tightly. In making this adjustment, the screw driver can be inserted in the chassis in line with shaft.
2. Removing Tuning Shaft
(a) Remove knob from shaft and coupling.
(b) Loosen lock nut on rear bearing and remove adjusting screw and ball bearing.
(c) Remove cotter pin from stop assembly.
(d) Unscrew carrage as shaft is pulled out through front of R. F. tuner and chassis.
(e) When installing new shaft (B) adjust positions of stop assembly and carriage, before inserting cotter pin, so that the carriage (C) is approximately 5 turns from the stop assembly (D) with shaft in extreme counterclockwise position from front. The stop assembly is rotated until all washers are in contact. The bottom washer should be located between the stops nearest together.
45A TOP
45B CENTER
45C BOTTOM
50A TOP
50B BOTTOM
34C TOP
34A CENTER
34B BOTTOM
38B 38A 38C 44A 44B 44C
22A 22B 22C 27A 27B 27C
8A 8B 8C 11A 11B 11C
6V6EG
7T8
7CTE
51A
7A6
76
80
A
B
C
D
E
F

FIG. 1—BAND SPREAD TUNING MECHANISM



TUBE AND COMPENSATOR LOCATIONS—TOP OF CHASSIS

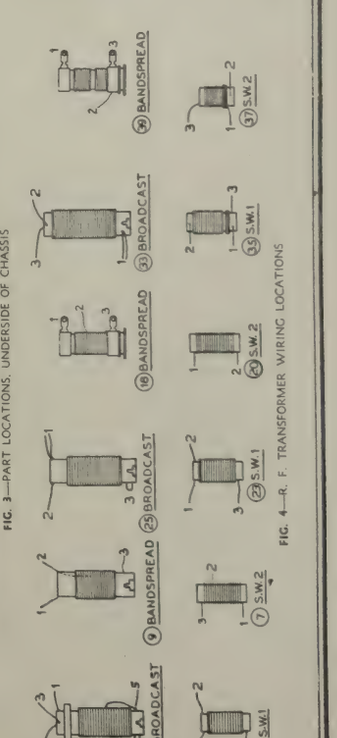


FIG. 3—PART LOCATIONS, UNDERSIDE OF CHASSIS

FIG. 4—R. F. TRANSFORMER WIRING LOCATIONS

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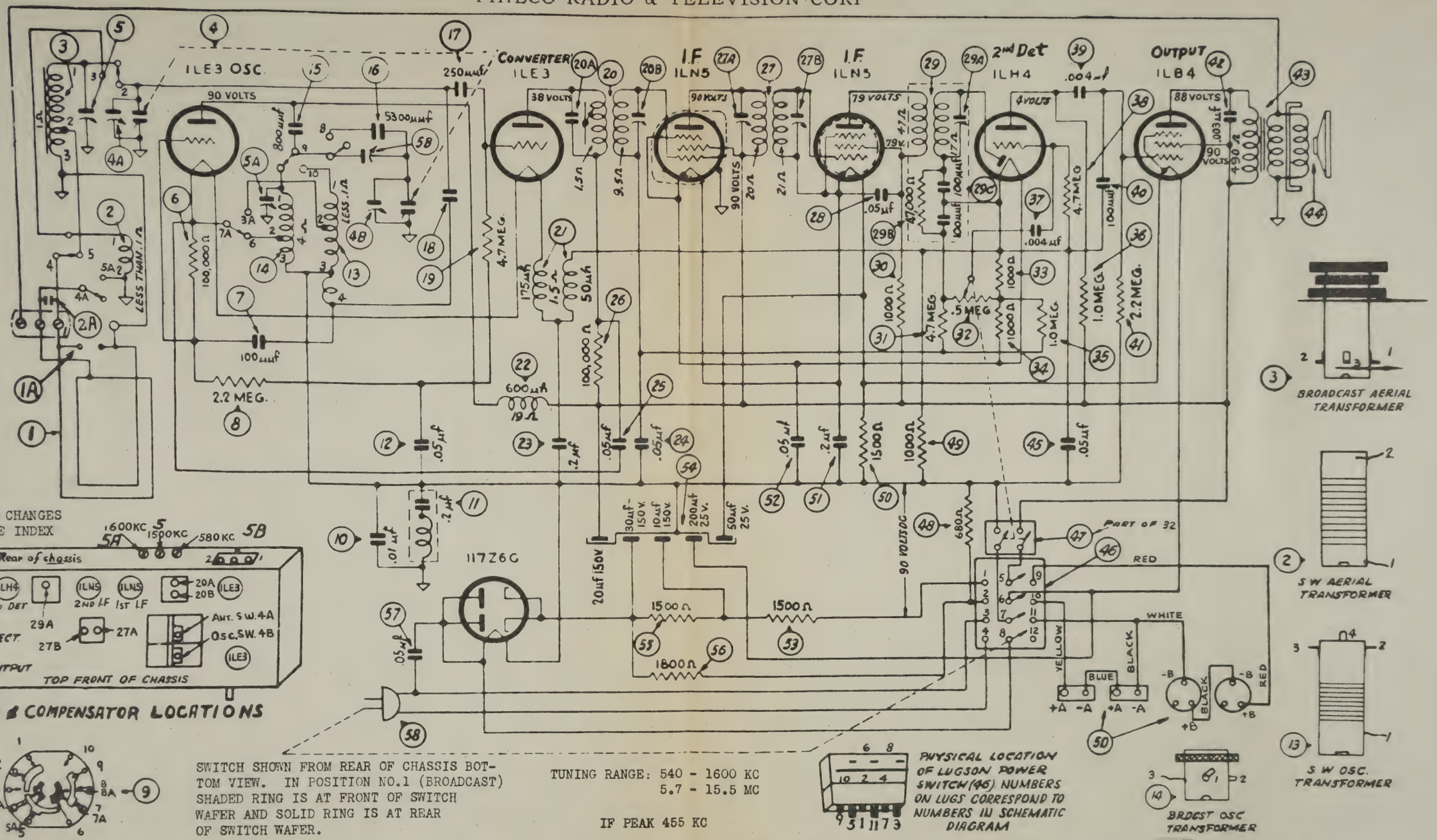
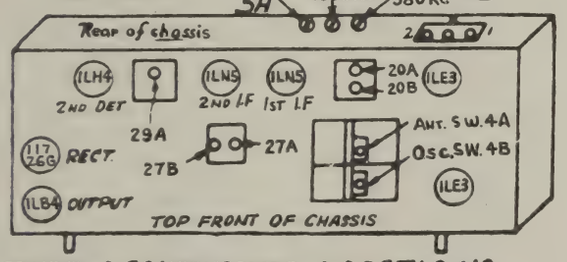
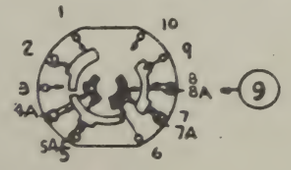


FOR CHANGES SEE INDEX



TUBE & COMPENSATOR LOCATIONS



SWITCH SHOWN FROM REAR OF CHASSIS BOTTOM VIEW. IN POSITION NO.1 (BROADCAST) SHADED RING IS AT FRONT OF SWITCH WAFER AND SOLID RING IS AT REAR OF SWITCH WAFER.

TUNING RANGE: 540 - 1600 KC
5.7 - 15.5 MC

IF PEAK 455 KC

PHYSICAL LOCATION OF LUGSON POWER SWITCH (46) NUMBERS ON LUGS CORRESPOND TO NUMBERS IN SCHEMATIC DIAGRAM

BROADCAST AERIAL TRANSFORMER

S W AERIAL TRANSFORMER

S W OSC. TRANSFORMER

BRDCST OSC TRANSFORMER

SCHE. No.	DESCRIPTION	PART No.
1.	Loop Aerial (42-853)	76-1278
	Mtg. Screw	W-2071
1A.	External Loop Aerial Socket	27-6175
2.	Aerial Transformer (S.W.)	32-3718
	Mtg. Clip	28-5002
2A.	Mica Condenser 15 mmfd.	60-015137
3.	Aerial Transformer (Broadcast)	32-3717
	Mtg. Clip	23-5002
4.	Tuning Condenser	31-2556
	Mtg. Spacer	28-5665
	Mtg. Grommet	27-5496
	Tuning Shaft	56-6136
	"C" Washer	28-5990
	Pointer (Dial)	27-4868
	Spring (Cond. Drive)	28-8882
	Drive Cord	31-2546
	Washer Mtg. Cond.	W-151
	Lockwashers Mtg. Cond.	W-388
	Screw Mtg. Cond.	W-523
	Nuts Mtg. Cond.	W-1543
5.	Compensator (Brdcst. Aerial Trans.)	31-6427
6.	Resistor (100,000 ohms)	33-410339
7.	Mica Condenser (100 mmfd.)	60-110157
8.	Resistor (2.2 megohms)	33-522339
9.	Band Switch	42-1670
	Mtg. Nut	W-2157
10.	Condenser (.01 mfd., 400 volts)	30-4572
11.	Condenser (.2 mfd. and R. F. choke)	76-1227
12.	Condenser (.05 mfd., 200 volts)	30-4519
13.	Oscillator Transformer (S. W.)	32-3720
14.	Oscillator Transformer (Brdcst.)	32-3719
15.	Mica Condenser (800 mmfd.)	60-180157
16.	Mica Condenser (5300 mmfd.)	60-253224
17.	Mica Condenser (250 mmfd.)	60-125157
18.	Condenser, Consisting of a lug mounted on contact 2, Band Switch	
19.	Resistor (4.7 megohms)	33-547339
20.	1st I. F. Transformer	32-3620
21.	Filament Choke	32-3632
22.	Oscillator Plate Choke	32-3615
23.	Condenser (.2 mfd., 200 volts)	30-4536
24.	Condenser (.05 mfd., 200 volt)	30-4519
25.	Condenser (.05 mfd., 200 volts)	30-4519
26.	Resistor (100,000 ohms)	33-410339
27.	2nd I. F. Transformer	32-3621
	Mtg. Nut	W-1949
28.	Condenser (.05 mfd., 200 volts)	30-4519
29.	3rd I. F. Transformer	32-3631
29A.	Compensator part of 29	
29B.	Resistor 47,000 ohms part of 29	33-347339
29C.	Condenser (100 mmfd.) part of 29	
30.	Resistor (1,000 ohms)	33-210339
31.	Resistor (4.7 megohms)	33-547339
32.	Volume Control	33-5436
	Mtg. Nut	W-2157
33.	Resistor (1,000 ohms)	33-210339
34.	Resistor (1,000 ohms)	33-210339
35.	Resistor (1 megohm)	33-510339
36.	Resistor (1 megohm)	33-510339
37.	Condenser (.004 mfd., 400 volts)	30-4578
38.	Resistor (4.7 megohms)	33-547339
39.	Condenser (.004 mfd., 400 volts)	30-4578
40.	Mica Condenser (100 mmfd.)	60-110157
41.	Resistor (2.2 megohms)	33-522339
42.	Condenser (.003 mfd., 1,000 volts)	30-4469
43.	Output Transformer	32-8169
44.	Cone Assembly (for speaker 36-1540-3)	36-4205
45.	Condenser (.05 mfd., 200 volts)	30-4519
46.	Battery and Powerline Changeover Switch	42-1650
	Mtg. Spacers	57-0194
	Screws	W-1395
	Spacers	57-0194
47.	OFF-ON Switch (part of 32)	
48.	Resistor (680 ohms)	33-168336
49.	Resistor (1,000 ohms)	33-210339
50.	Resistor (1,500 ohms)	33-215339
51.	Condenser (.2 mfd., 200 volts)	30-4587
52.	Condenser (.05 mfd., 200 volts)	30-4519
53.	Resistor (1500 ohms)	33-215339
54.	Electrolytic Condenser	
	10 mfd.-150 volts; 20 mfd.-150 volts	
	30 mfd.-150 volts; 50 mfd.- 25 volts	
	200 mfd.-25 volts	30-2498
	Clamp (Mtg. Elect. Cond.)	56-1452
55.	Resistor (1,500 ohms)	33-215339
56.	Resistor (1,800 ohms)	33-218339
57.	Condenser (.05 mfd., 400 volts)	30-4518
58.	Power Cord (A.C.-D.C.)	L-3199
59.	Battery Cable	41-3570

POWER SUPPLY: For battery operation two Philco "A" batteries type P-100 and two Philco "B" batteries type P-200 are required. When operating these radios with the batteries wrap the power line cord around its holder clamp on the back of the cabinet and insert the plug end into the socket provided on the chassis. To operate on a 115 volt A.C. or D.C. power supply, remove the power line cord plug from the socket on the chassis and insert it into a power receptacle.

MISCELLANEOUS

Cabinet 42-853	10537B
Cabinet 42-854	10538B
Clamp (Battery)	56-2178
Screw	W-527
Nut	W-2261
Dial Scale	27-5729
Washer	3093
Screws	W-453
Knobs	27-4970
Lock (42-853 Cabinet)	45-6184
Key	45-6203
Socket (Tubes)	27-6177
Rivets	W-239
Socket (1st I. F. Tube)	27-6174
Rubber Washer (Mtg. socket)	27-4112
Rubber Grommets	27-4707
Adapter Plate (Mtg. Socket)	56-2112
Stud	56-6120
Speaker	36-1540

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MODEL 42-1001(121,122)
MODELS 42-1012,42-1013 PHILCO RADIO & TELEVISION CORP.

MODEL 42-1001(121,122) CONNECTING ALIGNING INSTRUMENTS

AUDIO OUTPUT METER: If this type of aligning meter is used, connect it to the voice coil terminals of the speaker or from the plate of the 50L6GT tube to "B" (—) negative. Adjust the meter for the 0 to 10 volt scale.

The left terminal on the terminal panel at rear is also provided for connecting the audio output meter. If this terminal is used, the lowest A.C. scale of the meter should be used when aligning.

VACUUM TUBE VOLTMETER: To use the vacuum tube voltmeter as an aligning indicator, make the following connections: Attach the negative (—) terminal of the voltmeter to any point in the circuit where the A. V. C. voltage can be obtained. Connect the positive (+) terminal of the vacuum tube voltmeter to the chassis.

SIGNAL GENERATOR: When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to the antenna section of the tuning condenser. Connect the ground or low side of the generator to the chassis.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled.

After connecting the aligning instruments adjust the compensators as shown in the tabulation below. Locations are shown on Schematic.

If the indicating meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations In Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Setting Dial	Dial Setting	Control Setting	Adjust Compensators In Order	
1	Ant. Section of tuning	455 K.C.	540 K.C. Tuning Cond. Closed	Vol Max.	12A, 12B, 10A, 10B	Note B
2	Loop see above instructions	1600 K.C.	1600 K.C.	Vol Max.	(7B, Note C)	Note A
3	Loop see above instructions	1500 K.C.	1500 K.C.	Vol Max.	(7A, Note D)	

NOTE A: DIAL POINTER CALIBRATION — In order to adjust the receiver correctly, the pointer must be adjusted to track properly with the tuning condenser. To do this, turn the tuning condenser to the maximum capacity (plates fully meshed). With the condenser in this position, set the tuning pointer on the first small line stamped in the scale plate on the left side. If adjusted in the cabinet, set the dial pointer to the mark on dial scale below 540 K.C.

NOTE B — Before adjusting compensators, turn down (10B) to tight position. Then adjust the compensators for maximum output in the following order: 12A, 12B, 10A and 10B.

NOTE C — Turn tuning condenser until dial pointer is on the first small line stamped in the scale plate from right side of chassis. Adjust padder (7B) to maximum at this point. If the radio is adjusted in the cabinet, set dial pointer to 1600 K.C. If adjusted in the cabinet, set the dial pointer to 1600 K.C.

NOTE D — Turn tuning condenser until dial pointer is on the second small line stamped in the scale plate from right side of chassis. Adjust padder (7A) to maximum at this point. If adjusted in cabinet, set pointer to 1500 K.C. on dial.

MODELS 42-1012, 42-1013, CODE 121 EXTERNAL AERIAL CONNECTIONS

The built-in aerial system is designed to operate without an outside aerial or ground and to give exceptionally high receiving performance of stations in the standard, shortwave, or FM bands.

To operate the radio in steel reinforced buildings and other shielded locations where signal strength is weak, an external aerial is recommended. Three differnt types of aerial combinations are available, to improve reception on the standard, shortwave, or FM bands.

1—For Additional Sensitivity on Frequency Modulation only:

*Philco Dipole Outdoor Aerial, Part No. 45-2926.

The plug at the end of the transmission line is inserted in the socket of the back of the chassis in place of the plug connected to the F. M. loop in the cabinet.

2—For Additional Sensitivity on ALL ranges:

*Philco Dipole Outdoor Aerial, Part No. 45-2926.

Philco Aerial Coupler, Part No. 45-1361.

The coupler plugs into the socket at the back of the chassis in place of the plug connected to the F. M. loop. The aerial transmission line then connects to the terminals on the coupler marked "red" and "black." The local-distance switch on the coupler connects or disconnects the outdoor aerial from the standard broadcast and shortwave tuning ranges. The dipole remains connected to the F. M. band regardless of the position of the switch.

3—For Additional Sensitivity on Standard Broadcast and Shortwave only in Areas where F. M. reception is not available.

Philco Safety Aerial, Part No. 40-6370.

Philco Aerial Coupler, Part No. 45-1361

Connect the single wire lead-in of the aerial to the "black" terminal on the aerial coupler.

*Accessories for this aerial are the Philco Aerial Mast Kit, the Philco Reflector Kit and Philco High Efficiency Transmission Line. See Service Bulletin No. 396 on Dipole Aerials.

NOTE: When installing the F. M. Philco Outdoor Dipole Aerial, it is very important that the aerial compensating condensers of the standard and shortwave band are repadded.

ELECTRIC PUSH-BUTTON ADJUSTMENTS

The electric push button tuning mechanism consists of ten push buttons. Five push buttons control and select power supply, broadcast, police and shortwave bands and phonograph operation. The remaining five push buttons are used for automatically selecting five standard broadcast stations.

Select five of the most popular stations received in the locality. Insert the station call letters into the spaces above the buttons. The station with the lowest frequency is placed in the second button from the left and the highest frequency is placed in the sixth push button from the left. Each push button is adjusted by two adjusting screws located on the rear of the chassis. Each set of screws is numbered and labeled "Ant.", "Osc." and covers a frequency range as shown in Fig. 5.

Looking at the front of the cabinet, the second button from the left is adjusted by adjusting screws No. 1. The next push button by adjusting screws No. 2, and the remaining push buttons in order.

To adjust the electric push buttons accurately for reception of broadcast stations, a vacuum tube voltmeter such as Philco Models 027 and 028 should be used. In addition, an insulated padding screw driver, Part No. 45-2610, and a Philco Model 070 signal generator are required. With this equipment at hand proceed as follows:

1. Press in "Broadcast" push button.

2. Set up a Model 070 Signal Generator near the receiver and connect a loop aerial (made from a few turns of wire 12 inches in diameter) to the high and ground output jacks of the signal generator. Turn the output controls to maximum and set the modulation control to "MOD. ON"

Connect the negative (—) terminal of the vacuum tube voltmeter to the aligning test socket at the rear of the chassis. Attach the positive (+) terminal of the voltmeter to the chassis.

3. Manually tune in the station to be set up on the first station push button. After doing this set the indicator of the 070 Signal Generator to the frequency of the station being received. As the indicator approaches the frequency of the station a whistle will be heard; leave the indicator at this point.

4. Press "in" the second push button from the left of cabinet. Using the insulated screw driver, turn the No. 1 "Osc." screw until the broadcast station identified by the signal generator is heard; at this point, turn the indicator of the signal generator away from the frequency of the station. Readjust No. 1 "Osc." and "Ant." screws for maximum deflection of the vacuum tube voltmeter pointer.

After setting up the first station the same procedure as outlined above is used for the remaining stations. When these models are set up to receive the sound of a television program tuned in by the special type Philco Television Sets or if it is to be used in conjunction with a Philco Record Player, the lowest frequency push button should be used. To tune in these programs, the same procedure as given for broadcast stations above is used.

Further details for setting up these radios for operation with Philco Television Sets or Record Players are supplied with the instruments.

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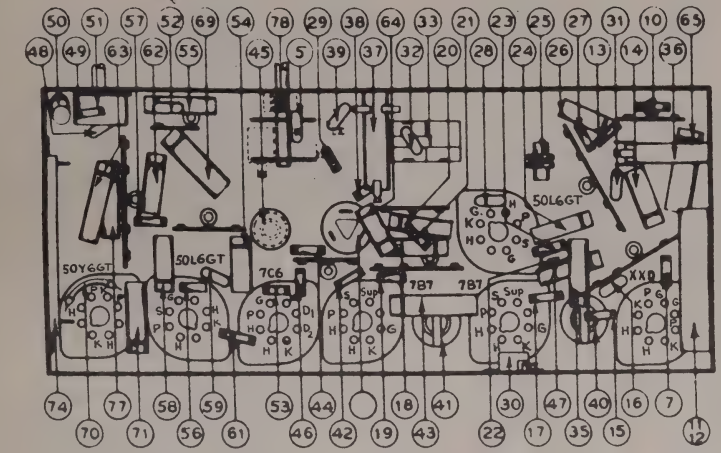
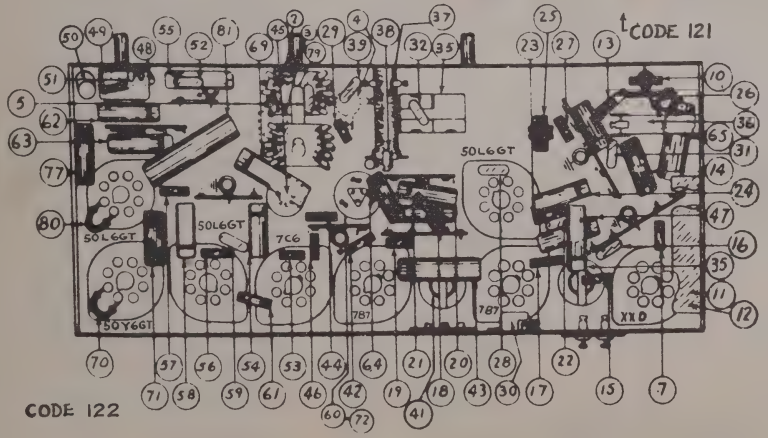




CODE 122

MODEL 42-1003, CODES 121-122

Model 42-1003, Codes 121-122 are alternating current operated superheterodyne radio-phonograph combinations. In general, Code 121 and 122 of this model are similar in design with the exception of the number of tubes, speaker types and rectifier circuits. Code 121 consists of a seven-tube chassis using a six-inch permanent magnet dynamic speaker and a single rectifier tube circuit.

Code 122 chassis contains eight tubes, a six-inch electrodynamic speaker and two tubes in the rectifier circuit. One tube type 50Y6GT supplies plate votage for the other tubes and a 50L6GT excites the field coil of the electrodynamic speaker.

PHONOGRAPH SECTION

The phonograph incorporates a self-starting rim drive turntable motor, and a manually operated Philco Photo-Electric reproducer, which operates through the audio system of the radio. The phonograph motor is automatically started when the photo-eleatric reproducer is lifted from its rest. The motor is designed to operate on 115 volts, 60 cycle, or 115 volts, 50 cycle A.C. power supplies. When operating on 115 volt, 50 cycle current, a special spring collar, Part No. 28-8999 must be placed on the motor drive shaft pulley.

RADIO SECTION

The radio features in this model are a built-in loop aerial; two tuning ranges; two I. F. amplifier tubes; automatic volume control; two position tone control, mounted on the motor board; audio BASS compensation in the volume control circuit; beam power pentode audio output stage and Philco LOKTAL tubes.

TUNING BAND FREQUENCIES: 540 to 1720 K.C. and 9 to 15.5 M.C.
INTERMEDIATE FREQUENCY: 455 K.C.
AUDIO OUTPUT: 1.5 watts.
POWER SUPPLY: 115 volts, 60 cycle A.C.

PHILCO TUBES USED

Code 121 chassis—XXD, R. F. converter and phonograph pre-amplifier; 50L6GT, oscillator; 7B7, 1st. I. F. amplifier; 7B7, 2nd I. F. amplifier; 7C6, second detector, first audio; 50L6GT audio output and a 50Y6GT rectifier.

Code 122 chassis—XXD, R. F. converter and phonograph pre-amplifier; 50L6GT, oscillator; 7B7, 1st I. F. amplifier; 7B7, 2nd I. F. amplifier; 7C6 second detector, first audio; 50L6GT audio output; 50Y6GT rectifier 50L6GT rectifier.

EXTERNAL AERIAL CONNECTIONS

The built-in low-impedance loop aerial system of this model is designed to operate without an outside aerial or ground, and to give exceptional receiving performance under average conditions.

To operate the radio, however, in steel reinforced buildings and other shielded locations, where signal strength is weak, the Philco outdoor aerial Part No. 45-2817 is recommended for maximum receiving performance. The outdoor aerial can be easily connected to the radio by inserting the plug attached to the transformer (supplied with the aerial) into the socket provided at the rear of the radio.

FOR PHONOGRAPH REPRODUCER ADJUSTMENTS, SEE MODEL 42-1015

PHILCO RADIO & TELEVISION CORP.

MODELS 42-842,42-843, 42-844
MODELS 42-853,42-854

CONNECTING ALIGNING INSTRUMENTS

AUDIO OUTPUT METER: If an audio output meter is used, connect it across the plate and screen terminals of the output tubes. Adjust the meters to use the 0 to 10 scale. Terminal No. 1 on the rear of the chassis which connects to the speaker is also provided for connecting the audio output meter. If this terminal is used, the lowest scale of the meter should be used when aligning.

VACUUM TUBE VOLTMETER: If a vacuum tube voltmeter is used as an aligning indicator, the negative (—) terminal is connected to the A. V. C. circuit of the receiver through a 2 megohm resistor. The positive (+) terminal is connected to the chassis or ground.

SIGNAL GENERATOR: When adjusting the "I. F." padders the high side of the signal generator is connected through a .1 mfd. condenser to the loop tuning condenser stator lug which connects to the grid of the first detector tube. The ground or low side of the signal generator is connected to the chassis of the receiver.

When aligning the R. F. padders of the portable models a loop aerial is made from a few turns of wire and connected to the signal generator output terminals. The signal generator is then placed a few feet from the set. The loop aerial of the receiver should be assembled in the cabinet together with the battery when adjusting the R. F. padders.

MODELS 42-842, 42-843, 42-844

These models may be adjusted when operated by battery or 115 volts A.C.-D.C. power.

Operations In Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators	
1	See Paragraph on Signal Generator above	455 K.C.	540 K.C.	Vol. Max.	26A, 25A, 25B, 15A, 15B	Note A
2	Use Loop on Generator as above	1500 K.C.	1500 K.C.	Vol. Max.	4B, 4A	
3	Use Loop on Generator as above	580 K.C.	580 K.C.	Vol. Max.	7A, Note B	Roll Tuning Condenser to Max.
4	Use Loop on Generator as above	Repeat Operation 2	Repeat Operation 2	Repeat Operation 2		

NOTE A: DIAL CALIBRATION — Before adjusting the R. F. padders the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the tuning condenser in the closed position (maximum capacity), set the dial pointer on the small dot below 540 K.C.

NOTE B — Roll tuning condenser as compensator 7A is being adjusted until maximum output is indicated on output meter.

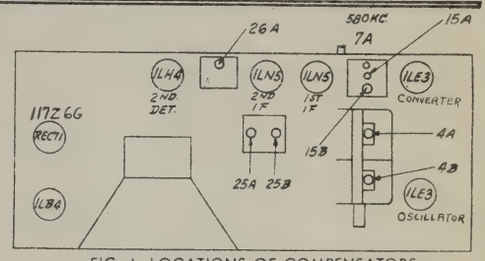


FIG. 1. LOCATIONS OF COMPENSATORS.

MODELS 42-853, 42-854

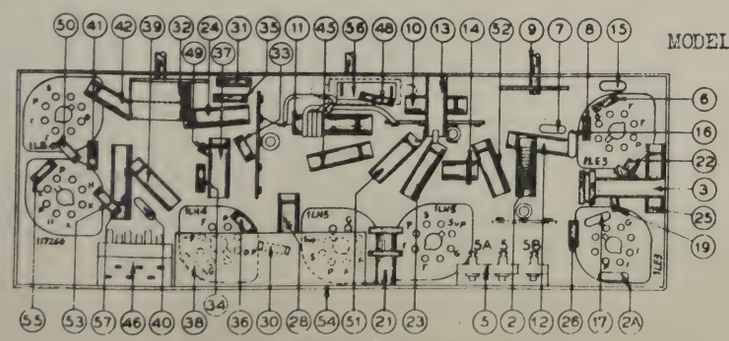
These models may be adjusted when operated by battery or 115 volts A.C.-D.C. power.

Operations In Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators	
1.	See paragraph on Signal Generator above	455 K.C.	540 K.C.	Vol. Max. Band—Broadcast	20A, 20B, 27A, 27B, 29A	Note A
2.	Loop on Generator	15 mc.	15 mc.	Band—S.W.	4B, 4A	Note B
3.	Loop on Generator	1600 K.C.	1600 K.C.	Band—Broadcast	5A	
4.	Loop on Generator	1500 K.C.	1500 K.C.	Band—Broadcast	5	Note C
5.	Loop on Generator	580 K.C.	580 K.C.	Band—Broadcast	5B	Roll Tuning Condenser
	Repeat operation 3					

NOTE A: DIAL CALIBRATION — Before adjusting the R. F. padders the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the tuning condenser in the closed position (maximum capacity), set the dial pointer on the small dot below 540 K.C.

NOTE B: When adjusting the S. W. oscillator compensator be sure to tune in the fundamental signal (15 mc.) instead of the image signal. If the compensator is correctly adjusted, the image signal will be found by turning the signal generator dial 910 mc. below the fundamental signal which will be 14.090 mc.

NOTE C: To adjust the aerial compensator (5) to maximum, first set signal generator to 1500 K.C., then tune in this signal on the radio. The aerial compensator is then adjusted to maximum output.



LOCATION OF PARTS, UNDERSIDE OF CHASSIS

MODELS 42-853, 42-854

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MODEL 42-1001(121,122)
MODELS 42-1012,42-1013 PHILCO RADIO & TELEVISION CORP.

MODEL 42-1001(121,122) CONNECTING ALIGNING INSTRUMENTS

AUDIO OUTPUT METER: If this type of aligning meter is used, connect it to the voice coil terminals of the speaker or from the plate of the 50L6GT tube to "B" (—) negative. Adjust the meter for the 0 to 10 volt scale.

The left terminal on the terminal panel at rear is also provided for connecting the audio output meter. If this terminal is used, the lowest A.C. scale of the meter should be used when aligning.

VACUUM TUBE VOLTMETER: To use the vacuum tube voltmeter as an aligning indicator, make the following connections: Attach the negative (—) terminal of the voltmeter to any point in the circuit where the A. V. C. voltage can be obtained. Connect the positive (+) terminal of the vacuum tube voltmeter to the chassis.

SIGNAL GENERATOR: When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to the antenna section of the tuning condenser. Connect the ground or low side of the generator to the chassis.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled.

After connecting the aligning instruments adjust the compensators as shown in the tabulation below. Locations are shown on Schematic.

If the indicating meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations In Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Setting Dial	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of tuning	455 K.C.	540 K.C. Tuning Cond. Closed	Vol Max.	12A, 12B, 10A, 10B	Note B
2	Loop see above instructions	1600 K.C.	1600 K.C.	Vol Max.	(7B, Note C)	Note A
3	Loop see above instructions	1500 K.C.	1500 K.C.	Vol Max.	(7A, Note D)	

NOTE A: DIAL POINTER CALIBRATION — In order to adjust the receiver correctly, the pointer must be adjusted to track properly with the tuning condenser. To do this, turn the tuning condenser to the maximum capacity (plates fully meshed). With the condenser in this position, set the tuning pointer on the first small line stamped in the scale plate on the left side. If adjusted in the cabinet, set the dial pointer to the mark on dial scale below 540 K.C.

NOTE B — Before adjusting compensators, turn down (10B) to tight position. Then adjust the compensators for maximum output in the following order: 12A, 12B, 10A and 10B.

NOTE C — Turn tuning condenser until dial pointer is on the first small line stamped in the scale plate from right side of chassis. Adjust padder (7B) to maximum at this point. If the radio is adjusted in the cabinet, set dial pointer to 1600 K.C. If adjusted in the cabinet, set the dial pointer to 1600 K.C.

NOTE D — Turn tuning condenser until dial pointer is on the second small line stamped in the scale plate from right side of chassis. Adjust padder (7A) to maximum at this point. If adjusted in cabinet, set pointer to 1500 K.C. on dial.

MODELS 42-1012, 42-1013, CODE 121 EXTERNAL AERIAL CONNECTIONS

The built-in aerial system is designed to operate without an outside aerial or ground and to give exceptionally high receiving performance of stations in the standard, shortwave, or FM bands.

To operate the radio in steel reinforced buildings and other shielded locations where signal strength is weak, an external aerial is recommended. Three differnt types of aerial combinations are available, to improve reception on the standard, shortwave, or FM bands.

1—For Additional Sensitivity on Frequency Modulation only:

*Philco Dipole Outdoor Aerial, Part No. 45-2926.

The plug at the end of the transmission line is inserted in the socket of the back of the chassis in place of the plug connected to the F. M. loop in the cabinet.

2—For Additional Sensitivity on ALL ranges:

*Philco Dipole Outdoor Aerial, Part No. 45-2926.

Philco Aerial Coupler, Part No. 45-1361.

The coupler plugs into the socket at the back of the chassis in place of the plug connected to the F. M. loop. The aerial transmission line then connects to the terminals on the coupler markd "red" and "black." The local-distance switch on the coupler connects or disconnects the outdoor aerial from the standard broadcast and shortwave tuning ranges. The dipole remains connected to the F. M. band regardless of the position of the switch.

3—For Additional Sensitivity on Standard Broadcast and Shortwave only in Areas where F. M. reception is not available.

Philco Safety Aerial, Part No. 40-6370.

Philco Aerial Coupler, Part No. 45-1361

Connect the single wire lead-in of the aerial to the "black" terminal on the aerial coupler.

* Accessories for this aerial are the Philco Aerial Mast Kit, the Philco Reflector Kit and Philco High Efficiency Transmission Line. See Service Bulletin No. 396 on Dipole Aerials.

NOTE: When installing the F. M. Philco Outdoor Dipole Aerial, it is very important that the aerial compensating condensers of the standard and shortwave band are repadded.

ELECTRIC PUSH-BUTTON ADJUSTMENTS

The electric push button tuning mechanism consists of ten push buttons. Five push buttons control and select power supply, broadcast, police and shortwave bands and phonograph operation. The remaining five push buttons are used for automatically selecting five standard broadcast stations.

Select five of the most popular stations received in the locality. Insert the station call letters into the spaces above the buttons. The station with the lowest frequency is placed in the second button from the left and the highest frequency is placed in the sixth push button from the left. Each push button is adjusted by two adjusting screws located on the rear of the chassis. Each set of screws is numbered and labeled "Ant.", "Osc." and covers a frequency range as shown in Fig. 5.

Looking at the front of the cabinet, the second button from the left is adjusted by adjusting screws No. 1. The next push button by adjusting screws No. 2, and the remaining push buttons in order.

To adjust the electric push buttons accurately for reception of broadcast stations, a vacuum tube voltmeter such as Philco Models 027 and 028 should be used. In addition, an insulated padding screw driver, Part No. 45-2610, and a Philco Model 070 signal generator are required. With this equipment at hand proceed as follows:

1. Press in "Broadcast" push button.

2. Set up a Model 070 Signal Generator near the receiver and connect a loop aerial (made from a few turns of wire 12 inches in diameter) to the high and ground output jacks of the signal generator. Turn the output controls to maximum and set the modulation control to "MOD. ON"

Connect the negative (—) terminal of the vacuum tube voltmeter to the aligning test socket at the rear of the chassis. Attach the positive (+) terminal of the voltmeter to the chassis.

3. Manually tune in the station to be set up on the first station push button. After doing this set the indicator of the 070 Signal Generator to the frequency of the station being received. As the indicator approaches the frequency of the station a whistle will be heard; leave the indicator at this point.

4. Press "in" the second push button from the left of cabinet. Using the insulated screw driver, turn the No. 1 "Osc." screw until the broadcast station identified by the signal generator is heard; at this point, turn the indicator of the signal generator away from the frequency of the station. Readjust No. 1 "Osc." and "Ant." screws for maximum deflection of the vacuum tube voltmeter pointer.

After setting up the first station the same procedure as outlined above is used for the remaining stations. When these models are set up to receive the sound of a television program tuned in by the special type Philco Television Sets or if it is to be used in conjunction with a Philco Record Player, the lowest frequency push button should be used. To tune in these programs, the same procedure as given for broadcast stations above is used.

Further details for setting up these radios for operation with Philco Television Sets or Record Players are supplied with the instruments.

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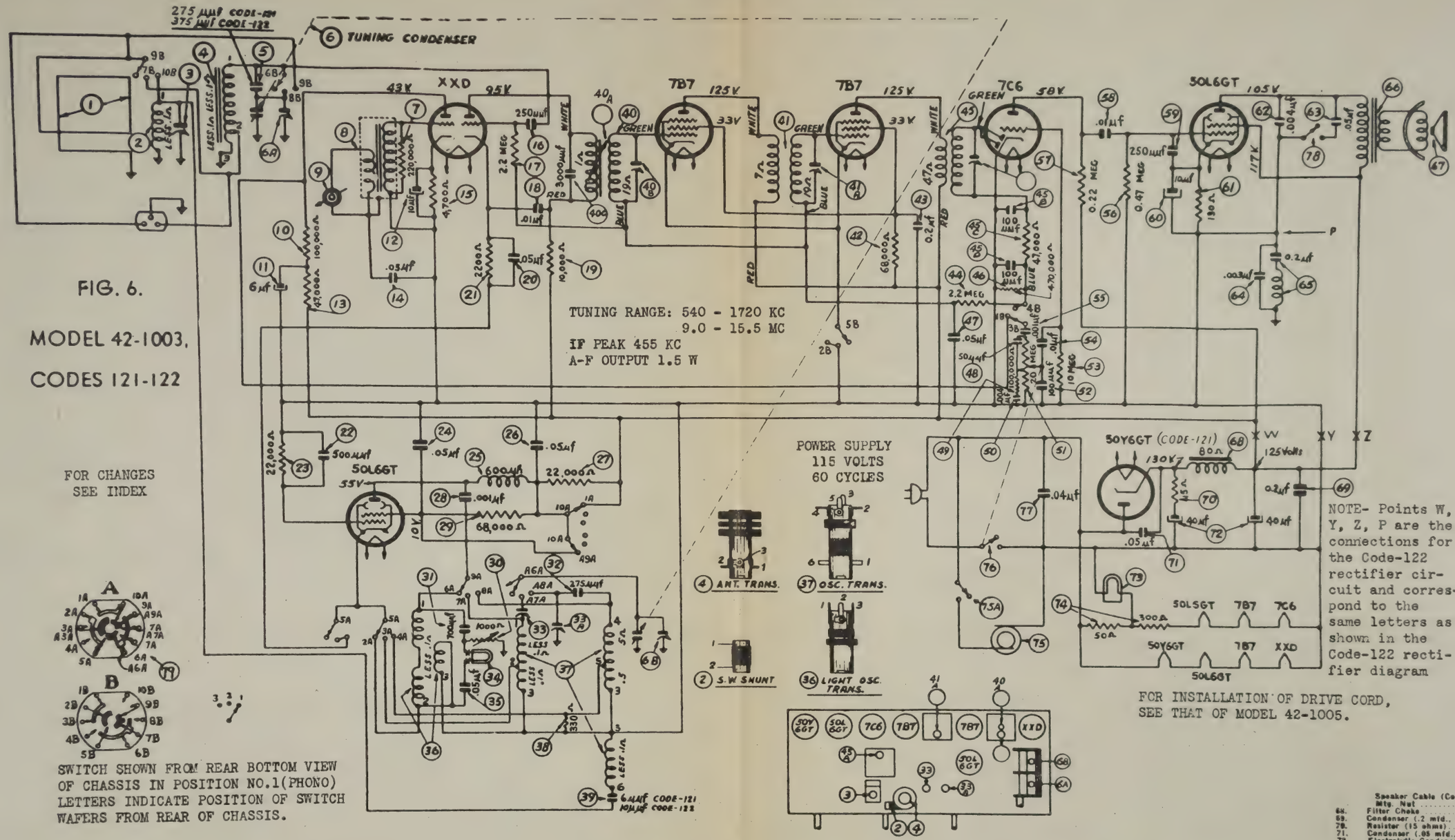

FIG. 6.

MODEL 42-1003,

CODES 121-122

FOR CHANGES SEE INDEX

NOTE- Points W, Y, Z, P are the connections for the Code-122 rectifier circuit and correspond to the same letters as shown in the Code-122 rectifier diagram

FOR INSTALLATION OF DRIVE CORD, SEE THAT OF MODEL 42-1005.

SWITCH SHOWN FROM REAR BOTTOM VIEW OF CHASSIS IN POSITION NO.1(PHONO) LETTERS INDICATE POSITION OF SWITCH WAFERS FROM REAR OF CHASSIS.

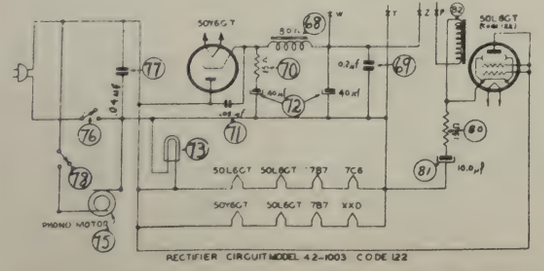

FIG. 2. RECTIFIER CIRCUIT—MODEL 42-1003, CODE 122

Points "C", "P", "W", "Y" correspond to the connections with the same letters in the rectifier circuit for Model 42-1003, Code 121, shown in Fig. 6.

Schem. No.	Description	Part No.
1.	Loop Aerial	76-1330
	Screw	W-2071
2.	Short Wave Aerial Transformer (Code 121)	32-3754
	Short Wave Aerial Transformer (Code 122)	32-3861
3.	Compensator (S. W. Aerial)	31-6437
4.	Broadcast Aerial Transformer	32-3739
	Broadcast Aerial Transformer (Code 122)	32-3849
	Mtg. Clip	28-5002
5.	Mica Condenser (275 mmfd., Code 121)	20-027511
	Mica Condenser (375 mmfd., Code 122)	20-037517
6.	Tuning Condenser	31-2572
6a.	Compensator (Part of 6)	
6b.	Compensator (Part of 6)	
	Drive Cord	31-2573
	Spring	28-8854
	Drive Shaft Assembly	31-2571
	Rubber Grommet	27-4618
	Mtg. Sleeve	28-5583
	Mtg. Nut (Drive Shaft)	W-684
	Pointer	56-2076
	Mtg. Nut (Tuning Condenser)	W-1543
7.	Resistor (220,000 ohms)	33-422339
8.	Phonograph Input transformer	32-8183
	Input Cable	41-3566
9.	Light Beam Pickup (Complete)	33-2517
	Lock Washer	57-8148
	Rubber Bumper	54-4070
	Rubber Mtg. Grommet (two required)	54-4095
	Rubber Mtg. Grommet (one required)	54-4096
	Nut	W-628
10.	Resistor (100,000 ohms, Code 121)	33-410339
	Resistor (220,000 ohms, Code 122)	33-422339
11.	Electrolytic Condenser (6 mfd.)	30-2508
	Mtg. Clamp	36-1346
12.	Electrolytic Condenser (10 mfd.) Part of 11	
13.	Resistor (47000 ohms)	33-347339
14.	Condenser (.05 mfd., 200 volts)	30-4519
15.	Resistor (4700 ohms)	33-247339
16.	Mica Condenser (250 mmfd.)	60-125157
17.	Resistor (2.2 megohms)	33-522339
18.	Condenser (.01 mfd. 400 volts)	30-4572
19.	Resistor (10,000 ohms)	33-310339
20.	Condenser (.05 mfd., 400 volts)	30-4518
21.	Resistor (2200 ohms)	33-222339
22.	Condenser (500 mmfd.)	60-150157,
23.	Resistor (22000 ohms)	33-322339
24.	Condenser (.05 mfd., 200 volts)	30-4519
25.	Oscillator Choke	32-3615
26.	Condenser (.05 mfd., 200 volts)	30-4519
27.	Resistor (22000 ohms)	33-322339
28.	Mica Condenser (.001 mfd., 400 volts)	30-1063
29.	Resistor (68000 ohms)	33-368339
30.	Light Control (Light Beam Reproducer)	33-5435
31.	Mica Condenser (700 mmfd., Code 121)	60-170157
	Mica Condenser (680 mmfd., Code 122)	60-168137
32.	Mica Condenser (275 mmfd.)	20-027511
33.	Compensator (586 K.C.)	31-6432
33a.	Compensator (Part of 33)	
34.	Lamp (Light Beam Reproducer)	34-2474
35.	Condenser (.05 mfd., 200 volts)	30-4519
36.	Light Beam Osc. Transformer	32-3741
	Mtg. Clip	28-5002
37.	Oscillator Transformer (Broadcast, S. W.)	32-3740
	Mtg. Clip	28-5002
38.	Resistor (330 ohms)	33-133339
39.	Mica Condenser (10 mmfd., Code 122)	60-010137
	Mica Condenser (6 mmfd., Code 121)	60-006137
40.	1st I.F. Transformer	32-3616
	Mtg. Clip	W-1949
40a.	Primary Compensator (Part of 40)	
40b.	Secondary Compensator (Part of 40)	
40c.	Condenser (3000 mmfd.) (Part of 40)	
41.	2nd I.F. Transformer	32-3617
	Mtg. Nut	W-1949
41a.	Secondary Compensator (Part of 41)	
42.	Resistor (68000 ohms)	33-368339
43.	Condenser (.2 mfd., 200 volts)	30-4587
44.	Resistor (2.2 megohms)	33-522339
45.	3rd I.F. Transformer	32-3758
	Mtg. Nut	W-1949
45a.	Secondary Compensator (Part of 45)	
45b.	Condenser (100 mmfd.) (Part of 45a)	
45c.	Resistor (47000 ohms) (Part of 45a)	33-347339
45d.	Condenser (100 mmfd.) (Part of 45a)	
46.	Resistor (470000 ohms)	33-447339
47.	Condenser (.05 mfd., 200 volts)	30-4519
48.	Mica Condenser (50 mmfd.)	60-050157
49.	Resistor (100000 ohms)	33-410339
50.	Condenser (.004 mfd., 600 volts)	30-4623
51.	Volume Control	33-5457
	Mtg. Nut	W-2157
52.	Mica Condenser (100mmfd.)	60-110157
53.	Resistor (10 megohms)	33-610339
54.	Condenser (.01 mfd., 400 volts)	30-4572
55.	Condenser (.001 mfd., 600 volts)	30-4620
56.	Resistor (470000 ohms)	33-447339
57.	Resistor (220000 ohms)	33-422339
58.	Condenser (.01 mfd., 400 volts)	30-4572
59.	Mica Condenser (250 mmfd.)	60-125157
60.	Electrolytic Condenser (10 mfd., 25 volts)	30-2509
61.	Resistor (130 ohms)	33-113336
62.	Condenser (.004 mfd., 600 volts)	30-4623
63.	Condenser (.05 mfd., 400 volts)	30-4518
64.	Condenser (.003 mfd., 600 volts)	30-4582
65.	Condenser and Choke Assembly	76-1161
66.	Output Transformer (Code 121)	32-8176
	Output Transformer (Code 122)	32-8207
67.	Speaker (Code 121)	36-1550
	Speaker (Code 122)	36-1562
	Cone Assembly (for speaker 36-1550)	36-4209
	Cone Assembly (for speaker 36-1562)	36-4219
	Speaker Cable (Code 122)	41-3665
	Mtg. Nut	W-124
68.	Filter Choke	32-8155
69.	Condenser (.2 mfd., 400 volts)	30-4594
70.	Resistor (15 ohms)	33-015438
71.	Condenser (.05 mfd., 400 volts)	30-4518
72.	Electrolytic Condenser (40-40 mfd., 150 volts)	30-2509
	Mtg. Panel	27-9508
	Insulating Tube	27-9902
73.	Pilot Lamp	34-2477
	Socket Assembly	76-1282
74.	Filament Resistor (50-300 ohms, Code 121 only)	33-3413
75.	Phonograph Motor (115 volts, 60 cycles)	35-1265-2
	Spring Collar (for 115 volts, 50 cycles, A.C. operation)	28-8999
	Mtg. Sleeve	28-5663
	Rubber Mtg. Grommet	27-4596
	Screw	W-333
	Turntable	35-3847-2
	Washer	W-151
75a.	Motor Switch	42-1654
	Washer	W-467
	Nut	W-684
	Lockwasher	W-1824
76.	ON-OFF Switch (Part of 53)	
77.	Condenser (.04 mfd., 400 volts)	30-4119
78.	Tone Control Switch	42-1562-2
	Switch Plate	56-1793
	Screw	W-3460
79.	Band Switch	42-1678
	Mtg. Nut	W-2157

PARTS USED IN CODE 122 CHASSIS ONLY

80.	Resistor (15 ohms)	33-015436
81.	Electrolytic Condenser (10 mfd.)	30-2386
82.	Field Coil (Replace speaker 36-1562)	

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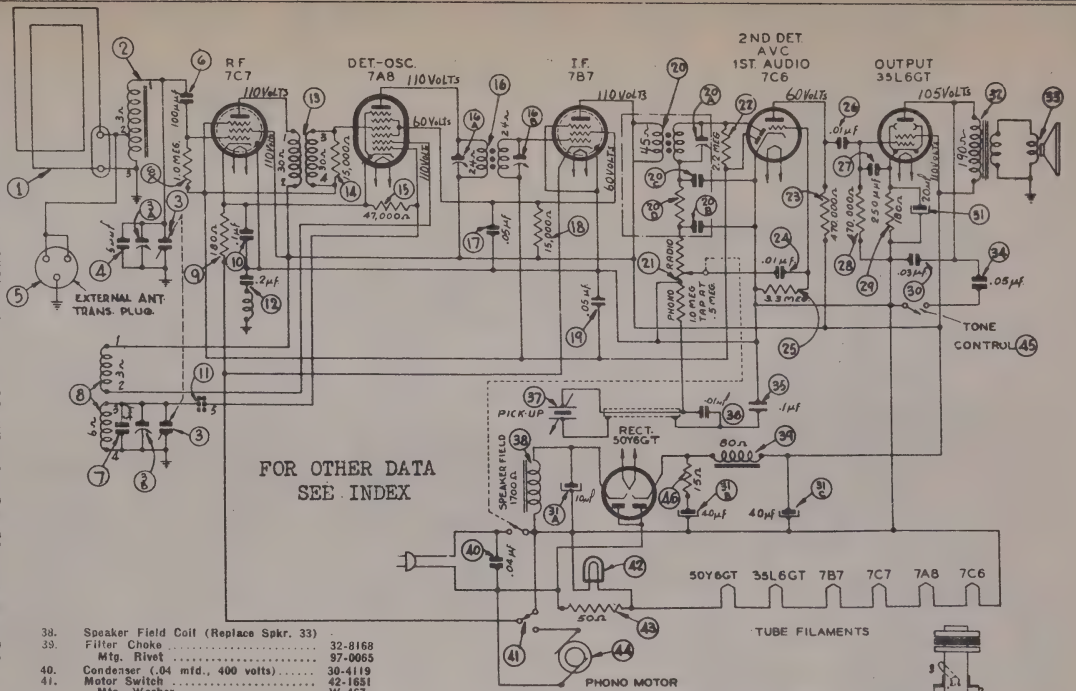
Schem. No.	Description	Part No.
1.	Loop Aerial	76-1368
	Terminal Panel	38-2477
	Mtg. Sleeve (Loop Mtg.)	28-3806
	Mtg. Washer	W-425
	Spring Washer	28-4186
	Mtg. Screw	W-1827
2.	Aerial Transformer	32-3776
	Mtg. Clip	28-5002
3.	Tuning Condenser	31-2567
3a.	Compensator (Aerial)	Part of 3
3b.	Compensator (Oscillator)	Part of 3
	Drive Cord	31-2573
	Spring	28-4054
	Pointer	56-2076
	Drive Shaft	31-2571
	Mtg. Nut	W-644FA3
	Mtg. Grommet	27-4610
	Mtg. Sleeve	28-5583
4.	Mica Condenser (5 mmfd.)	60-005157
5.	External Aerial Transformer Socket	27-6145
	Mtg. Rivets	W-207FA5
6.	Mica Condenser (100 mmfd.)	60-110158
6x.	Resistor (1 megohm)	33-510339
7.	Mica Condenser (5 mmfd.)	60-005157
8.	Oscillator Transformer	32-3613
	Mtg. Clip	28-5002
9.	Resistor (180 ohms)	33-118336
10.	Condenser (.1 mfd., 200 volts)	61-0104
11.	Condenser (1 mmfd.)	Part of 8
12.	Condenser (.2 mfd., 400 volts) and R. F. Choke	76-1318
13.	R. F. Transformer	32-3595
	Mtg. Clip	28-5002
14.	Resistor (15,000 ohms) Part of 13	33-315339
15.	Resistor (47,000 ohms)	33-347339
16.	First I. F. Transformer	32-3777
16a.	Primary Compensator	Part of 16
16b.	Secondary Compensator	Part of 16
	Mtg. Nut	W-1949
17.	Condenser (.05 mfd., 200 volts)	30-4519
18.	Resistor (15,000 ohms)	33-315339
19.	Condenser (.05 mfd., 200 volts)	30-4519
20.	Second I. F. Transformer	32-3848
20a.	Primary Compensator	Part of 20
20b.	Condenser	Part of 20a
	Mtg. Nut	W-1949
20c.	Condenser	Part of 20a
20d.	Resistor	Part of 20 33-347339
21.	Volume Control	33-5466
	Mtg. Nut	W-2157
22.	Resistor (2.2 megohms)	33-522339
23.	Resistor (470,000 ohms)	33-447339
24.	Condenser (.01 mfd., 400 volts)	30-4572
25.	Resistor (3.3 megohms)	33-533339
26.	Condenser (.01 mfd., 400 volts)	30-4572
27.	Mica Condenser (250 mfd.)	60-125157
28.	Resistor (470,000 ohms)	33-447339
29.	Resistor (180 ohms)	33-118336
30.	Condenser (.03 mfd., 400 volts)	30-4517
31.	Electrolytic Condenser (20 mfd., 25 volts)	30-2528
31a.	Electrolytic Condenser (10 mfd., 150 volts)	Part of 31
31b.	Electrolytic Condenser (40 mfd., 150 volts)	Part of 31
31c.	Electrolytic Condenser (40 mfd., 150 volts)	Part of 31
	Mtg. Clamp	56-1466
32.	Output Transformer	32-8203
33.	Speaker 36-1513-4 or	36-1564-4
	Cone Assem. (for Spkr. 36-1513-4)	36-4169
	Cone Assem. (for Spkr. 36-1564-4)	36-4169
	Cable	41-3651
	Rubber Grommet (Mtg. Speaker)	27-4596
	Mtg. Washer	28-3320
	Mtg. Sleeve	56-2044
	Mtg. Nut	W-124FA3
34.	Condenser (.05 mfd., 400 volts)	30-4518
35.	Condenser (.1 mfd., 200 volts)	30-4506
36.	Condenser (.01 mfd., 400 volts)	30-4572
37.	Crystal Pickup and Tone Arm Complete	35-2524
	Pickup Cable	41-3624
	Pickup Needle	76-1285
	Mtg. Washer	W-894
	Rubber Mtg. Grommet (2 required)	54-4095
	Rubber Mtg. Grommet (1 required)	54-4096
	Rubber Bumper	54-4070
38.	Speaker Field Coil (Replace Spkr. 33)	
39.	Filter Choke	32-8168
	Mtg. Rivet	97-0065
40.	Condenser (.04 mfd., 400 volts)	30-4119
41.	Motor Switch	42-1651
	Mtg. Washer	W-467
	Switch Plate	56-1793
	Mtg. Nut	W-684
	Mtg. Screw	W-560
	Switch Cover	56-2109
42.	Pilot Lamp	34-2477
	Socket Assembly	76-1282
43.	Filament Resistor	33-3412
44.	Phono Motor (115 volts, 60 cycle)	35-1265-2
	Cable and Plug Assembly	41-3641
	Mtg. Rubber Grommet	27-4596
	Mtg. Sleeve	28-5665
	Mtg. Screw	W-333FE11
	Motor Plug	54-4142
	Turntable	35-3047-2
45.	Tone Control Switch	42-1562-2

MISCELLANEOUS PARTS

Bezel	54-4093
Mtg. Screw	W-2073
Cable (Power)	L-3245
Cabinet	10584
Dial Scale	27-5788
Mtg. Grommet	4169
Mtg. Clip	56-1876FE7
Knob (Tuning, Volume)	54-4105
Rubber Grommet (Chassis Mtg.)	3915
Rubber Grommet (Chassis Mtg.)	27-4307
Screw (Chassis Mtg.)	W-443FA3
Socket (Output Tube)	27-6174
Socket (Loktal Tubes)	27-6177



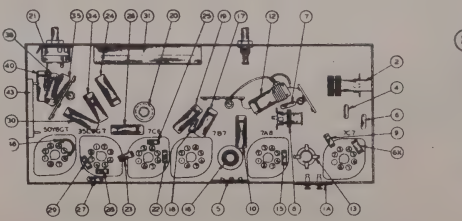


FIG. 3. LOCATIONS OF PARTS — UNDER CHASSIS

PHILCO RADIO & TELEVISION CORP. MODELS 42-1012, 42-1013M, 42-1013W

REPLACEMENT PARTS—MODELS 42-1012, 42-1013, CODE 121

Sch. No.	Description	Part No.
1.	F. M. Dipole Aerial (42-1012)	76-1387
	F. M. Dipole Aerial (42-1013W, 42-1013M)	76-1346
1A.	F. M. Aerial Socket	27-8181
2.	Loop Aerial (Brdcst. & S. W. Bands)	76-1386
	Mtg. Screw	W-722-FE11
	Mtg. Sleeve	28-3806
	Spring Washer	28-4186F-E7
	Washer	W-425F-A3
2A.	Terminal Panel	38-5876
3.	Compensator (Brdcst., Aerial)	31-5443
3A.	Compensator (S. W., Aerial) (Part of 3)	
3B.	Compensator (F. M., Aerial) (Part of 3)	
3C.	Compensator (F. M., Osc.) (Part of 3)	
3D.	Compensator (S. W., Osc.) (Part of 3)	
3E.	Compensator (Brdcst, Osc.) (Part of 3)	
3F.	Compensator (Brdcst, Osc. 580 KC) (Part of 3)	
4.	S. W. Aerial Transformer	32-3838
	Mtg. Clip	28-5002
5.	Brdcst. Aerial Transformer	32-3815
	Mtg. Clip	28-5002
6.	F. M. Aerial Transformer	32-3865
6A.	F. M. Oscillator Transformer (Part of 6)	
	Mtg. Clip	28-5002
7.	Tuning Condenser (F. M. Aerial)	31-2592
7A.	Tuning Condenser (F. M. Oscillator) (Part of 7)	
7B.	Tuning Condenser (Brdcst. & S. W. Aerial) (Part of 7)	
7C.	Tuning Condenser (Brdcst. & S. W. Aerial (Part of 7)	
	Drive Cord (Pointer)	31-2576
	Spring	28-8953
	Drive Cord (Cond. Drive)	31-2603
	Spring	28-8751
	Drive Shaft	56-8195
	"C" Washer	28-2043
	Drive Drum (Tuning Condenser)	76-1293
	Mtg. Grommet	27-4596
	Mtg. Sleeve	56-1505FA3
	Mtg. Screw	W-1351
	Pointer	56-2331
8.	Phonograph Oscillator Transformer	32-3818
	Mtg. Clip	28-5002
9.	Condenser (.05 mfd, 400 volts)	30-4518
10.	Mica Condenser (500 mmfd)	60-150257
11.	Phono Light Control	33-5435
12.	Resistor (10,000 ohms)	33-310439
13.	Resistor (22,000 ohms)	33-322439
14.	Resistor (15,000 ohms)	33-315439
15.	Condenser (.05 mfd, 400 volts)	30-4518
16.	Mica Condenser (185 mmfd)	20-018511
17.	Resistor (10,000 ohms)	33-310339
18.	Resistor (15,000 ohms)	33-315339
19.	Mica Condenser (500 mmfd)	60-150157
20.	Mica Condenser (250 mmfd)	60-125258
21.	Mica Condenser (375 mmfd)	20-037517
22.	Push-Button Switch (Bottom Section)	42-1701
22A.	Push-Button Switch (Top Section) (Part of 22)	
22B.	Main Power Switch (Part of 22)	
22C.	Phono Power Switch (Part of 22)	
23.	Mica Condenser (185 mmfd)	20-018511
24.	Shortwave Oscillator Transformer	32-3793
	Mtg. Clip	28-5002
25.	Brdcst Oscillator Transformer	32-3791
	Mtg. Clip	28-5002
26.	Resistor (56 ohms)	33-056339
27.	Mica Condenser (185 mmfd)	20-018511
28.	Condenser (1 mmfd, consist of wire and ring)	
29.	Mica Condenser (.185 mmfd)	20-018511
30.	P. B. Aerial Compensator (900 to 1600 KC)	31-6439
30A.	P. B. Aerial Compensator (850 to 1500 KC) (Part of 30)	
30B.	P. B. Aerial Compensator (650 to 1300 KC) (Part of 30)	
30C.	P. B. Aerial Compensator (600 to 1200 KC) (Part of 30)	
30D.	P. B. Aerial Compensator (540 to 1000 KC) (Part of 30)	
31.	P. B. Oscillator Transformer (900 to 1600 KC)	32-3779
31A.	P. B. Oscillator Transformer (850 to 1500 KC)	32-3779
31B.	P. B. Oscillator Transformer (650 to 1300 KC)	32-3780
31C.	P. B. Oscillator Transformer (600 to 1200 KC)	32-3780
31D.	P. B. Oscillator Transformer (540 to 1000 KC)	32-3780
	Iron Core	56-6100
	Cap	28-6936
	Clip	56-2250
32.	Resistor (47,000 ohms)	33-347339
33.	Condenser (.05 mfd, 400 volts)	30-4518

Sch. No.	Description	Part No.
34.	Resistor (100,000 ohms)	33-410339
35.	Resistor (2,700 ohms)	33-227339
36.	Resistor (2.2 megohms)	33-522339
37.	Mica Condenser (250 mmfd)	60-125257
38.	Condenser (.05 mfd, 400 volts)	30-4518
39.	First I. F. Transformer	32-3843
	Mtg. Nut	W-1949FA2
39A.	Primary Compensator (455 KC) (Part of 39)	
39B.	Primary Compensator (4.3 MC) (Part of 39)	
39C.	Secondary Compensator (455 KC) (Part of 39)	
39D.	Secondary Compensator (4.3 MC) (Part of 39)	
39E.	Condenser (4,000 mmfd) (Part of 39)	
40.	Resistor (22,000 ohms)	33-322339
41.	Condenser (.05 Mfd, 200 volts)	30-4519
42.	Resistor (100 ohms)	33-110339
43.	Resistor 68 ohms)	33-068339
44.	Condenser (.05 mfd, 200 volts)	30-4519
45.	Resistor (100,000 ohms)	33-410339
46.	Resistor (2.2 megohms)	33-522339
47.	Electrolytic Condenser (8 mfd, 475 volts)	30-2535
47A.	Electrolytic Condenser (8 mfd, 475 volts) (Part of 47)	
48.	Resistor (4700 ohms)	33-247339
49.	Condenser (.05 mfd, 200 volts)	30-4519
50.	Resistor (2.2 megohms)	33-522339
51.	Resistor (1000 ohms)	33-210339
52.	Resistor (8200 ohms)	33-282339
53.	Resistor (22,000 ohms)	33-322339
54.	Condenser (.05 mfd, 400 volts)	30-4518
55.	Condenser (.01 mfd, 400 volts)	30-4572
56.	Second I. F. Transformer	32-3844
	Mtg. Nut	W-1949FA3
56A.	Primary Compensator (4.3 MC) (Part of 56)	
56B.	Secondary Compensator (4.3 MC) (Part of 56)	
56C.	Secondary Compensator (455 KC) (Part of 56)	
56D.	Resistor (47,000 ohms) (part of 56)	33-347339
57.	Resistor (150 ohms)	33-115336
58.	Condenser (.05 mfd, 200 volts)	30-4519
59.	Condenser (.01 mfd, 400 volts)	30-4572
60.	Third I. F. Transformer	32-3845
	Mtg. Nut	W-1949FA3
60A.	Primary Compensator (4.3 MC) (Part of 60)	
60B.	Primary Compensator (455 KC) (Part of 60)	
60C.	Secondary Compensator (4.3 MC) (Part of 60)	
60D.	Secondary Compensator (455 KC) (Part of 60)	
61.	Condenser (.01 mfd, 400 volts)	30-4572
62.	Resistor (1000 ohms)	33-210339
63.	Mica Condenser (500 mmfd)	60-150157
64.	Condenser (.1 mfd, 200 volts)	30-4586
65.	Resistor (2.2 megohms)	33-522339
66.	Condenser (.01 mfd, 400 volts)	30-4572
67.	Tone Coil (Audio Bass)	53-5478
	Mtg. Nut	W-2157FA3
68.	Condenser (.003 mfd, 1000 volts)	30-4469
69.	Mica Condenser (100 mmfd)	60-110157
70.	Condenser (.01 mfd, 400 volts)	30-4572
71.	Mica Condenser (100 mmfd)	60-110157
72.	Resistor (100,000 ohms)	33-410339
73.	Volume Control	53-5478
	Mtg. Nut	W-2157FA3
74.	Resistor (10 megohms)	33-610339
75.	Condenser (.01 mfd, 400 volts)	30-4572
76.	Resistor (220,000 ohms)	33-422339
77.	Resistor (470,000 ohms)	33-447339
78.	Resistor (1 megohm)	33-510339
79.	Mica Condenser (150 mmfd)	60-115137
80.	Mica Condenser (150 mmfd)	60-115137
81.	Resistor (470,000 ohms)	33-447339
82.	Tone Control (Audio Treble)	33-5480
	Mtg. Nut	W-2157
83.	Condenser (.01 mfd, 400 volts)	30-4572
84.	Mica Condenser (100 mmfd)	60-110157
85.	Condenser (.01 mfd, 400 volts)	30-4572
86.	Resistor (1 megohm)	33-510339
87.	Resistor (220,000 ohms)	33-422339
88.	Resistor (47,000 ohms)	33-347339
89.	Resistor (47,000 ohms)	33-247339
90.	Condenser (.01 mfd, 400 volts)	30-4572
91.	Condenser (.01 mfd, 400 volts)	30-4572
92.	Resistor (470,000 ohms)	33-447339
93.	Resistor (470,000 ohms)	33-447339
94.	Resistor (56,000 ohms)	33-356339
95.	Resistor (470,000 ohms)	33-447339
96.	Condenser (.001 mfd, 1000 volts)	30-4501
97.	Output Transformer	32-6191
98.	Speaker	36-1565 or 36-1524
	Cone Assembly	36-4178
	Cable	41-3636
	Mtg. Sleeve	56-2044
	Mtg. Grommet	27-4596
	Mtg. Washer	28-3320
99.	Home Recording Socket	27-6179
	Mtg. Rivet	W1209FA5

Sch. No.	Description	Part No.
100.	Phono Power Socket	27-6182
	Mtg. Rivet	W-209FA5
101.	Power line Condenser (.01-.01 mfd)	3903-0DG
102.	Compartment light Switch and Cable	76-1390
	Spring	28-8991
	Mtg. Screw	W-5505FE11
103.	Compartment Light	34-2484
	Cable and Socket Assembly	41-3638
104.	Cabinet Jewel Lamp	34-2068
	Cable and Socket (42-1012)	76-1392
	Cable and Socket (42-1013)	76-1378
105.	Resistor (10 ohms)	33-010436
106.	Dial Lamp	34-2141
	Socket Assembly	76-1395
107.	Power Transformer (115 volts, 60 cycles)	32-8226
108.	Electrolytic Condenser (18 mfd, 475 volts)	30-2517
109.	Bias Resistor (140 ohms)	33-3418
109A.	Bias Resistor (10 ohms) (Part of 109)	
120.	Field Coil (Replace Speaker)	36-1565
111.	Electrolytic Condenser (18 mfd, 475 volts)	30-2527
112.	Resistor (470,000 ohms)	33-447339
113.	Condenser (.0015 mfd, 1000 volts)	30-4516
114.	Resistor (100,000 ohms)	33-410339
115.	Resistor (330,000 ohms)	33-433339
116.	Resistor (3300 ohms)	33-233339
117.	Electrolytic Condenser (10 mfd, 25 volts)	30--2500
118.	Phono Input Transformer	32-8196
118A.	Cable (Phono Input Transformer)	41-3637
119.	Photo-Electric Pickup (Metal Tone Arm)	35-2518
	NOTE: A Plastic Tone Arm Part No. 35-2540 was also used on this model either tone arm can be used.	
120.	Electric Reject Trip (see items 39 and 48 in service bulletin 402)	
121.	Reject Solenoid (see items 35, 38, 46, 56 in service bulletin 402)	
122.	Manual Reject Button (Automatic Record Changer—see item 10 in service Bulletin 402)	
123.	Record Changer Motor (115 volts, 60 cycle)	318-2802
	Pulley (60 cycle)	218-1448
	Pulley (50 cycle)	56-6173
	Turntable (60 cycle)	318-2807
	Turntable (50 cycle)	35-3056
124.	Manual-Automatic Change-over Switch	35-2547
125.	Power Plug	35-2597
	Plug Cover	35-2598
126.	Neon Lamp)	34-2483

MISCELLANEOUS PARTS

Models 42-1012, 42-1013, Code 121

	Automatic Record Changer	35-1285
	Bezel (42-1012, 42-1013W)	54-4128
	Mtg. Screw	W-2073FA9
	Bezel (42-1013M)	54-4156
	Mtg. Screw	W-2073FA9
	Cabinet (42-1012)	10586-A
	Cabinet (42-1013W—Walnut)	10550-A
	Cabinet (42-1013M—Mahogany)	10550-B
	Cord (Power)	L-3245
	Dial Scale	27-5789
	Rubber Channel	54-4114
	Spring (Background Plate)	28-8990
	Background Plate	27-5984
	Clamp	56-2314FA3
	Mtg. Screw	W-1949
	Jewel (Cabinet Pilot Light)	27-4777
	Knob (Tuning, Vol. Tone, 42-1012, 42-1013W)	54-4105
	Knob (Push-Button) (42-1012, 42-1013)	54-4144
	Spring (Push-Button)	76-1294
	Knob (Tuning, Vol., Tone, 42-1013M)	54-4154
	Knob (Push-Button, 42-1013M)	54-4155
	Rubber Corner (Chassis Mtg.)	54-4016
	Rubber Grommet (Chassis Mtg.)	27-4571
	Screw (Chassis Mtg.)	W-1345FA3
	Socket (6Y6G Tube)	27-6174
	Socket (Loktal Tubes)	27-6177
	Mtg. Rivet	W-239
	Socket (Test Socket)	27-6180
	Tab Kit	40-6603
	Tab (Off)	27-5742
	Tab (Television)	27-5779
	Tab (Broadcast)	27-5739
	Tab (S. W.)	27-5740
	Tab (F. M.)	27-5741
	Tab (Phono)	27-5769
	Tab Cover	27-3815
	Washer (Chassis Mtg.)	28-5114FA8

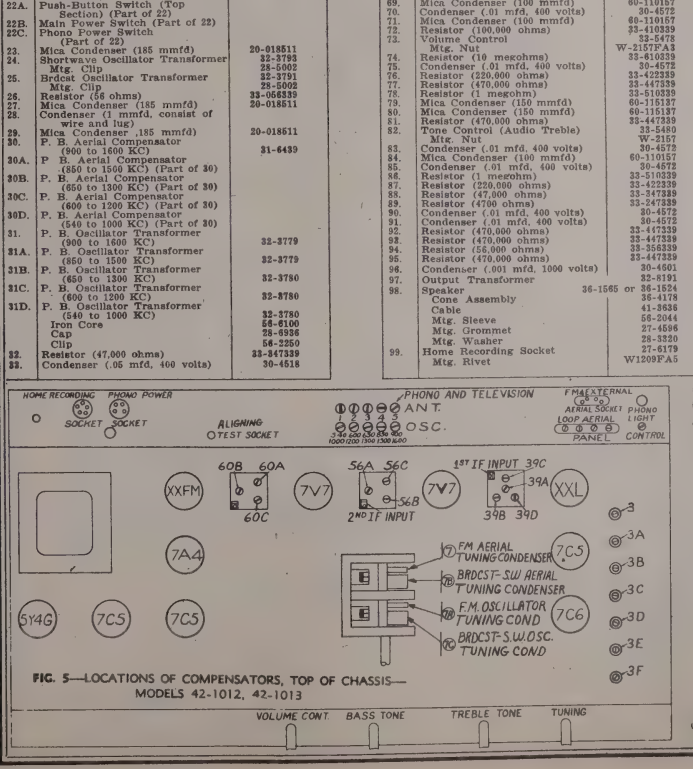


FIG. 5—LOCATIONS OF COMPENSATORS, TOP OF CHASSIS—MODELS 42-1012, 42-1013

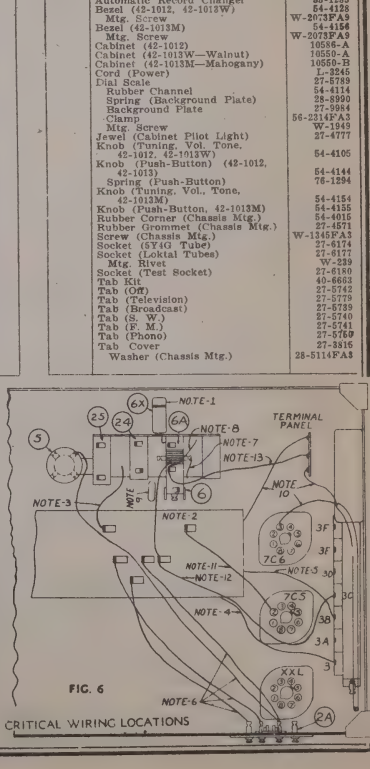


FIG. 6

CRITICAL WIRING LOCATIONS

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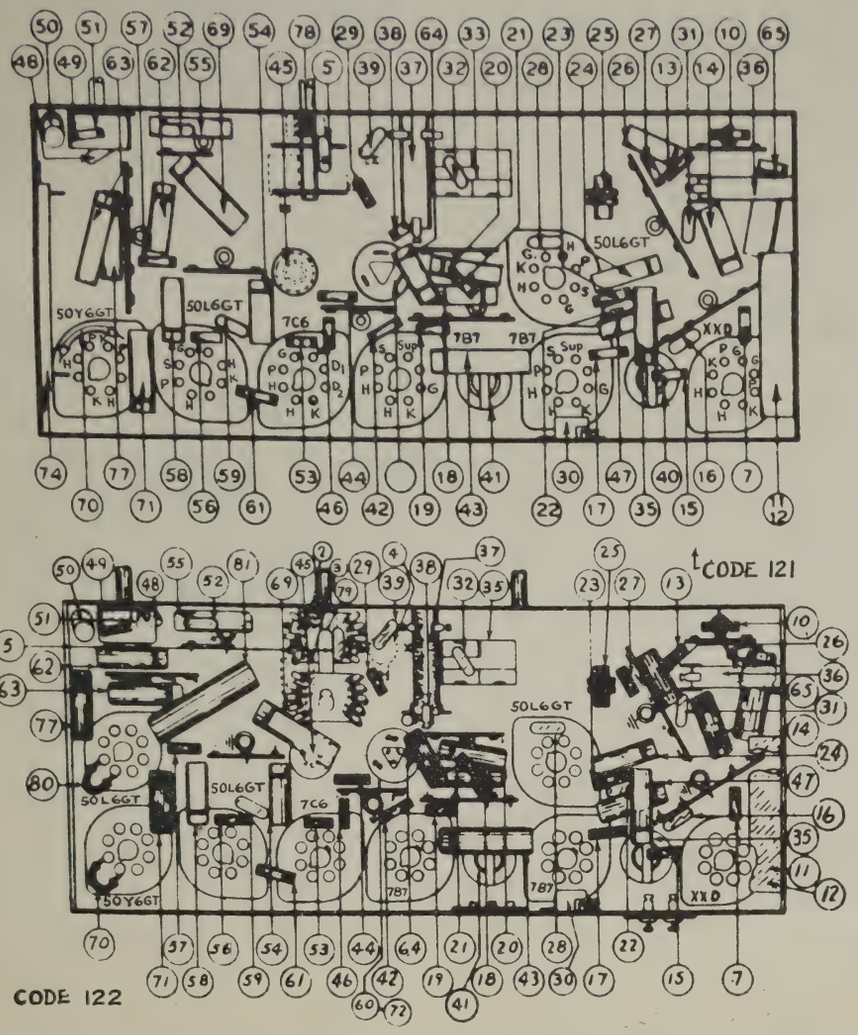

MODEL 42-1003, CODES 121-122

Model 42-1003, Codes 121-122 are alternating current operated superheterodyne radio-phonograph combinations. In general, Code 121 and 122 of this model are similar in design with the exception of the number of tubes, speaker types and rectifier circuits. Code 121 consists of a seven-tube chassis using a six-inch permanent magnet dynamic speaker and a single rectifier tube circuit.

Code 122 chassis contains eight tubes, a six-inch electrodynamic speaker and two tubes in the rectifier circuit. One tube type 50Y6GT supplies plate votage for the other tubes and a 50L6GT excites the field coil of the electrodynamic speaker.

PHONOGRAPH SECTION

The phonograph incorporates a self-starting rim drive turntable motor, and a manually operated Philco Photo-Electric reproducer, which operates through the audio system of the radio. The phonograph motor is automatically started when the photo-eleatric reproducer is lifted from its rest. The motor is designed to operate on 115 volts, 60 cycle, or 115 volts, 50 cycle A.C. power supplies. When operating on 115 volt, 50 cycle current, a special spring collar, Part No. 28-8999 must be placed on the motor drive shaft pulley.

RADIO SECTION

The radio features in this model are a built-in loop aerial; two tuning ranges; two I. F. amplifier tubes; automatic volume control; two position tone control, mounted on the motor board; audio BASS compensation in the volume control circuit; beam power pentode audio output stage and Philco LOKTAL tubes.

TUNING BAND FREQUENCIES: 540 to 1720 K.C. and 9 to 15.5 M.C.
INTERMEDIATE FREQUENCY: 455 K.C.
AUDIO OUTPUT: 1.5 watts.
POWER SUPPLY: 115 volts, 60 cycle A.C.

PHILCO TUBES USED

Code 121 chassis—XXD, R. F. converter and phonograph pre-amplifier; 50L6GT, oscillator; 7B7, 1st. I. F. amplifier; 7B7, 2nd I. F. amplifier; 7C6, second detector, first audio; 50L6GT audio output and a 50Y6GT rectifier.

Code 122 chassis—XXD, R. F. converter and phonograph pre-amplifier; 50L6GT, oscillator; 7B7, 1st I. F. amplifier; 7B7, 2nd I. F. amplifier; 7C6 second detector, first audio; 50L6GT audio output; 50Y6GT rectifier 50L6GT rectifier.

EXTERNAL AERIAL CONNECTIONS

The built-in low-impedance loop aerial system of this model is designed to operate without an outside aerial or ground, and to give exceptional receiving performance under average conditions.

To operate the radio, however, in steel reinforced buildings and other shielded locations, where signal strength is weak, the Philco outdoor aerial Part No. 45-2817 is recommended for maximum receiving performance. The outdoor aerial can be easily connected to the radio by inserting the plug attached to the transformer (supplied with the aerial) into the socket provided at the rear of the radio.

FOR PHONOGRAPH REPRODUCER ADJUSTMENTS, SEE MODEL 42-1015

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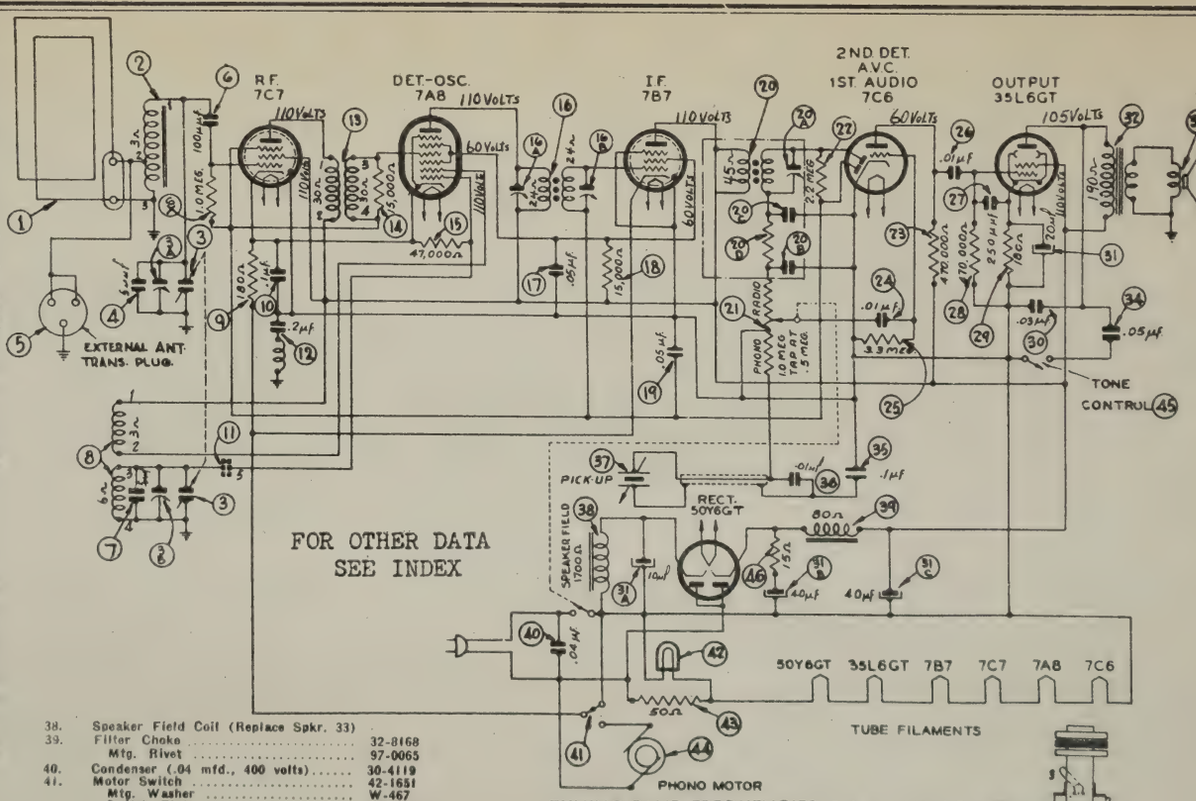
Schem. No.	Description	Part No.
1.	Loop Aerial	76-1368
	Terminal Panel	38-2477
	Mtg. Sleeve (Loop Mtg.)	28-3606
	Mtg. Washer	W-425
	Spring Washer	28-4186
	Mtg. Screw	W-1827
2.	Aerial Transformer	32-3776
	Mtg. Clip	28-5002
3.	Tuning Condenser	31-2587
3a.	Compensator (Aerial)	Part of 3
3b.	Compensator (Oscillator)	Part of 3
	Drive Cord	31-2573
	Spring	28-8954
	Pointer	56-2076
	Drive Shaft	31-2571
	Mtg. Nut	W-684FA3
	Mtg. Grommet	27-4610
	Mtg. Sleeve	28-5583
4.	Mica Condenser (5 mmfd.)	60-005157
5.	External Aerial Transformer Socket	27-6145
	Mtg. Rivets	W-207FA5
6.	Mica Condenser (100 mmfd.)	60-110158
6x.	Resistor (1 megohm)	33-510339
7.	Mica Condenser (5 mmfd.)	60-005157
8.	Oscillator Transformer	32-3613
	Mtg. Clip	28-5002
9.	Resistor (180 ohms)	33-118336
10.	Condenser (.1 mfd., 200 volts)	61-0104
11.	Condenser (1 mmfd.)	Part of 3
12.	Condenser (.2 mfd., 400 volts) and R. F. Choke	76-1318
13.	R. F. Transformer	32-3595
	Mtg. Clip	28-5002
14.	Resistor (15,000 ohms) Part of 13	33-315339
15.	Resistor (47,000 ohms)	33-347339
16.	First I. F. Transformer	32-3777
16a.	Primary Compensator	Part of 16
16b.	Secondary Compensator	Part of 16
	Mtg. Nut	W-1949
17.	Condenser (.05 mfd., 200 volts)	30-4519
18.	Resistor (15,000 ohms)	33-315339
19.	Condenser (.05 mfd., 200 volts)	30-4519
20.	Second I. F. Transformer	32-3848
20a.	Primary Compensator	Part of 20
20b.	Condenser	Part of 20a
	Mtg. Nut	W-1949
20c.	Condenser	Part of 20a
20d.	Resistor Part of 20	33-347339
21.	Volume Control	33-5466
	Mtg. Nut	W-2157
22.	Resistor (2.2 megohms)	33-522339
23.	Resistor (470,000 ohms)	33-447339
24.	Condenser (.01 mfd., 400 volts)	30-4572
25.	Resistor (3.3 megohms)	33-533339
26.	Condenser (.01 mfd., 400 volts)	30-4572
27.	Mica Condenser (250 mfd.)	60-125157
28.	Resistor (470,000 ohms)	33-447339
29.	Resistor (180 ohms)	33-118336
30.	Condenser (.03 mfd., 400 volts)	30-4517
31.	Electrolytic Condenser (20 mfd., 25 volts)	30-2528
31a.	Electrolytic Condenser (10 mfd., 150 volts)	Part of 31
31b.	Electrolytic Condenser (40 mfd., 150 volts)	Part of 31
31c.	Electrolytic Condenser (40 mfd., 150 volts)	Part of 31
	Mtg. Clamp	56-1466
32.	Output Transformer	32-8203
33.	Speaker 36-1513-4 or	36-1564-4
	Cone Assem. (for Spkr. 36-1513-4)	36-4169
	Cone Assem. (for Spkr. 36-1564-4)	36-4169
	Cable	41-3651
	Rubber Grommet (Mtg. Speaker)	27-4596
	Mtg. Washer	28-3320
	Mtg. Sleeve	56-2044
	Mtg. Nut	W-124FA3
34.	Condenser (.05 mfd., 400 volts)	30-4518
35.	Condenser (.1 mfd., 200 volts)	30-4586
36.	Condenser (.01 mfd., 400 volts)	30-4572
37.	Crystal Pickup and Tone Arm Complete	35-2524
	Pickup Cable	41-3624
	Pickup Needle	76-1285
	Mtg. Washer	W-894
	Rubber Mtg. Grommet (2 required)	54-4095
	Rubber Mtg. Grommet (1 required)	54-4096
	Rubber Bumper	54-4070
38.	Speaker Field Coil (Replace Spkr. 33)	
39.	Filter Choke	32-8168
	Mtg. Rivet	97-0065
40.	Condenser (.04 mfd., 400 volts)	30-4119
41.	Motor Switch	42-1651
	Mtg. Washer	W-467
	Switch Plate	56-1793
	Mtg. Nut	W-684
	Mtg. Screw	W-560
	Switch Cover	56-2100
42.	Pilot Lamp	34-2477
	Socket Assembly	76-1282
43.	Filament Resistor	33-3412
44.	Phono Motor (115 volts, 60 cycle)	35-1265-2
	Cable and Plug Assembly	41-3641
	Mtg. Rubber Grommet	27-4596
	Mtg. Sleeve	28-5665
	Mtg. Screw W-333FE11	
	Motor Plug	54-4142
	Turntable	35-3047-2
45.	Tone Control Switch	42-1562-2

MISCELLANEOUS PARTS

Bezel	54-4093
Mtg. Screw	W-2073
Cable (Power)	L-3245
Cabinet	10584
Dial Scale	27-5788
Mtg. Grommet	4169
Mtg. Clip	56-1876FE7
Knob (Tuning, Volume)	54-4105
Rubber Grommet (Chassis Mtg.)	3915
Rubber Grommet (Chassis Mtg.)	27-4307
Screw (Chassis Mtg.)	W-443FA3
Socket (Output Tube)	27-6174
Socket (Loktal Tubes)	27-6177



TUNING BAND FREQUENCIES: 540 to 1600 K.C.
INTERMEDIATE FREQUENCIES: 455 K.C.
POWER SUPPLY: 115 volts, 60 cycle, A.C.

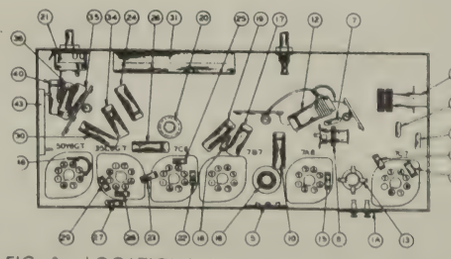
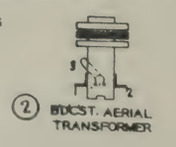


FIG. 3. LOCATIONS OF PARTS—UNDER CHASSIS

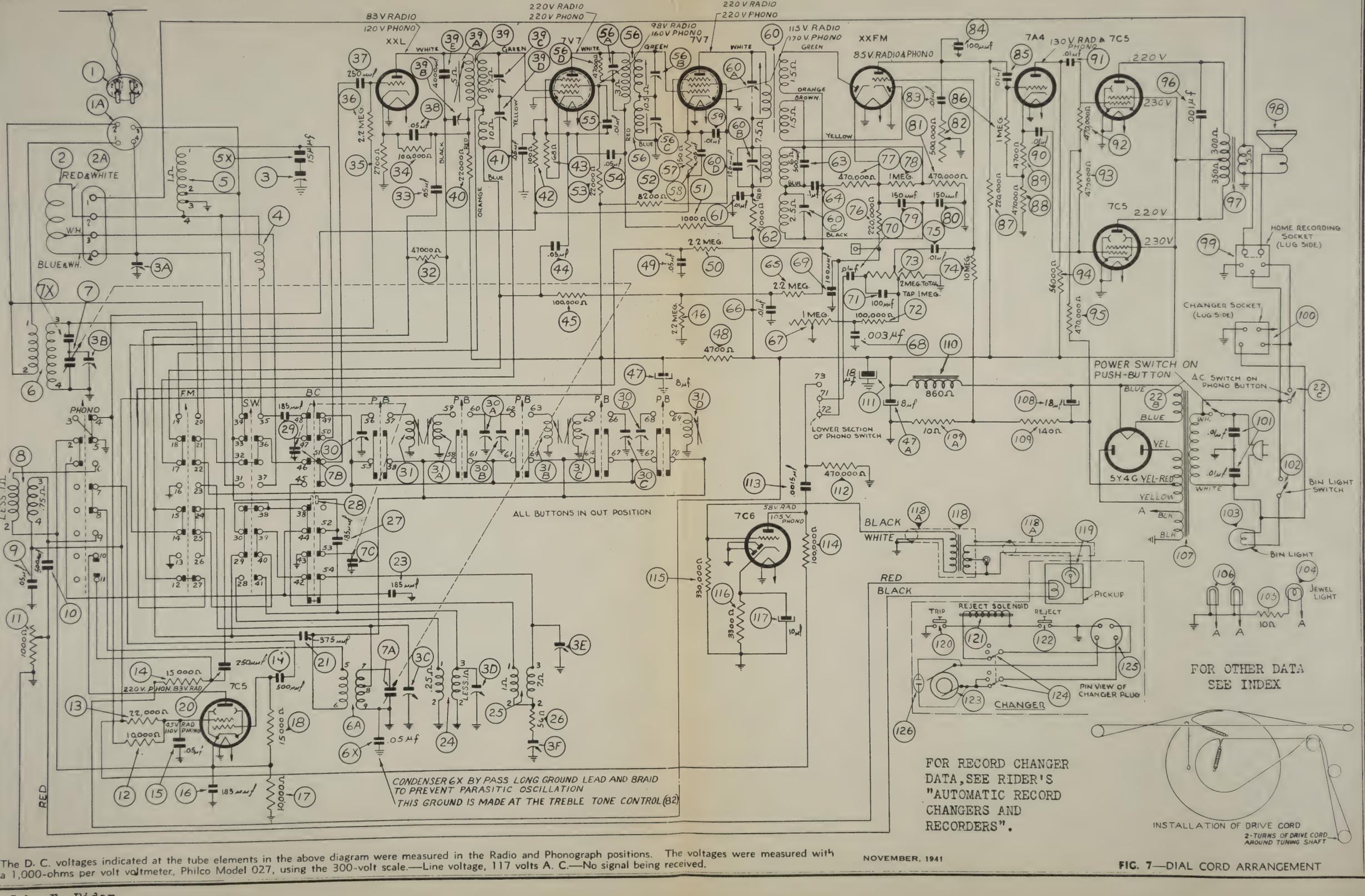


Tuning Band Frequencies: Brdcst, 540 to 1720 KC; S.W., 9 to 15.5 MC; F.M., 42 to 50 MC.

Intermediate Frequencies: Standard I. F., 455 KC; F. M. I. F., 4.3 MC.

PHILCO RADIO & TELEVISION CORP.

MODELS 42-1012,42-1013M,42-1013W



The D. C. voltages indicated at the tube elements in the above diagram were measured in the Radio and Phonograph positions. The voltages were measured with a 1,000-ohms per volt voltmeter, Philco Model 027, using the 300-volt scale.—Line voltage, 117 volts A. C.—No signal being received.

NOVEMBER, 1941

FIG. 7—DIAL CORD ARRANGEMENT

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EQUIPMENT REQUIRED

1. SIGNAL GENERATOR: Covering the frequency of the receiver, such as the Philco Model 070.
2. ALIGNING INDICATOR: Audio Output Meter. Philco Models 027 and 028. Circuit testers contain a sensitive output meter and are recommended.
3. TOOLS: Philco Fiber Screw Driver, Part No. 45-2610.

CONNECTING ALIGNING INSTRUMENTS

AUDIO OUTPUT METER: Terminal No. 1 is provided on the loop aerial panel for connecting one lead of the audio output meter to the voice coil of the speaker. The other lead of the meter is connected to the chassis. When using these connections, the lowest A. C. scale of the meter must be used. (0 to 10 volts.)

The audio output meter can also be connected between the plate of the output tube and the chassis.

SIGNAL GENERATOR: When adjusting the "I. F." padders, the high side of the signal generator is connected through a .1 mfd. condenser to the points indicated in signal generator column "output connections" to receiver in the tabulations below.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet and dipole aerial lead. Do not remove the receiving loops from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

After connecting the aligning instruments adjust the compensators in the order shown in the tabulation below. Location of the compensators are shown in Fig. 5. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

STANDARD AND S. W. BANDS ALIGNING PROCEDURE

SIGNAL GENERATOR			RECEIVER			
Operations in Order	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	Special Instructions
1	High side to No. 2 terminal loop panel	455 KC	580 KC	Vol. max. P. B. Switch "Brdcst."	60B, 56C, 39C, 39A	
2	Use loop on generator	1500 KC	1500 KC	P. B. Switch "Brdcst."	3E, 3	Note A
3	Use loop on generator	580 KC	580 KC	P. B. Switch "Brdcst."	3F	Roll Tuning Condensers Note B
4	Use loop on generator	Readjust as given in Operation 2				
5	Use loop on generator	15 MC	15 MC	P. B. Switch "S. W."	3D, 3A	Note C

FREQUENCY MODULATION ALIGNING PROCEDURE

Note: The Frequency Modulation Circuits Must Be Adjusted With the Dipole Aerial Connected

CRITICAL WIRING LOCATIONS

The followng items on these models are critical for location and position. See Fig. 6, Page 5 for locations of wires and parts:

NOTE 1. Wire from condenser (6X) to F. M. oscillator transformer 6A must be kept short.

NOTE 2. Wire from push-button switch contact (23) to tap on F. M. oscillator transformer 6A must be dressed away from the push-button switch.

NOTE 3. Wire from standard and S. W. Band tuning section 7C of the oscillator tuning condenser must be dressed through the push-button switch between the S. W. oscillator transformer (24) and the standard broadcast transformer (25).

NOTE 4. Wire from compensator (3) to contact (50) of push-button switch must be dressed away from chassis.

NOTE 5. Wire from compensator (3B) to terminal panel must be dressed away from chassis.

NOTE 6. Wires from loop terminal panel (2A) to push-button switch must be dressed away from chassis.

NOTE 7. Wire from F. M. oscillator section (7A) of tuning condenser to F. M. oscillator transformer 6A must be as short as possible.

NOTE 8. Dress ground braid wire to F. M. oscillator transformer (6A) away from the oscillator windings.

NOTE 9. Dress Mica Condenser (21) away from the F. M. oscillator transformer (6 and 6A).

NOTE 10. Dress wires to contact 3 of 7C6 tube and terminal panel away from other wires and 7C5 oscillator tube socket.

NOTE 11. Dress wire from plate contact (2) of 7C5 oscillator tube socket to push-button switch contact (10) away from other leads and other push-button switch contact.

NOTE 12. Dress wire from compensator 3C to contact (23) of push-button switch away from the chassis and other wiring.

NOTE 13. Dress ground wire braid from terminal panel to F. M. aerial transformer (6) over winding.

NOTE 14. Red wire from F. M. oscillator section (7A) of tuning condenser must be dressed away from chassis bases.

F. M. BAND ALIGNING PROCEDURE

SIGNAL GENERATOR			RECEIVER			
Operations in Order	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	Special Instructions
1	2nd I. F., F. M. input connection	4.3 MC	580 KC	Vol. max. P. B. Switch "F. M."	60C (Note D) 60A (Note E)	
2	1st I. F., F. M. input connection	4.3 MC	580 KC	P. B. Switch "F. M."	56B, 56A (Note F)	
3	Ant.-Section of F. M. Tuning Cond. and Grd.	4.3 MC	580 KC	P. B. Switch "F. M."	39D, 39B (Note F)	
4	Use test loop on generator; place near dipole aerial	85 (Note G)	P. B. Switch "F. M."		3C (Note G) 3B (Note H)	Roll tuning condenser when adjusting 3B. See Note B.
5	"	48.5 MC	85	P. B. Switch "F. M."	3C oscillator	

NOTE A.—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial pointer must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity) set the dial pointer on the extreme left index at the low frequency end of the broadcast scale.

NOTE B.—When adjusting the low frequency compensator of the broadcast or the aerial padders of the high frequency tuning range, the receiver tuning condenser must be adjusted (rolled) as follows: First, tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C.—Adjust compensator (3D) to the second signal peak from the closed position (maximum capacity). Check image at 15,910 m.c. by turning signal generator pointer to 15,910 mc.

The aerial compensator (3A) must also be adjusted to maximum on the first signal peak by rolling the tuning condenser. (See Note B.)

NOTE D.—With the signal generator set to 4.3 MC, padder (60C) is adjusted to the point where minimum signal indication is observed on the output meter.

NOTE E.—Turn the signal generator first to approximately 125 KC below 4.3 MC (4.17 MC) and then 125 KC above 4.3 MC (4.42 MC). A signal peak should be observed on the output meter at approximately each of these points (4.17 and 4.42). The two peak signals should be of equal reading on the output meter and equally spaced in frequency each side of 4.3 MC. If the peaks are unequal in amplitude, padder (60A) must be adjusted in the direction necessary to make both peaks equal. This is done by slightly turning padder and then turning signal generator above and below 4.3 to observe peaks. After equal peaks readings are obtained, set the signal generator to 4.3 MC. The output meter should show zero reading at 4.3 MC. If a signal indication is observed readjust padder (60C) until zero reading is obtained on the meter. After this adjustment is made padder No. 60A should be reset for equal peaks as given above.

NOTE F.—Adjust padders 56B, 56A, 39D, and 39B for equal signal peaks and equal frequency spacing each side of 4.3 MC.

NOTE G.—The dial scale numbers are listed in tenths of megacycles less the first digit; i. e., 49 MC is 90, 48.5 is 85. Set the tuning dial pointer to 85 on the F. M. scale. Adjust padder (3C) to the point where minimum signal indication is observed on the output meter.

NOTE H.—In order to adjust padder (3B) the signal generator should be set to either the signal peak approximately 125 KC below 48.5 MC (48.375 MC), or 125 KC above 48.5 MC (48.625 MC). Adjust padder (3B) to maximum output reading on either of these peak signals. As padder 3B is being adjusted roll the tuning condenser as given in Note B.

AUDIO OUTPUT: 8 WATTS
POWER SUPPLY; 115 VOLTS
60~ AC
These models can also be operated on 50~ by changing the phono motor parts as given in the parts list.
POWER CONSUMPTION: 125 watts

PHILCO RADIO & TELEVISION CORP.

MODEL 42-1015

The radio incorporates the Philco Built-in Super Aerial System for reception of standard and short wave broadcast stations; a Philco F. M. Dipole Aerial for reception of frequency modulation stations; twelve (12) electric push-buttons for automatically tuning six (6) stations in the standard broadcast band, turning the A. C. power off and selecting the phonograph circuit, standard, short-wave and frequency modulation bands; three (3) I. F. amplifier stages; two (2) variable tone controls which vary the bass and treble audio frequencies; automatic volume control; push-pull beam power pentode audio output stage; Philco LOKTAL tubes; illuminated horizontal dial; illuminated tuning band and station indicators; concert grand balanced field electro-dynamic speakers; and a dual section tuning condenser. In addition this model is designed to receive the sound of a television program tuned in by special Philco Television Receivers.

The phonograph of each model consists of the PHILCO Automatic Record Changer with a stroboscope pitch and tempo control; a dual speed motor that can be adjusted to play not only normal speed records (78 RPM) but also slow speed records (33-1/3 to 39 RPM); the Philco Photo-Electric Reproducer with a floating jewel which reproduces sound on- a beam of light, and a special phonograph amplifier stage for operation through the push-pull output tubes of the radio. The automatic record changer plays 12 ten-inch or 10 twelve-inch records at one loading. The automatic record changer is also equipped with provision for attaching a Philco Home Recording Unit Model HR-2 for making phonograph records in the home. The Home Recording Units can be obtained from your Philco distributor with complete instructions for installation and operation.

Sch. No.	Description	Part No.
1.	Loop Aerial (Std. & S. W. Bands)	76-1404
	Mtg. Sleeve	28-3806
	Spring Washer	28-4186
	Washer	W-151FA3
	Washer	W-425
	Screw	W-722
1A.	Terminal Panel	38-9870
2.	F. M. Dipole Aerial	76-1346
2A.	Socket (F. M. Dipole Aerial)	27-6181
3.	F. M. Aerial Transformer	32-3825
3A.	F. M. Oscillator Transformer (Part of 3)	28-5002
	Mtg. Clip	31-2600
4.	Tuning Condenser (F. M. Aerial)	
4A.	Tuning Condenser (F. M. Oscillator) Part of 4	
4B.	Tuning Condenser (Std. & S. W. Aerial) Part of 4	
4C.	Tuning Condenser (Std. & S. W. Oscillator) Part of 4	
	Coupling (Cond. to Drum)	31-2291
	Drive Cord (Pointer)	31-2316
	Drive Cord (Tuning Condenser) Springs	31-2315
	Drum (Drive Cord)	28-8913
	Pointer (Dial)	38-9716
	Rubber Grommet	56-2272
5.	Compensator (F. M. Aerial)	27-4771
5A.	Compensator (F. M. Oscillator) Part of 5	31-6364
6.	Aerial Transformer (S. W. 1 Band)	32-3831
6A.	Aerial Transformer (S. W. 2 Band) Part of 6	
	Mtg. Clip	28-5002
7.	Resistor (47,000 ohms)	33-347339
8.	Resistor (15 ohms)	33-015339
9.	Compensator (S. W. 2 Aerial)	31-6448
9A.	Compensator (S. W. 2 Oscillator) Part of 9	
10.	Mica Condenser (5 mmfd)	
11.	Oscillator Transformer (SW-1, SW-2)	32-3834
	Mtg. Clip	28-5002
12.	Compensator (Brdcst Band-1500 KC)	31-6451
12A.	Compensator (Brdcst Band-1500 KC) Part of 12	
12B.	Compensator (SW-1 Oscillator) Part of 12	
12C.	Compensator (SW-1 Aerial) Part of 12	
12D.	Compensator (Brdcst Aerial) Part of 12	
13.	Resistor (33 ohms)	33-033336
14.	Oscillator Transformer (Brdcst)	32-3809
15.	Mica Condenser (145 mmfd)	20-014511
16.	P. B. Oscillator Transformer (540 to 1000 KC	32-3780
16A.	P. B. Oscillator Transformer (600 to 1200 KC)	32-3780
16B.	P. B. Oscillator Transformer (650 to 1300 KC)	32-3780
16C.	P. B. Oscillator Transformer (850 to 1600 KC)	32-3779
16D.	P. B. Oscillator Transformer (900 to 1600 KC)	32-3779
16E.	P. B. Oscillator Transformer (900 to 1600 KC)	32-3779
	Iron Core	56-6100
	Cap	28-6936
	Clip	56-2250
17.	P. B. Aerial Compensator (540 to 1000 KC)	31-6454
17A.	P. B. Aerial Compensator (600 to 1200 K. C.) Part of 17	
17B.	P. B. Aerial Compensator (650 to 1300 KC) Part of 17	
17C.	P. B. Aerial Compensator (850 to 1600 KC) Part of 17	
17D.	P. B. Aerial Compensator (900 to 1600 KC) Part of 17	
17E.	P. B. Aerial Compensator (900 to 1600 KC) Part of 17	
18.	Brdcst Aerial Transformer	32-3830
	Mtg. Clip	28-5002
19.	Mica Condenser (155 mmfd)	20-015511
20.	Resistor (2.2 megohm)	33-522339
21.	Mica Condenser (205 mmfd)	60-125157
22.	Resistor (4,700 ohms)	33-247339
23.	Condenser (.01 mfd, 400 volts)	30-4572
24.	Condenser (.05 mfd, 400 volts)	30-4518
25.	Mica Condenser (250 mmfd)	60-125157
26.	Resistor (47,000 ohms)	33-347339
27.	Mica Condenser (500 mmfd)	30-1138
28.	Mica Condenser (280 mmfd)	30-1216
29.	Condenser (.03 mfd, 400 volts)	30-4517
30.	Electrolytic Condenser (8 mfd, 350 volts)	30-2473
	Mtg. Strap	56-1452FA5
31.	Resistor (33,000 ohms)	33-333439
32.	Resistor (2,200 ohms)	33-223339
33.	Resistor (470 ohms)	33-147336
34.	Condenser (.05 mfd, 200 volts)	30-4519
35.	Mica Condenser (250 mmfd)	60-125157
36.	Resistor (10,000 ohms)	33-310339
37.	Resistor (15,000 ohms)	33-315339
38.	First I. F. Transformers	32-3820
38A.	Primary Compensator (455 KC), Part of 38	
38B.	Primary Compensator (4.3 MC) Part of 38	
38C.	Secondary Compensator (455 KC) Part of 38	
38D.	Secondary Compensator (4.3 MC) Part of 38	
38E.	Condenser (4,000 mmfd) Part of 38	
	Mtg. Nut	W-1949
39.	Resistor (100 ohms)	33-110336
40.	Condenser (.05 mfd, 400 volts)	30-4518
41.	Resistor (150,000 ohms)	33-415339
42.	Second I. F. Transformer	32-3821
42A.	Primary Compensator (4.3 MC) Part of 42	
42B.	Secondary Compensator (4.3 MC) Part of 42	
42C.	Secondary Compensator (455 KC) Part of 42	
	Mtg. Nut	W-1949
43.	Condenser (.05 mfd, 200 volts)	30-4519
44.	Resistor (560 ohms)	33-156336
45.	Resistor (1,000 ohms)	33-210339
46.	Third I. F. Transformer	32-3821
46A.	Primary Compensator (4.3 MC) Part of 46	
46B.	Primary Compensator (4.3 MC) Part of 46	
46C.	Secondary Compensator (455 KC) Part of 46	
	Mtg. Nut	W-1949
47.	Condenser (.05 mfd, 400 volts)	30-4518
48.	Mica Condenser (100 mmfd)	60-110257
49.	Condenser (.05 mfd, 200 volts)	30-4519
50.	Resistor (560 ohms)	33-156336
51.	Condenser (.05 mfd, 400 volts)	30-4518
52.	Resistor (68,000 ohms)	33-368339
53.	Fourth I. F. Transformer	32-3822
53A.	Primary Compensator (4.3 MC) Part of 53	
53B.	Primary Compensator (455 KC) Part of 53	
53C.	Secondary Compensator (4.3 MC) Part of 53	
	Mtg. Nut	W-1949
53D.	Mica Condenser (500 mmfd) Part of 53	
54.	Mica Condenser (150 mmfd)	60-115137
55.	Mica Condenser (150 mmfd)	60-115137
56.	Resistor (47,000 ohms)	33-447339
57.	Resistor (470,000 ohms)	33-447339
58.	Mica Condenser (100 mmfd)	60-110157
59.	Resistor (220,000 ohms)	33-422339
60.	Resistor (330,000 ohms)	33-433339
61.	Mica Condenser (100 mmfd)	60-110257
62.	Condenser (.05 mfd, 400 volts)	30-4518
63.	Resistor (1 megohm)	33-510339
64.	Resistor (4,700 ohms)	33-247339
65.	Resistor (47,000 ohms)	33-347339
66.	Resistor (47,000 ohms)	33-347339
67.	Condenser (.006 mfd, 400 volts)	30-4591
68.	Condenser (.006 mfd, 400 volts)	30-4591
69.	Condenser (.002 mfd, 600 volts)	30-4622
70.	Condenser (.004 mfd, 600 volts)	30-4623
71.	Condenser (.01 mfd, 400 volts)	30-4572
72.	Resistor (2.2 megohms)	33-522339
73.	Resistor (2.2 megohms)	33-522339
74.	Tone Control Switch	42-1700
	Mtg. Nut	W-215FA3
75.	Resistor (2.2 megohms)	33-522339
76.	Resistor (470,000 ohms)	33-447339
77.	Resistor (470,000 ohms)	33-447339
78.	Condenser (.003 mfd, 1,000 volts)	30-4469
79.	Output Transformer	32-8184
80.	Speaker	36-1501
	Cone Assembly	36-4216
	Cable	41-3651
	Mtg. Sleeve	56-2044
	Rubber Grommet (Mtg. Spkr)	27-4596
	Washer (Spker Mtg.)	28-3320
	Nut	W-124
81.	Home Recording Socket	27-6179
	Shorting Bar	56-2270
82.	Record Changer Power Socket	27-6182
83.	Condenser (.003 mfd, 1,000 volts)	30-4469
84.	Dial and Push-Button Lights	34-2064
	Socket Assembly (Dial Lamp)	38-9695
	Socket Assembly (P. B. Lights)	76-1359
85.	Resistor (10 ohms)	33-010430
86.	Pilot Light Cabinet Socket Assembly	34-2068
		76-1112
87.	Electrolytic Condenser (25 mfd, 300 volts)	30-2532
	Mtg. Clamp	56-1314
88.	Field Coil (Replace Speaker)	36-1561
89.	Condenser (.1 mfd, 200 volts)	30-4586
90.	Resistor (100,000 ohms)	33-410339
91.	Bias Resistor (8—192 ohms)	33-3420
92.	Electrolytic Condenser (18 mfd, 475 volts)	30-2527
93.	Record Changer Compartment Light	34-2484
	Socket and Cable Assembly	41-3634
94.	Switch and Cable (Compartment Light)	76-1364
	Spring	28-8991
	Screw	W-560
95.	Power Transformer (115 volts, 60 cycles)	32-8227
96.	Condenser (.01-01 mfd)	3903-ODG
97.	Phono Input Transformer	32-8196
98.	Input Cable (Pickup Cell and Light)	41-3645
99.	Bass Tone Control	33-5472
100.	Condenser (.002 mfd, 600 volts)	30-4582
101.	Resistor (10 megohms)	33-610339
102.	Volume Control	33-5286
103.	Condenser (.006 mfd, 400 volts)	30-4591
104.	Condenser (.006 mfd, 400 volts)	30-4591
105.	Condenser (.006 mfd, 400 volts)	30-4591
106.	Resistor (470,000 ohms)	33-447339
107.	Mica Condenser (100 mmfd)	60-110257
108.	Resistor (100,000 ohms)	33-410339
109.	Resistor (4.7 megohms)	33-547339
110.	Resistor (220,000 ohms)	33-422339
111.	Condenser (.002 mfd, 600 volts)	30-4622
112.	Resistor (1 megohm)	33-510339
113.	Resistor (1 megohm)	33-510339
114.	Resistor (100,000 ohms)	33-410339
115.	Condenser (.02 mfd, 200 volts)	30-4516
116.	Mica Condenser (350 mmfd)	60-135257
117.	Phono Reproducer Light Control	33-5435
118.	Condenser (.05 mfd, 400 volts)	30-4518
119.	Oscillator Transformer (Reproducer Light)	32-3818
120.	Mica Condenser (250 mmfd)	60-125157
121.	Resistor (47,000 ohms)	33-347339
122.	Condenser (.05 mfd, 400 volts)	30-4518
123.	Resistor (27,000 ohms)	33-327339
124.	Photo-Electric Reproducer and Tone Arm Complete (Metal Tone Arm)	35-2519
	(Bakelite Tone Arm)	35-2540
124A.	Photo-Electric Cell (Part of 124	318-2676
124B.	Reproducer Lamp	34-2478
124C.	Pickup Cable Plug (Mounted on Changer)	217-1396
125.	Power Plug (Changer Cable)	35-2547
126.	Reject Switch (Mounted on Changer)	35-2555
127.	Changeover Switch (Mounted on Changer)	35-2547
128.	Reject Solenoid (Mounted on Changer)	[illegible]
129.	Electric Reject Trip (Mounted on Changer)	
	Pulsating Plate	318-2785
	Trip Switch Assembly	35-2563
130	Phono Motor (115 volts, 60 cycles)	35-2553
	Turntable (60 cycles)	35-2554
	Turntable (50 cycles)	35-2059
	Pulley (60 cycles)	218-1448
	Pulley (50 cycles)	56-6173
	Screw	218-1450
131.	Neon Speed Lamp (Changer)	34-2483
132.	Push-Button Switch (P. B. Coils and Padders)	42-1706
	Mtg. Sleeve	28-3806
	Snap Fasteners	28-4342
	Mtg. Washer	W-151
132A.	Power Switch (ON-OFF) Push-Button)	42-1726
	Cover	76-1343
132B.	Power Switch (Phono Push-Button)	42-1727
	Cover	76-1343
133	Push-Button Switch (Under Chassis—Top Section)	42-1707
133A.	Push-Button Switch (Under Chassis—Bottom Section) Part of 133	

MISCELLANEOUS PARTS

Automatic Record Changer	35-1289
Bezel (Cabinet—42-1015W)	40-6686
Screw	W-2073FA9
Bezel (Cabinet—42-1015M)	40-6696
Cable (Power)	L-3245
Cabinet (Model 42-1015W)	10556A
Cabinet (Model 42-1015M)	10556B
Control Drum (Bass & Treble)	54-4149
Control Drum (Volume)	54-4150
Control Drum (Tuning)	54-4119
Washer (Between Control Drums)	28-3976
Keyed Washer	56-1029FA3
Spring Washer (Vol. Drum)	56-1385
Spring Washer (Tuning Drum)	56-1659
Clutch Plate	56-2273
Dial Scale	27-5760
Felt Gasket	27-3224
Mtg. Clamp	56-1034FA3
Jewel (Pilot Light Cabinet)	27-4777
Knob (Push-Buttons—Model 42-1015W)	54-4144
Spring Assembly	76-1375
Knobs (Push-Buttons—Model 42-1015M)	54-4155
Rubber Grommet (Tuning Unit Mtg.)	3914
Rubber Grommet (Tuning Unit Mtg.)	3915
Rubber Grommet (Chassis Mtg.)	27-4571
Rubber Corner (Chassis)	54-4015
Screw (Chassis Mtg.)	W-1345FA3
Socket (6L6G & 5X4 Tubes)	27-6174
Socket (LOKTAL Tubes)	27-6177
Sleeve (Tuning Unit Mtg.)	28-2257
59X Test Socket	27-6180
Tab Cover	27-5769
Tab (OFF)	27-5770
Tab (Phono)	27-5771
Tab (Broadcast)	27-5773
Tab (SW-1)	27-5774
Tab (SW-2)	27-5775
Tab (F. M.)	27-5776
Tab (Television)	27-5780
Tab Kit (Stations)	40-6674
Washer (Chassis Mtg.)	28-5114

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PHILCO RADIO & TELEVISION CORP.

MODELS 42-1012, 42-1013M, 42-1013W

REPLACEMENT PARTS—MODELS 42-1012, 42-1013, CODE 121

Sch. No.	Description	Part No.
1.	F. M. Dipole Aerial (42-1012)	76-1387
	F. M. Dipole Aerial (42-1013W, 42-1013M)	76-1346
1A.	F. M. Aerial Socket	27-6181
2.	Loop Aerial (Brdcst. & S. W. Bands)	76-1386
	Mtg. Screw	W-722-FE11
	Mtg. Sleeve	28-3806
	Spring Washer	28-4186FE7
	Washer	W-425FA3
2A.	Terminal Panel	38-9870
3.	Compensator (Brdcst., Aerial)	31-6443
3A.	Compensator (S. W., Aerial) (Part of 3)	
3B.	Compensator (F. M., Aerial) (Part of 3)	
3C.	Compensator (F. M., Osc.) (Part of 3)	
3D.	Compensator (S. W., Osc.) (Part of 3)	
3E.	Compensator (Brdcst, Osc.) (Part of 3)	
3F.	Compensator (Brdcst, Osc. 580 KC) (Part of 3)	
4.	S. W. Aerial Transformer Mtg. Clip	32-3833 28-5002
5.	Brdcst. Aerial Transformer Mtg. Clip	32-3815 28-5002
6.	F. M. Aerial Transformer	32-3865
6A.	F. M. Oscillator Transformer (Part of 6)	
	Mtg. Clip	28-5002
7.	Tuning Condenser (F. M. Aerial)	31-3592
7A.	Tuning Condenser (F. M. Oscillator) (Part of 7)	
7B.	Tuning Condenser (Brdcst. & S. W. Aerial) (Part of 7)	
7C.	Tuning Condenser (Brdcst. & S. W. Aerial (Part of 7)	
	Drive Cord (Pointer)	31-2576
	Spring	28-8952
	Drive Cord (Cond. Drive)	31-2603
	Spring	28-8751
	Drive Shaft	56-6195
	"C" Washer	28-2043
	Drive Drum (Tuning Condenser)	76-1293
	Mtg. Grommet	27-4596
	Mtg. Sleeve	56-1505FA3
	Mtg. Screw	W-1351
	Pointer	56-2331
8.	Phonograph Oscillator Transformer	32-3818
	Mtg. Clip	28-5002
9.	Condenser (.05 mfd, 400 volts)	30-4518
10.	Mica Condenser (500 mmfd)	60-150257
11.	Phono Light Control	33-5435
12.	Resistor (10,000 ohms)	33-310439
13.	Resistor (22,000 ohms)	33-322439
14.	Resistor (15,000 ohms)	33-315439
15.	Condenser (.05 mfd, 400 volts)	30-4518
16.	Mica Condenser (185 mmfd)	20-018511
17.	Resistor (10,000 ohms)	33-310339
18.	Resistor (15,000 ohms)	33-315339
19.	Mica Condenser (500 mmfd)	60-150157
20.	Mica Condenser (250 mmfd)	60-125258
21.	Mica Condenser (375 mmfd)	20-037517
22.	Push-Button Switch (Bottom Section)	42-1701
22A.	Push-Button Switch (Top Section) (Part of 22)	
22B.	Main Power Switch (Part of 22)	
22C.	Phono Power Switch (Part of 22)	
23.	Mica Condenser (185 mmfd)	20-018511
24.	Shortwave Oscillator Transformer Mtg. Clip	32-3793 28-5002
25.	Brdcst Oscillator Transformer Mtg. Clip	32-3791 28-5002
26.	Resistor (56 ohms)	33-056339
27.	Mica Condenser (185 mmfd)	20-018511
28.	Condenser (1 mmfd, consist of wire and lug)	
29.	Mica Condenser (.185 mmfd)	20-018511
30.	P. B. Aerial Compensator (900 to 1600 KC)	31-6439
30A.	P. B. Aerial Compensator (850 to 1500 KC) (Part of 30)	
30B	P. B. Aerial Compensator (650 to 1300 KC) (Part of 30)	
30C.	P. B. Aerial Compensator (600 to 1200 KC) (Part of 30)	
30D.	P. B. Aerial Compensator (540 to 1000 KC) (Part of 30)	
31.	P. B. Oscillator Transformer (900 to 1600 KC)	32-3779
31A.	P. B. Oscillator Transformer (850 to 1500 KC)	32-3779
31B.	P. B. Oscillator Transformer (650 to 1300 KC)	32-3780
31C.	P. B. Oscillator Transformer (600 to 1200 KC)	32-3780
31D.	P. B. Oscillator Transformer (540 to 1000 KC)	32-3780
	Iron Core	56-6190
	Cap	28-6936
	Clip	56-2250
32.	Resistor (47,000 ohms)	33-347339
33.	Condenser (.05 mfd, 400 volts)	30-4518
34.	Resistor (100,000 ohms)	33-410339
35.	Resistor (2,700 ohms)	33-227339
36.	Resistor (2.2 megohms)	33-522339
37.	Mica Condenser (250 mmfd)	60-125257
38.	Condenser (.05 mfd, 400 volts)	30-4518
39.	First I. F. Transformer Mtg. Nut	32-3843 W-1949FA3
39A.	Primary Compensator (455 KC) (Part of 39)	
39B.	Primary Compensator (4.3 MC) (Part of 39)	
39C.	Secondary Compensator (455 KC) (Part of 39)	
39D.	Secondary Compensator (4.3 MC) (Part of 39)	
39E.	Condenser (4,000 mmfd) (Part of 39)	
40.	Resistor (22,000 ohms)	33-322339
41.	Condenser (.05 Mfd, 200 volts)	30-4519
42.	Resistor (100 ohms)	33-110336
43.	Resistor 68 ohms)	33-068339
44.	Condenser (.05 mfd, 200 volts)	30-4519
45.	Resistor (100,000 ohms)	33-410339
46.	Resistor (2.2 megohms)	33-522339
47.	Electrolytic Condenser (8 mfd, 475 volts)	30-2535
47A.	Electrolytic Condenser (8 mfd, 475 volts) (Part of 47)	
48.	Resistor (4700 ohms)	33-247339
49.	Condenser (.05 mfd, 200 volts)	30-4519
50.	Resistor (2.2 megohms)	33-522339
51.	Resistor (1000 ohms)	33-210339
52.	Resistor (3200 ohms)	33-232339
53.	Resistor (22,000 ohms)	33-322339
54.	Condenser (.05 mfd, 400 volts)	30-4518
55.	Condenser (.01 mfd, 400 volts)	30-4572
56.	Second I. F. Transformer Mtg. Nut	32-3844 W-1949FA3
56A.	Primary Compensator (4.3 MC) (Part of 56)	
56B.	Secondary Compensator (4.3 MC) (Part of 56)	
56C.	Secondary Compensator (455 KC) (Part of 56)	
56D.	Resistor (47,000 ohms) (part of 56)	33-347339
57.	Resistor (150 ohms)	33-115336
58.	Condenser (.05 mfd, 200 volts)	30-4519
59.	Condenser (.01 mfd, 400 volts)	30-4572
60.	Third I. F. Transformer Mtg. Nut	32-3845 W-1949FA3
60A.	Primary Compensator (4.3 MC) (Part of 60)	
60B.	Primary Compensator (455 KC) (Part of 60)	
60C.	Secondary Compensator (4.3 MC) (Part of 60)	
60D.	Condenser (125 mmfd) (Part of 60)	
61.	Condenser (.01 mfd, 400 volts)	30-4572
62.	Resistor (1000 ohms)	33-210339
63.	Mica Condenser (500 mmfd)	60-150157
64.	Condenser (.1 mfd, 200 volts)	30-4586
65.	Resistor (2.2 megohms)	33-522339
66.	Condenser (.01 mfd, 400 volts)	30-4572
67.	Tone Control (Audio Bass) Mtg. Nut	33-5479 W-2157FA3
68.	Condenser (.003 mfd, 1000 volts)	30-4469
69.	Mica Condenser (100 mmfd)	60-110157
70.	Condenser (.01 mfd, 400 volts)	30-4572
71.	Mica Condenser (100 mmfd)	60-110157
72.	Resistor (100,000 ohms)	33-410339
73.	Volume Control Mtg. Nut	33-5478 W-2157FA3
74.	Resistor (10 megohms)	33-610339
75.	Condenser (.01 mfd, 400 volts)	30-4572
76.	Resistor (220,000 ohms)	33-422339
77.	Resistor (470,000 ohms)	33-447339
78.	Resistor (1 megohm)	33-510339
79.	Mica Condenser (150 mmfd)	60-115137
80.	Mica Condenser (150 mmfd)	60-115137
81.	Resistor (470,000 ohms)	33-447339
82.	Tone Control (Audio Treble) Mtg. Nut	33-5480 W-2157
83.	Condenser (.01 mfd, 400 volts)	30-4572
84.	Mica Condenser (100 mmfd)	60-110157
85.	Condenser (.01 mfd, 400 volts)	30-4572
86.	Resistor (1 megohm)	33-510339
87.	Resistor (220,000 ohms)	33-422339
88.	Resistor (47,000 ohms)	33-347339
89.	Resistor (4700 ohms)	33-247339
90.	Condenser (.01 mfd, 400 volts)	30-4572
91.	Condenser (.01 mfd, 400 volts)	30-4572
92.	Resistor (470,000 ohms)	33-447339
93.	Resistor (470,000 ohms)	33-447339
94.	Resistor (56,000 ohms)	33-356339
95.	Resistor (470,000 ohms)	33-447339
96.	Condenser (.001 mfd, 1000 volts)	30-4601
97.	Output Transformer	32-8191
98.	Speaker 36-1565 or	36-1524
	Cone Assembly	36-4178
	Cable	41-8636
	Mtg. Sleeve	56-2044
	Mtg. Grommet	27-4596
	Mtg. Washer	28-3320
99.	Home Recording Socket	27-6179
	Mtg. Rivet	W1209FA5
100.	Phono Power Socket	27-6182
	Mtg. Rivet	W-209FA5
101.	Power line Condenser (.01-.01 mfd)	30-4503-0DG
102.	Compartment light Switch and Cable	76-1390
	Spring	28-8991
	Mtg. Screw	W-560FE11
103.	Compartment Light Cable and Socket Assembly	34-2484 41-3638
104.	Cabinet Jewel Lamp Cable and Socket (42-1012)	34-2068 76-1392
	Cable and Socket (42-1013)	76-1378
105.	Resistor (10 ohms)	33-010436
106.	Dial Lamp Socket Assembly	34-2141 76-1295
107.	Power Transformer (115 volts, 60 cycles)	32-8226
108.	Electrolytic Condenser (18 mfd, 475 volts)	30-2517
109.	Bias Resistor (140 ohms)	33-3418
109A.	Bias Resistor (10 ohms) (Part of 109)	
110.	Field Coil (Replace Speaker)	36-1565
111.	Electrolytic Condenser (18 mfd, 475 volts)	30-2527
112.	Resistor (470,000 ohms)	33-447339
113.	Condenser (.0015 mfd, 1000 volts)	30-4516
114.	Resistor (100,000 ohms)	33-410339
115.	Resistor (330,000 ohms)	33-433339
116.	Resistor (3300 ohms)	33-233339
117.	Electrolytic Condenser (10 mfd, 25 volts)	30--2500
118.	Phono Input Transformer	32-8196
118A.	Cable (Phono Input Transformer)	41-3637
119.	Photo-Electric Pickup (Metal Tone Arm)	35-2518
	NOTE: A Plastic Tone Arm Part No. 35-2540 was also used on this model either tone arm can be used.	
120.	Electric Reject Trip (see items 39 and 48 in service bulletin 402)	
121.	Reject Solenoid (see items 35, 35A, 36 in service bulletin 402)	
122.	Manual Reject Button (Automatic Record Changer—see item 10 in service Bulletin 403)	
123.	Record Changer Motor (115 volts, 60 cycle)	318-2802
	Pulley (60 cycle)	218-1448
	Pulley (50 cycle)	56-6173
	Turntable (60 cycle)	318-2807
	Turntable (50 cycle)	35-3058
124.	Manual-Automatic Change-over Switch	35-2547
125.	Power Plug	35-2597
	Plug Cover	35-2598
126.	Neon Lamp)	34-2483
	MISCELLANEOUS PARTS Models 42-1012, 42-1013, Code 121	
	Automatic Record Changer	35-1285
	Bezel (42-1012, 42-1013W)	54-4128
	Mtg. Screw	W-2073FA9
	Bezel (42-1013M)	54-4156
	Mtg. Screw	W-2073FA9
	Cabinet (42-1012)	10586-A
	Cabinet (42-1013W—Walnut)	10550-A
	Cabinet (42-1013M—Mahogany)	10550-B
	Cord (Power)	L-3245
	Dial Scale	27-5789
	Rubber Channel	54-4114
	Spring (Background Plate)	28-8990
	Background Plate	27-5984
	Clamp	56-2314FA3
	Mtg. Screw	W-1949
	Jewel (Cabinet Pilot Light)	27-4777
	Knob (Tuning, Vol. Tone, 42-1012, 42-1013W)	54-4105
	Knob (Push-Button) (42-1012, 42-1013)	54-4144
	Spring (Push-Button)	76-1294
	Knob (Tuning, Vol., Tone, 42-1013M)	54-4154
	Knob (Push-Button, 42-1013M)	54-4155
	Rubber Corner (Chassis Mtg.)	54-4015
	Rubber Grommet (Chassis Mtg.)	27-4571
	Screw (Chassis Mtg.)	W-1345FA3
	Socket (5Y4G Tube)	27-6174
	Socket (Loktal Tubes)	27-6177
	Mtg. Rivet	W-239
	Socket (Test Socket)	27-6180
	Tab Kit	40-6663
	Tab (Off)	27-5742
	Tab (Television)	27-5779
	Tab (Broadcast)	27-5739
	Tab (S. W.)	27-5740
	Tab (F. M.)	27-5741
	Tab (Phono)	27-5760
	Tab Cover	27-3816
	Washer (Chassis Mtg.)	28-5114FA3

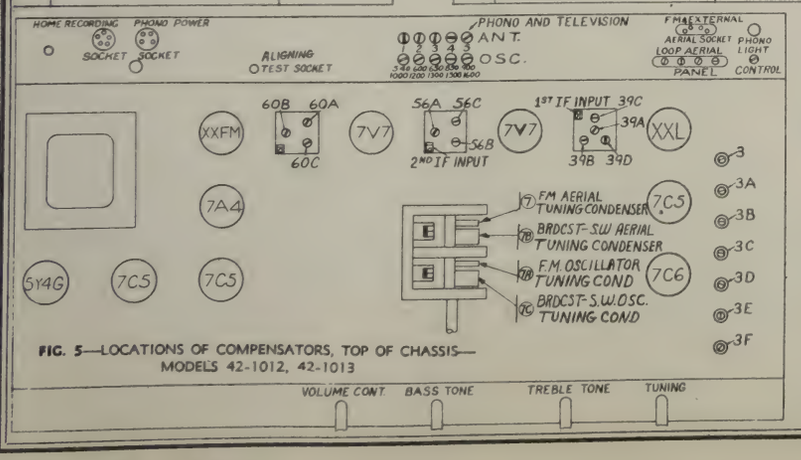

FIG. 5—LOCATIONS OF COMPENSATORS, TOP OF CHASSIS—MODELS 42-1012, 42-1013

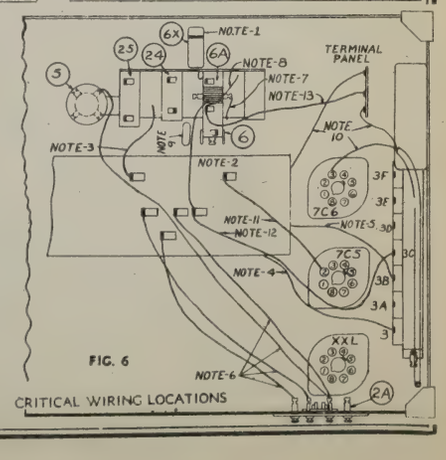

FIG. 6

CRITICAL WIRING LOCATIONS

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MODELS 42-1012, 42-1013M 42-1013W

PHILCO RADIO & TELEVISION CORP.

AUDIO OUTPUT: 8 WATTS
POWER SUPPLY; 115 VOLTS 60~ AC
POWER CONSUMPTION: 125 Watts

These models can also be operated on 50~ by changing the phono motor parts as given in the parts list.

NOTE A.—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial pointer must be aligned to track properly with the tuning condenser. To adjust the dial pointer as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index at the low frequency end of the broadcast scale.

NOTE B.—When adjusting the low frequency compensator of the broadcast or the aerial padders of the high frequency tuning range, the receiver tuning condenser must be set at approximately 1500 KC. Next, connect the signal generator to the receiving loops from the receiver, so that the receiver be left in the same position as it was when the dial pointer was set at 1500 KC.

After connecting the aligning instruments as shown in the tabulation below, tune in the signal generator. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

NOTE C.—Adjust compensator (3D) to the second signal peak from the closed position (maximum capacity). Check image at 15,910 m.c. by turning signal generator pointer to 15,910 mc.

The aerial compensator (3A) must also be adjusted to maximum on the first signal peak by rolling the tuning condenser. (See Note B.)

NOTE D.—With the signal generator set to 4.3 MC, padder (60C) is adjusted to the point where minimum signal indication is observed on the output meter.

NOTE E—Turn the signal generator first to approximately 125 KC below 4.3 MC (4.175 MC) and then 125 KC above 4.3 MC (4.42 MC). A signal should be observed on the output meter at approximately each of these points (4.17 and 4.42). The two peak signals should be of equal reading on the output meter and equally spaced in frequency each side of 4.3 MC. If the signals are unequal in amplitude padder (60A) must be adjusted a little by using a screwdriver to make both peaks equal. This is done by slightly turning padder and then turning signal generator above and below to observe peaks. After equal peaks readings are obtained, set the signal generator to 4.3 MC. The output meter should show zero reading at 4.3 MC. If a signal indication is observed readjust padder (60C) until zero reading is obtained on the meter. After this adjustment is made padder No. 60A should be reset for equal peaks as given above.

NOTE F.—Adjust padders 56B, 56A, 39D, and 39B for equal signal peaks and equal frequency spacing for each side of 4.3 MC.

NOTE G.—The dial scale numbers are listed in tenths of megacycles less the first digit i. e., 49 MC is 90, 48.5 is 85. Set the tuning dial pointer to 85 on the F. M. scale. Adjust padder (3C) to the point where minimum signal indication is observed on the output meter.

NOTE H—In order to adjust padder (3B) the signal generator should be set to either the signal peak approximately 48.5 MC below 48.5 MC (48.375 MC), or 125 KC above 48.5 MC (48.625 MC). Adjust padder (3B) to maximum output reading on the output meter. Both of these peak signals, As padder 3B is being adjusted roll the tuning condenser as given in Note B.

EQUIPMENT REQUIRED

1. SIGNAL GENERATOR: Covering the frequency of the receiver, such as the Philco Model 070.
2. ALIGNING INDICATOR: Audio Output Meter. Philco Models 027 and 028. Circuit testers contain a sensitive output meter and are recommended.
3. TOOLS: Philco Fiber Screw Driver, Part No. 45-2610.

CONNECTING ALIGNING INSTRUMENTS

AUDIO OUTPUT METER: Terminal No. 1 is provided on the loop aerial panel for connecting one lead of the audio output meter. The other lead of the meter is connected to the chassis. When using these connections the lowest A. C. scale of the meter must be used. (0 to 10 volts.)

The audio output meter can also be connected between the plate of the output tube and the chassis.

SIGNAL GENERATOR: When adjusting the "I. F" padders, the high side of the signal generator is connected through a .1 mfd. condenser to the points indicated signal generator column "output connections" to receiver in the tabulations below.

STANDARD AND S. W. BANDS ALIGNING PROCEDURE

	SIGNAL GENERATOR		RECEIVER		
Operations In Order	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order
1	High side to No. 2 terminal loop panel	455 KC	580 KC	Vol. max. P. B. Switch "Brdcst."	60B, 56C, 39C, 39A
2	Use loop on generator	1500 KC	1500 KC	P. B. Switch "Brdcst."	3E, 3
3	Use loop on generator	580 KC	580 KC	P. B. Switch "Brdcst."	3F
4	Use loop on generator	Readjust as given in Operation 2			3D, 3A
5	Use loop on generator	15 MC	15 MC	P. B. Switch "S. W."	

Operations In Order	Special Instructions
1	
2	Note A
3	Roll Tuning Condensers Note B
4	Note C
5	

FREQUENCY MODULATION ALIGNING PROCEDURE

Note: The Frequency Modulation Circuits Must Be Adjusted With the Dipole Aerial Connected

CRITICAL WIRING LOCATIONS

The following items on these models are critical for location and position. See Fig. 6. Page 5 for locations of wires and parts:

NOTE 1. Wire from condenser (6X) to F. M. oscillator transformer 6A must be kept short.

NOTE 2. Wire from push-button switch contact (23) to tap on F. M. oscillator transformer 6A must be dressed away from the push-button switch.

NOTE 3. Wire from standard and S. W. Band tuning section 7C of the oscillator tuning condenser must be dressed through the push-button switch between the S. W. oscillator transformer (24) and the standard broadcast transformer (25). be dressed away from chassis.

NOTE 4. Wire from compensator (3) to contact (50) of push-button switch must

NOTE 5. Wires from compensator (3B) to terminal panel must be dressed away from chassis.

NOTE 6. Wires from loop terminal panel (2A) to push-button switch must be dressed away from chassis.

NOTE 7. Wire from F. M. oscillator section (7A) of tuning condenser to F. M. oscillator transformer 6A must be as short as possible.

NOTE 8. Dress ground to F. M. oscillator transformer (6A) away from the oscillator windings.

NOTE 9. Dress Mica Condenser (21) away from the F. M. oscillator transformer (6 and 6A).

NOTE 10. Dress wires to contact 3 of 7C6 tube and terminal panel away from other wires and 7C5 oscillator tube socket.

NOTE 11. Dress wire from plate contact (2) of 7C5 oscillator tube socket to push-button switch contact (10) away from other leads and other push-button switch contact.

NOTE 12. Dress wire from compensator 3C to contact (23) of push-button switch away from the chassis and other wiring.

NOTE 13. Dress ground wire braid from terminal panel to F. M. aerial transformer (6) over winding.

NOTE 14. Red wire from F. M. oscillator section (7A) of tuning condenser to F. M. oscillator transformer 6A must be dressed away from chassis bases.

F. M. BAND ALIGNING PROCEDURE

	SIGNAL GENERATOR		RECEIVER		
Operations In Order	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order
1	2nd I. F. M. Input connection	4.3 MC	580 KC	Vol. max. P. B. Switch "F. M."	60C (Note D) 60A (Note E)
2	1st I. F. M. input connection	4.3 MC	580 KC	P. B. Switch "F. M."	56B, 56A (Note F)
3	Ant. Section of F. M. Tuning Cond. and Grd.	4.3 MC	580 KC	P. B. Switch "F. M."	39D, 39B (Note F)
4	Use test loop on generator; place near dipole aerial	48.5 MC	85 (Note G)	P. B. Switch "F. M."	3C (Note G) 3B (Note H)
5	"	48.5 MC	85	P. B. Switch "F. M."	3C oscillator

Operations In Order	Special Instructions
1	
2	
3	
4	Roll tuning condenser when adjusting 3B. See Note B.
5	

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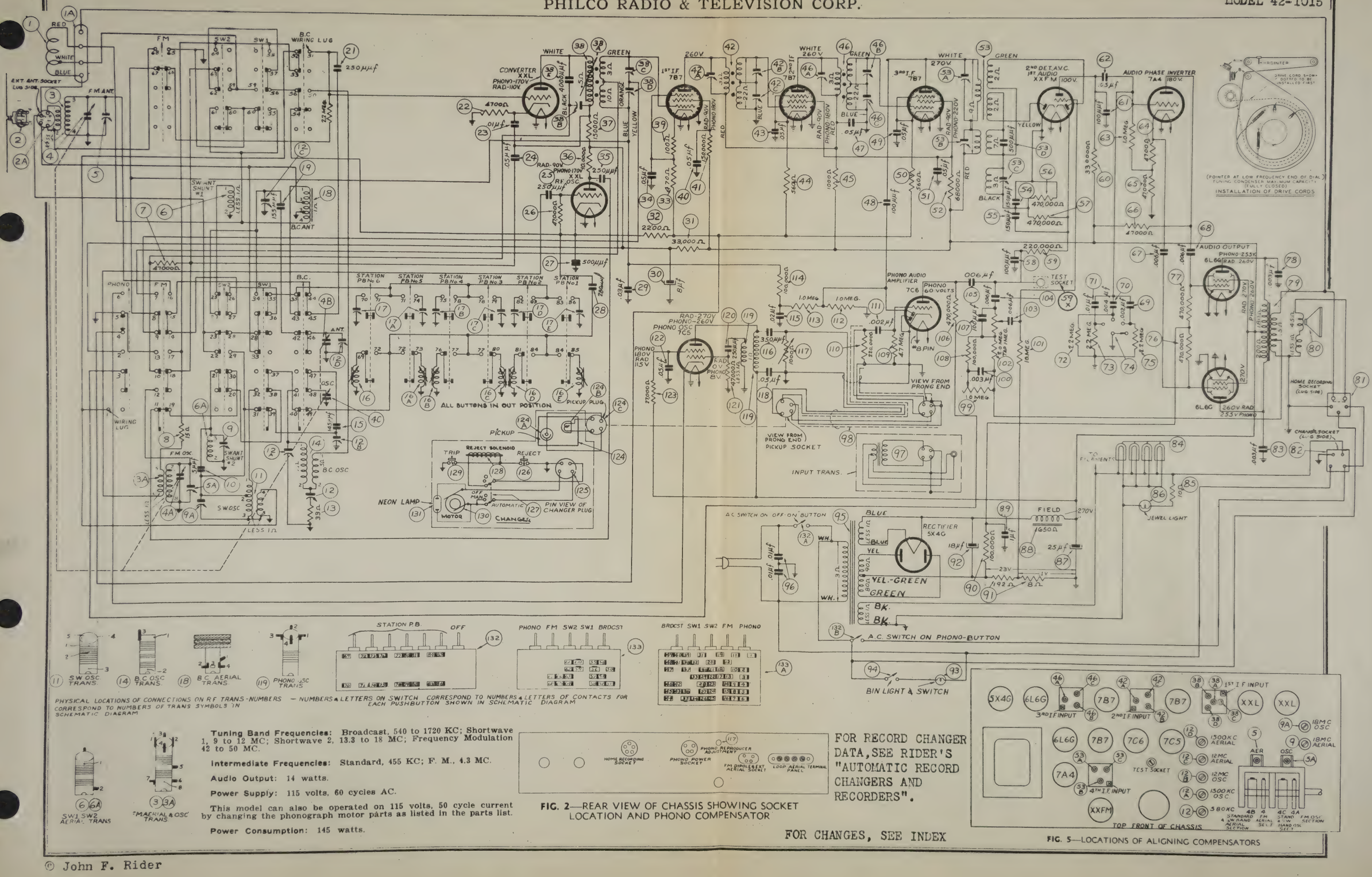
MODEL 42-1015



Tuning Band Frequencies: Broadcast, 540 to 1720 KC; Shortwave 1, 9 to 12 MC; Shortwave 2, 13.3 to 18 MC; Frequency Modulation 42 to 50 MC.

Intermediate Frequencies: Standard, 455 KC; F. M., 4.3 MC.

Audio Output: 14 watts.

Power Supply: 115 volts, 60 cycles AC.

This model can also be operated on 115 volts, 50 cycle current by changing the phonograph motor parts as listed in the parts list.

Power Consumption: 145 watts.

FIG. 2—REAR VIEW OF CHASSIS SHOWING SOCKET LOCATION AND PHONO COMPENSATOR

FOR RECORD CHANGER DATA, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".

FOR CHANGES, SEE INDEX

FIG. 5—LOCATIONS OF ALIGNING COMPENSATORS

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PHILCO RADIO & TELEVISION CORP.

ALIGNING R. F. AND I. F. COMPENSATORS

EQUIPMENT REQUIRED

1. SIGNAL GENERATOR: Covering the frequency of the receiver, such as the Philco Model 070.
2. ALIGNING INDICATOR: Audio Output Meter. Philco Models 027 and 028. Circuit testers contain a sensitive output meter and are recommended.
3. TOOLS: Philco Fiber Screw Driver, Part No. 45-2610.

CONNECTING ALIGNING INSTRUMENTS

AUDIO OUTPUT METER: Terminal No. 1 is provided on the loop aerial panel for connecting one lead of the audio output meter to the voice coil of the speaker. The other lead of the meter is connected to the chassis. When using these connections, the lowest A. C. scale of the meter must be used. (0 to 10 volts.)

The audio output meter can also be connected between the plate of the output tube and the chassis.

SIGNAL GENERATOR: When adjusting the "I. F." padders, the high side of the signal generator is connected through a .1 mfd. condenser to the points indicated in signal generator column "output connections" to receiver in the tabulations below.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet and dipole aerial lead. Do not remove the receiving loops from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

After connecting the aligning instruments adjust the compensators in the order shown in the tabulation below. Location of the compensators are shown in Fig. 5. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

STANDARD AND S. W. BANDS ALIGNING PROCEDURE

Operations In Order	SIGNAL GENERATOR		RECEIVER			Special Instructions
	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators In Order	
1	Aerial Section of Standard Tuning Cond & Grd	455 KC	580 KC	Vol. max. push-button Bdcst. "IN"	53B, 46C, 42C, 38C, 38A	
2	Use loop on generator	1500 KC	1500 KC	Vol. max. push-button Bdcst. "IN"	12A, 12D	Note A
3	Use loop on generator	580 KC	580 KC	Vol. max. push-button Bdcst. "IN"	12	Roll Tuning Condensers Note B
4	Use loop on generator	Readjust as given in Operation 2				
5	Use loop on generator	12 MC	12 MC	Push-button SW-1	12B, 12C	Note C
6	Use loop on generator	18 MC	18 MC	Push-button SW-2	9A, 9	Roll Condensers Note C

FREQUENCY MODULATION ALIGNING PROCEDURE

Note: The Frequency Modulation Circuits Must Be Adjusted With the Dipole Aerial Connected

F. M. BAND ALIGNING PROCEDURE

Operations In Order	SIGNAL GENERATOR		RECEIVER			Special Instructions
	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators In Order	
1	3rd I. F., F. M. input connection	4.3 MC	1400 KC	Vol. max. F. M. push-button "IN"	53C (Note D) 53A (Note E)	
2	2nd I. F., F. M. input connection	4.3 MC	1400 KC	F. M. push-button "IN"	46B, 46A (Note F)	
6	1st I. F., F. M. input connection	4.3 MC	1400 KC	F. M. push-button "IN"	42B, 42A, (Note F)	
3	Ant. Section of F. M. Tuning Cond. and Grd.	4.3 MC	1400 KC	F. M. push-button "IN"	38D, 38B (Note F)	
4	Use test loop on generator; place near dipole aerial	48.5 MC	85 (Note G)	F. M. push-button "IN"	5A (Note G) 5 (Note H)	Roll tuning condenser when adjusting 5. See Note B.
5	Use test loop on generator; place near dipole aerial	48.5 MC	85	F. M. push-button "IN"	5A	

NOTE A.—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial pointer must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale.

NOTE B.—When adjusting the low frequency compensator of the broadcast or the aerial padders of the high frequency tuning range; the receiver tuning condenser must be adjusted (rolled) as follows: First, tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C.—Adjust compensators (12B and 9A) to the second signal peak from the closed position (maximum capacity). The aerial compensators (12C and 9) must also be adjusted to maximum on the first signal peak by rolling the tuning condenser. (See Note B.)

NOTE D.—With the signal generator set to 4.3 MC, padder (53C) is adjusted to the point where minimum signal indication is observed on the output meter.

NOTE E.—Turn the signal generator first ta approximately 125 KC below 4.3 MC (4.17 MC) and then 125 KC above 4.3 MC (4.42 MC). A signal peak should be observed on the output meter at approximately each of these points 4.17 and 4.42). The two peak signals should be of equal reading on the output meter and equally spaced in frequency each side of 4.3 MC. If the peaks are unequal in amplitude, padder (53A) must be adjusted in the direction necessary to make both peaks equal. This is done by slightly turning padder and then turning signal generator above and below 4.3 to observe peaks. After equal peaks readings are obtained, set the signal generator to 4.3 MC. The output meter should show zero reading at 4.3 MC. If a signal indication is observed readjust padder (53C) until zero reading is obtained on the meter. After this adjustment is made padder No. 53A should be reset for equal peaks as given above.

NOTE F.—Adjust padders 46B, 46A, 42B, 42A, 38D, 38B for equal signal peaks and equal frequency spacing each side of 4.3 MC.

NOTE G.—The dial scale numbers are listed in tenths of megacycles less the first digit; i. e.: 49 MC is 90, 48.5 is 85. Set the tuning dial pointer to 85 on the FM scale. Adjust padder (5A) to the point where minimum signal indication is observed on the output meter.

NOTE H.—In order to adjust padder (5) the signal generator should be set to either the signal peak approximately 125 KC below 48.5 MC (48.375 MC), or 125 KC above 48.5 MC (48.625 MC). Adjust padder (5) to maximum output reading on either of these peak signals. As padder 5 is being adjusted roll the tuning condenser as given in Note B.

EXTERNAL AERIAL CONNECTIONS

The built-in aerial system is designed to operate without an outside aerial or ground and to give exceptionally high receiving performance of stations in the standard, shortwave, or FM. bands.

To operate the radio in steel reinforced buildings and other shielded locations where signal strength is weak, an external aerial is recommended. Three different types of aerial combinations are available, to improve reception on the standard, shortwave, or FM bands.

1—For Additional Sensitivity on Frequency Modulation only:

*Philco Dipole Outdoor Aerial, Part No. 45-2926.

The plug at the end of the transmission line is inserted in the socket at the back of the chassis in place of the plug connected to the F. M. loop in the cabinet.

2—For Additional Sensitivity on ALL ranges:

*Philco Dipole Outdoor Aerial, Part No. 45-2926.

Philco Aerial Coupler, Part No. 76-1361.

The coupler plugs into the socket at the back of the chassis in place of the plug connected to the FM loop. The aerial transmission line then connects to the terminals on the coupler marked "red" and "black." The local-distance switch on the coupler connects or disconnects the outdoor aerial from the standard broadcast and shortwave tuning ranges. The dipole remains connected to the FM band regardless of the position of the switch.

3—For Additional Sensitivity on Standard Broadcast and Shortwave only in Areas where FM reception is not available.

Philco Safety Aerial, Part No. 40-6370.

Philco Aerial Coupler, Part No. 76-1361.

Connect the single wire lead-in of the aerial to the "black" terminal on the aerial coupler.

*Accessories for this aerial are the Philco Aerial Mast Kit, the Philco Reflector Kit and Philco High Efficiency Transmission Line. See Service Bulletin No. 396 on Dipole Aerials.

NOTE: When installing the FM Philco Outdoor Dipole Aerial, it is very important that the aerial compensating condensers of the standard and shortwave band are repadded.

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PHILCO RADIO & TELEVISION CORP.

MODEL 42-1016

ALIGNING R. F. AND I. F. COMPENSATORS

EQUIPMENT REQUIRED

1. SIGNAL GENERATOR: Covering the frequency of the receiver, such as the Philco Model 070.
2. ALIGNING INDICATOR: Audio Output Meter. Philco Models 027 and 028. Circuit testers contain a sensitive output meter and are recommended.
3. TOOLS: Philco Fiber Screw Driver. Part No. 45-2610.

CONNECTING ALIGNING INSTRUMENTS

Audio Output Meter: Connect the output meter to the plates of the 6L6G output tubes. The 0 to 30 volt scale of the meter should be used.

Signal Generator: When adjusting the "I. F." padders, the high side of the signal generator is connected through a .1 mfd condenser to the points indicated in signal generator column "output connections" to receiver in the tabulations below.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet and dipole aerial lead. Do not remove the receiving loops from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

After connecting the aligning instruments adjust the compensators in the order shown in the tabulation below. Location of the compensators are shown on the schematic diagram. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

STANDARD AND S. W. BANDS ALIGNING PROCEDURE

SIGNAL GENERATOR			RECEIVER			
Operations in Order	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	Special Instructions
1	1st I.F. Input Connection	455 KC	580 KC	Vol. max. push-button Brdcst. "IN"	52B	
2	1st I.F. Input Connection	455 KC	580 KC	Brdcst. Push-button "IN"	43D, 43B	
3	Aerial Tuning Condenser Lug.	455 KC	580 KC	Brdcst. Push-button "IN"	29D, 29A	
4	Use loop on generator	1500 KC	1500 KC	Brdcst. Push-button "IN"	17A, 18A	Note A
5	Use loop on generator	580 KC	580 KC	Brdcst. Push-button "IN"	17	Roll Tuning Condensers Note B
6	Use loop on generator		Readjust as given in Operation 4			
7	Use loop on generator	12 M.C.	12 M.C.	SW-1 Push-button "IN"	18, 18B Note C	Roll Tuning Condenser
8	Use loop on generator	18 M.C.	18 M.C.	SW-2 Push-button "IN"	5C, 5B Note C	Roll Tuning Condenser

FREQUENCY MODULATION ALIGNING PROCEDURE

NOTE: The Frequency Modulation Circuits Must Be Adjusted With the Dipole Aerial Connected.

SIGNAL GENERATOR			RECEIVER			
Operations in Order	Output Connections	Dial Setting	Dial Setting	Control Se. ngs	Adjust Compensators in Order	Special Instructions
1	2nd I. F., F. M. input connection	4.3 MC	580 KC	Vol. max. F. M. push-button "IN"	52C (Note D) 52A (Note E)	
2	1st I. F., F. M. input connection	4.3 MC	580 KC	F. M. push-button "IN"	43C, 43A (Note F)	
3	F. M. aerial tuning condenser lug	4.3 MC	580 KC	F. M. push-button "IN"	29E, 29B (Note F)	
4	Use test loop on generator; place near dipole aerial	48.5 MC	85 (Note G)	F. M. push-button "IN"	5A (Note G) 5 (Note H)	Roll tuning condenser when adjusting 5. See Note B
5	"	48.5 MC	85	F. M. push-buttbn "IN"	5A oscillator	

NOTE A.—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial pointer must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. See Fig. 11 for cord arrangement.

NOTE B.—When adjusting the low frequency compensator of the broadcast or the aerial padders of the high frequency tuning range; the receiver tuning condenser must be adjusted (rolled) as follows: First, tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C.—Adjust compensators (18 and 5C) to the second signal peak from the closed position (maximum capacity). The aerial compensators (18B and 5B) must also be adjusted to maximum on the first signal peak by rolling the tuning condenser. (See Note B.)

NOTE D.—With the signal generator set to 4.3 MC, padder (52C) is adjusted to the point where minimum signal indication is observed on the output meter.

NOTE E.—Turn the signal generator first to approximately 125 KC below 4.3 MC (4.17 MC) and then 125 KC above 4.3 MC (4.42 MC). A signal peak should be observed on the output meter at approximately each of these points (4.17 and 4.42). The two peak signals should be of equal reading on the output meter and equally spaced in frequency each side of 4.3 MC. If the peaks are unequal in amplitude, padder (52A) must be adjusted in the direction necessary to make both peaks equal. This is done by slightly turning padder and then turning signal generator above and below 4.3 to observe peaks. After equal peaks readings are obtained set the signal generator to 4.3 MC. The output meter should show zero reading at 4.3 MC. If a signal indication is observed, readjust padder (52C) until zero reading is obtained on the meter. After this adjustment is made padder No. 52A should be reset for equal peaks as given above.

NOTE F.—Adjust padders 43C, 43A, 29E, and 29B for equal signal peaks and equal frequency spacing each side of 4.3 MC.

NOTE G.—The dial scale numbers are listed in tenths of megacycles less the first digit; i. e., 49 MC is 90, 48.5 is 85. Set the tuning dial pointer to 85 on the F. M. scale. Adjust padder (5A) to the point where minimum signal indication is observed on the output meter.

NOTE H.—In order to adjust padder (5) the signal generator should be set to either the signal peak approximately 125 KC below 48.5 MC (48.375 MC), or 125 KC above 48.5 MC (48.625 MC). Adjust padder (5) to maximum output reading on either of these peak signals. As padder 5 is being adjusted roll the tuning condenser as given in Note B.

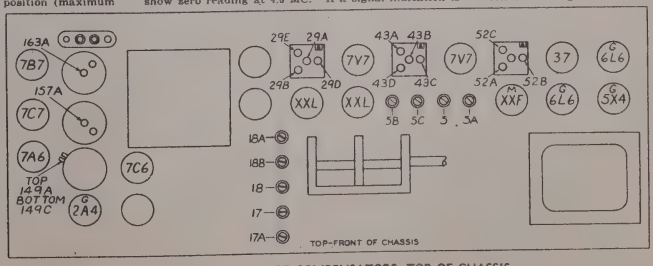

FIG. 9—LOCATIONS OF COMPENSATORS, TOP OF CHASSIS

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PHILCO RADIO & TELEVISION CORP.

MODEL 42-1015

The radio incorporates the Philco Built-in Super Aerial System for reception of standard and short wave broadcast stations; a Philco F. M. Dipole Aerial for reception of frequency modulation stations; twelve (12) electric push-buttons for automatically tuning six (6) stations in the standard broadcast band, turning the A. C. power off and selecting the phonograph circuit, standard, short-wave and frequency modulation bands; three (3) I. F. amplifier stages; two (2) variable tone controls which vary the bass and treble audio frequencies; automatic volume control; push-pull beam power pentode audio output stage; Philco LOKTAL tubes; illuminated horizontal dial; illuminated tuning band and station indicators; concert grand balanced field electro-dynamic speakers; and a dual section tuning condenser. In addition this model is designed to receive the sound of a television program tuned in by special Philco Television Receivers.

The phonograph of each model consists of the PHILCO Automatic Record Changer with a stroboscope pitch and tempo control; a dual speed motor that can be adjusted to play not only normal speed records (78 RPM) but also slow speed records (33-1/3 to 39 RPM); the Philco Photo-Electric Reproducer with a floating jewel which reproduces sound on a beam of light, and a special phonograph amplifier stage for operation through the push-pull output tubes of the radio. The automatic record changer plays 12 ten-inch or 10 twelve-inch records at one loading. The automatic record changer is also equipped with provision for attaching a Philco Home Recording Unit Model HR-2 for making phonograph records in the home. The Home Recording Units can be obtained from your Philco distributor with complete instructions for installation and operation.

Sch. No.	Description	Part No.
1.	Loop Aerial (Std. & S. W. Bands)	76-1404
	Mtg. Sleeve	28-3806
	Spring Washer	28-4186
	Washer	W-151FA3
	Washer	W-428
	Screw	W-722
1A.	Terminal Panel	38-9870
2.	F. M. Dipole Aerial	76-1346
2A.	Socket (F. M. Dipole Aerial)	27-6181
3.	F. M. Aerial Transformer	32-3825
3A.	F. M. Oscillator Transformer (Part of 3)	
	Mtg. Clip	28-5002
4.	Tuning Condenser (F. M. Aerial)	31-2600
4A.	Tuning Condenser (F. M. Oscillator) Part of 4	
4B.	Tuning Condenser (Std. & S. W. Aerial) Part of 4	
4C	Tuning Condenser (Std. & S. W. Oscillator) Part of 4	
	Coupling (Cond. to Drum)	31-2291
	Drive Cord (Pointer)	31-2316
	Drive Cord (Tuning Condenser)	31-2315
	Springs	28-8913
	Drum (Drive Cord)	38-9716
	Pointer (Dial)	56-2272
	Rubber Grommet	27-4771
5.	Compensator (F. M. Aerial)	31-6364
5A.	Compensator (F. M. Oscillator) Part of 5	
6.	Aerial Transformer (S. W. 1 Band)	32-3831
6A.	Aerial Transformer (S. W. 2 Band) Part of 6	
	Mtg. Clip	28-5002
7.	Resistor (47,000 ohms)	33-347339
8.	Resistor (15 ohms)	33-015339
9.	Compensator (S. W. 2 Aerial)	31-6448
9A.	Compensator (S. W. 2 Oscillator) Part of 9	
10.	Mica Condenser (5 mmfd)	
11.	Oscillator Transformer (SW-1, SW-2)	32-3834
	Mtg. Clip	28-5002
12.	Compensator (Brdcst Band-580 KC)	31-6451
12A.	Compensator (Brdcst Band-1500 KC) Part of 12	
12B.	Compensator (SW-1 Oscillator) Part of 12	
12C.	Compensator (SW-1 Aerial) Part of 12	
12D.	Compensator (Brdcst Aerial) Part of 12	
13.	Resistor (33 ohms)	33-033336
14.	Oscillator Transformer (Brdcst)	32-3809
15.	Mica Condenser (145 mmfd)	20-014511
16.	P. B. Oscillator Transformer (540 to 1000 KC)	32-3780
16A.	P. B. Oscillator Transformer (600 to 1200 KC)	32-3780
16B.	P. B. Oscillator Transformer (650 to 1300 KC)	32-3780
16C.	P. B. Oscillator Transformer (850 to 1500 KC)	32-3779
16D.	P. B. Oscillator Transformer (900 to 1600 KC)	32-3779
16E.	P. B. Oscillator Transformer (900 to 1600 KC)	32-3779
	Iron Core	56-6100
	Cap	28-6936
	Clip	56-2250
17.	P. B. Aerial Compensator (540 to 1000 KC)	31-6454
17A.	P. B. Aerial Compensator (600 to 1200 K. C.) Part of 17	
17B	P. B. Aerial Compensator (650 to 1300 KC) Part of 17	
17C	P. B. Aerial Compensator (850 to 1500 KC) Part of 17	
17D.	P. B. Aerial Compensator (900 to 1600 KC) Part of 17	
17E.	P. B. Aerial Compensator (900 to 1600 KC) Part of 17	
18.	Brdcst Aerial Transformer Mtg. Clip	32-3830 28-5002
19.	Mica Condenser (155 mmfd)	20-015511
20.	Resistor (2.2 megohm)	33-522339
21.	Mica Condenser (250 mmfd)	60-125157
22.	Resistor (4700 ohms)	33-247339
23.	Condenser (.01 mfd, 400 volts)	30-4572
24.	Condenser (.05 mfd, 400 volts)	30-4518
25.	Mica Condenser (250 mmfd)	60-125157
26.	Resistor (47,000 ohms)	33-347339
27.	Mica Condenser (500 mmfd)	30-1138
28.	Mica Condenser (280 mmfd)	30-1216
29.	Condenser (.03 mfd, 400 volts)	30-4517
30.	Electrolytic Condenser (8 mfd, 350 volts)	30-2473
	Mtg. Strap	56-1452FA5
31.	Resistor (33,000 ohms)	33-333439
32.	Resistor (2,200 ohms)	33-223339
33.	Resistor (470 ohms)	33-147336
34.	Condenser (.05 mfd, 200 volts)	30-4519
35.	Mica Condenser (250 mmfd)	60-125157
36.	Resistor (10,000 ohms)	33-310339
37.	Resistor (15,000 ohms)	33-315339
38.	First I. F. Transformers	32-3820
38A.	Primary Compensator (455 KC), Part of 38	
38B.	Primary Compensator (4.3 MC) Part of 38	
38C	Secondary Compensator (455 KC) Part of 38	
38D	Secondary Compensator (4.3 MC) Part of 38	
38E.	Condenser (4,000 mmfd) Part of 38	
	Mtg. Nut	W-1949
39.	Resistor (100 ohms)	33-110336
40.	Condenser (.05 mfd, 400 volts)	30-4518
41.	Resistor (150,000 ohms)	33-415339
42	Second I. F. Transformer	32-3821
42A.	Primary Compensator (4.3 MC) Part of 42	
42B.	Secondary Compensator (4.3 MC) Part of 42	
42C	Secondary Compensator (455 KC) Part of 42	
	Mtg. Nut	W-1949
43	Condenser (.05 mfd, 200 volts)	30-4519
44.	Resistor (560 ohms)	33-156336
45.	Resistor (1,000 ohms)	33-210339
46	Third I. F. Transformer	32-3821
46A	Primary Compensator (4.3 MC) Part of 46	
46B	Primary Compensator (4.3 MC) Part of 46	
46C	Secondary Compensator (455 KC) Part of 46	
	Mtg. Nut	W-1949
47.	Condenser (.05 mfd, 400 volts)	30-4518
48.	Mica Condenser (100 mmfd)	60-110257
49	Condenser (.05 mfd, 200 volts)	30-4519
50.	Resistor (560 ohms)	33-156336
51	Condenser (.05 mfd, 400 volts)	30-4518
52.	Resistor (68,000 ohms)	33-368339
53.	Fourth I. F. Transformer	32-3822
53A	Primary Compensator (4.3 MC) Part of 53	
53B.	Primary Compensator (455 KC) Part of 53	
53C.	Secondary Compensator (4.3 MC) Part of 53	
	Mtg. Nut	W-1949
53D.	Mica Condenser (500 mmfd) Part of 53	
54	Mica Condenser (150 mmfd)	60-115137
55	Mica Condenser (150 mmfd)	60-115137
56.	Resistor (470,000 ohms)	33-447339
57.	Resistor (470,000 ohms)	33-447339
58.	Mica Condenser (100 mmfd)	60-110157
59.	Resistor (220,000 ohms)	33-422339
60.	Resistor (330,000 ohms)	33-433339
61	Mica Condenser (100 mmfd)	60-110257
62	Condenser (.05 mfd, 400 volts)	30-4518
63	Resistor (1 megohm)	33-510339
64	Resistor (4,700 ohms)	33-247339
65.	Resistor (47,000 ohms)	33-347339
66.	Resistor (47,000 ohms)	33-347339
67.	Condenser (.006 mfd, 400 volts)	30-4591
68.	Condenser (.006 mfd, 400 volts)	30-4591
69.	Condenser (.002 mfd, 600 volts)	30-4622
70.	Condenser (.004 mfd, 600 volts)	30-4623
71.	Condenser (.01 mfd, 400 volts)	30-4572
72.	Resistor (2.2 megohms)	33-522339
73.	Resistor (2.2 megohms)	33-522339
74.	Tone Control Switch	42-1700
	Mtg. Nut	W-2157FA3
75.	Resistor (2.2 megohms)	33-522339
76.	Resistor (470,000 ohms)	33-447339
77.	Resistor (470,000 ohms)	33-447339
78.	Condenser (.003 mfd, 1,000 volts)	30-4469
79.	Output Transformer	32-8184
80.	Speaker	36-1501
	Cone Assembly	36-4216
	Cable	41-3651
	Mtg. Sleeve	56-2044
	Rubber Grommet (Mtg. Spkr)	27-4596
	Washer (Spker Mtg.)	28-3320
	Nut	W-124
81.	Home Recording Socket	27-6179
	Shorting Bar	56-2270
82	Record Changer Power Socket	27-6182
83.	Condenser (.003 mfd, 1,000 volts)	30-4469
84	Dial and Push-Button Lights	34-2064
	Socket Assembly (Dial Lamp)	38-9695
	Socket Assembly (P. B. Lights)	76-1359
85	Resistor (10 ohms)	33-010430
86.	Pilot Light Cabinet Socket Assembly	34-2068 76-1112
87.	Electrolytic Condenser (25 mfd, 300 volts)	30-2532
	Mtg. Clamp	56-1314
88.	Field Coil (Replace Speaker)	36-1561
89	Condenser (.1 mfd, 200 volts)	30-4586
90	Resistor (100,000 ohms)	33-410339
91.	Bias Resistor (8—192 ohms)	33-3420
92	Electrolytic Condenser (18 mfd, 475 volts)	30-2527
93	Record Changer Compartment Light	34-2484
	Socket and Cable Assembly	41-3634
94	Switch and Cable (Compartment Light)	76-1364
	Spring	28-8991
	Screw	W-560
95.	Power Transformer (115 volts, 60 cycles)	32-8227
96	Condenser (.01-01 mfd)	3903-ODG
97.	Phono Input Transformer	32-8196
98	Input Cable (Pickup Cell and Light)	41-3645
99	Bass Tone Control	33-5472
100.	Condenser (.002 mfd, 600 volts)	30-4582
101.	Resistor (10 megohms)	33-610339
102.	Volume Control	33-5286
103.	Condenser (.006 mfd, 400 volts)	30-4591
104.	Condenser (.006 mfd, 400 volts)	30-4591
105.	Condenser (006 mfd, 400 volts)	30-4591
106.	Resistor (470,000 ohms)	33-447339
107.	Mica Condenser (100 mmfd)	60-110257
108.	Resistor (100,000 ohms)	33-410339
109.	Resistor (4.7 megohms)	33-547339
110.	Resistor (220,000 ohms)	33-422339
111.	Condenser (.002 mfd, 600 volts)	30-4622
112.	Resistor (1 megohm)	33-510339
113.	Resistor (1 megohm)	33-510339
114.	Resistor (100,000 ohms)	33-410339
115.	Condenser (.02 mfd, 200 volts)	30-4516
116.	Mica Condenser (350 mmfd)	60-135257
117.	Phono Reproducer Light Control	33-5435
118.	Condenser (.05 mfd, 400 volts)	30-4518
119.	Oscillator Transformer (Reproducer Light)	32-3818
120.	Mica Condenser (250 mmfd)	60-125157
121.	Resistor (47,000 ohms)	33-347339
122.	Condenser (.05 mfd, 400 volts)	30-4518
123.	Resistor (27,000 ohms)	33-327339
124	Photo-Electric Reproducer and Tone Arm Complete (Metal Tone Arm)	35-2519
	(Bakelite Tone Arm)	35-2540
124A.	Photo-Electric Cell (Part of 124	318-2678
124B.	Reproducer Lamp	34-2478
124C.	Pickup Cable Plug (Mounted on Changer)	217-1396
125.	Power Plug (Changer Cable)	35-2547
126.	Reject Switch (Mounted on Changer)	35-2555
127.	Changeover Switch (Mounted on Changer)	35-2547
128.	Reject Solenoid (Mounted on Changer)	318-2875
129.	Electric Reject Trip (Mounted on Changer)	318-2785
	Pulsating Plate	35-2563
	Trip Switch Assembly	
130.	Phono Motor (115 volts, 60 cycles)	35-2553
	Turntable (60 cycles)	35-2554
	Turntable (50 cycles)	35-3059
	Pulley (60 cycles)	218-1448
	Pulley (50 cycles)	56-6173
	Screw	218-1450
131.	Neon Speed Lamp (Changer)	34-2483
132.	Push-Button Switch (P. B. Coils and Padders)	42-1706
	Mtg. Sleeve	28-3806
	Snap Fasteners	28-4342
	Mtg. Washer	W-151
132A.	Power Switch (ON-OFF) Push-Button)	42-1726
	Cover	76-1343
132B.	Power Switch (Phono Push-Button)	42-1727
	Cover	76-1343
133.	Push-Button Switch (Under Chassis—Top Section)	42-1707
133A.	Push-Button Switch (Under Chassis—Bottom Section) Part of 133	

MISCELLANEOUS PARTS

Automatic Record Changer	35-1289
Bezel (Cabinet—42-1015W)	40-6686
Screw	W-2073FA9
Bezel (Cabinet—42-1015M)	40-6696
Cable (Power)	L-3245
Cabinet (Model 42-1015W)	10556A
Cabinet (Model 42-1015M)	10556B
Control Drum (Bass & Treble)	54-4149
Control Drum (Volume)	54-4150
Control Drum (Tuning)	54-4119
Washer (Between Control Drums)	28-3976
Keyed Washer	56-1029FA3
Spring Washer (Vol. Drum)	56-1385
Spring Washer (Tuning Drum)	56-1659
Clutch Plate	56-2273
Dial Scale	27-5760
Felt Gasket	27-9224
Mtg. Clamp	56-1034FA3
Jewel (Pilot Light Cabinet)	27-4777
Knob (Push-Buttons—Model 42-1015W)	54-4144
Spring Assembly	76-1375
Knobs (Push-Buttons—Model 42-1045M)	54-4155
Rubber Grommet (Tuning Unit Mtg.)	3914
Rubber Grommet (Tuning Unit Mtg.)	3915
Rubber Grommet (Chassis Mtg.)	27-4571
Rubber Corner (Chassis)	54-4015
Screw (Chassis Mtg.)	W-1345FA3
Socket (6L6G, & 5X4 Tubes)	27-6174
Socket (LOKTAL Tubes)	27-6177
Sleeve (Tuning Unit Mtg.)	28-2257
59X Test Socket	27-6180
Tab Cover	27-5769
Tab (OFF)	27-5770
Tab (Phono)	27-5771
Tab (Broadcast)	27-5773
Tab (SW-1)	27-5774
Tab (SW-2)	27-5775
Tab (F. M.)	27-5776
Tab (Television)	27-5780
Tab Kit (Stations)	40-6674
Washer (Chassis Mtg.)	28-5114

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MODEL 42-1015

PHILCO RADIO & TELEVISION CORP.

ALIGNING R. F. AND I. F. COMPENSATORS

EQUIPMENT REQUIRED

1. SIGNAL GENERATOR: Covering the frequency of the receiver, such as the Philco Model 070.
2. ALIGNING INDICATOR: Audio Output Meter. Philco Models 027 and 028. Circuit testers contain a sensitive output meter and are recommended.
3. TOOLS: Philco Fiber Screw Driver, Part No. 45-2610.

CONNECTING ALIGNING INSTRUMENTS

AUDIO OUTPUT METER: Terminal No. 1 is provided on the loop aerial panel for connecting one lead of the audio output meter to the voice coil of the speaker. The other lead of the meter is connected to the chassis. When using these connections, the lowest A. C. scale of the meter must be used. (0 to 10 volts.)

The audio output meter can also be connected between the plate of the output tube and the chassis.

SIGNAL GENERATOR: When adjusting the "I. F." padders, the high side of the signal generator is connected through a .1 mfd. condenser to the points indicated in signal generator column "output connections" to receiver in the tabulations below.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet and dipole aerial lead. Do not remove the receiving loops from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

After connecting the aligning instruments adjust the compensators in the order shown in the tabulation below. Location of the compensators are shown in Fig. 5. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

STANDARD AND S. W. BANDS ALIGNING PROCEDURE

Operations in Order	SIGNAL GENERATOR		RECEIVER			Special Instructions
	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	Aerial Section of Standard Tuning Cond & Grd	455 KC	580 KC	Vol. max. push-button Bdcst. "IN"	53B, 46C, 42C, 38C, 38A	
2	Use loop on generator	1500 KC	1500 KC	Vol. max. push-button Bdcst. "IN"	12A, 12D	Note A
3	Use loop on generator	580 KC	580 KC	Vol. max. push-button Bdcst. "IN"	12	Roll Tuning Condensers Note B
4	Use loop on generator	Readjust as given in Operation 2				
5	Use loop on generator	12 MC	12 MC	Push-button SW-1	12B, 12C	Note C
6	Use loop on generator	18 MC	18 MC	Push-button SW-2	9A, 9	Roll Condensers Note C

FREQUENCY MODULATION ALIGNING PROCEDURE

Note: The Frequency Modulation Circuits Must Be Adjusted With the Dipole Aerial Connected

F. M. BAND ALIGNING PROCEDURE

Operations in Order	SIGNAL GENERATOR		RECEIVER			Special Instructions
	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	3rd I. F., F. M. input connection	4.3 MC	1400 KC	Vol. max. F. M. push-button "IN"	53C (Note D) 53A (Note E)	
2	2nd I. F., F. M. input connection	4.3 MC	1400 KC	F. M. push-button "IN"	46B, 46A (Note F)	
6	1st I. F., F. M. input connection	4.3 MC	1400 KC	F. M. push-button "IN"	42B, 42A, (Note F)	
3	Ant. Section of F. M. Tuning Cond. and Grd.	4.3 MC	1400 KC	F. M. push-button "IN"	38D, 38B (Note F)	
4	Use test loop on generator; place near dipole aerial	48.5 MC	85 (Note G)	F. M. push-button "IN"	5A (Note G) 5 (Note H)	Roll tuning condenser when adjusting 5. See Note B.
5	Use test loop on generator; place near dipole aerial	48.5 MC	85	F. M. push-button "IN"	5A	

NOTE A.—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial pointer must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale.

NOTE B.—When adjusting the low frequency compensator of the broadcast or the aerial padders of the high frequency tuning range; the receiver tuning condenser must be adjusted (rolled) as follows: First, tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C.—Adjust compensators (12B and 9A) to the second signal peak from the closed position (maximum capacity). The aerial compensators (12C and 9) must also be adjusted to maximum on the first signal peak by rolling the tuning condenser. (See Note B.)

NOTE D.—With the signal generator set to 4.3 MC. padder (53C) is adjusted to the point where minimum signal indication is observed on the output meter.

NOTE E.—Turn the signal generator first ta approximately 125 KC below 4.3 MC (4.17 MC) and then 125 KC above 4.3 MC (4.42 MC). A signal peak should be observed on the output meter at approximately each of these points 4.17 and 4.42). The two peak signals should be of equal reading on the output meter and equally spaced in frequency each side of 4.3 MC. If the peaks are unequal in amplitude, padder (53A) must be adjusted in the direction necessary to make both peaks equal. This is done by slightly turning padder and then turning signal generator above and below 4.3 to observe peaks. After equal peaks readings are obtained, set the signal generator to 4.3 MC. The output meter should show zero reading at 4.3 MC. If a signal indication is observed readjust padder (53C) until zero reading is obtained on the meter. After this adjustment is made padder No. 53A should be reset for equal peaks as given above.

NOTE F.—Adjust padders 46B, 46A, 42B, 42A, 38D, 38B for equal signal peaks and equal frequency spacing each side of 4.3 MC.

NOTE G.—The dial scale numbers are listed in tenths of megacycles less the first digit; i. e.: 49 MC is 90, 48.5 is 85. Set the tuning dial pointer to 85 on the FM scale. Adjust padder (5A) to the point where minimum signal indication is observed on the output meter.

NOTE H.—In order to adjust padder (5) the signal generator should be set to either the signal peak approximately 125 KC below 48.5 MC (48.375 MC), or 125 KC above 48.5 MC (48.625 MC). Adjust padder (5) to maximum output reading on either of these peak signals. As padder 5 is being adjusted roll the tuning condenser as given in Note B.

EXTERNAL AERIAL CONNECTIONS

The built-in aerial system is designed to operate without an outside aerial or ground and to give exceptionally high receiving performance of stations in the standard, shortwave, or FM bands.

To operate the radio in steel reinforced buildings and other shielded locations where signal strength is weak, an external aerial is recommended. Three different types of aerial combinations are available, to improve reception on the standard, shortwave, or FM bands.

1—For Additional Sensitivity on Frequency Modulation only:

*Philco Dipole Outdoor Aerial, Part No. 45-2926.

The plug at the end of the transmission line is inserted in the socket at the back of the chassis in place of the plug connected to the F. M. loop in the cabinet.

2—For Additional Sensitivity on ALL ranges:

*Philco Dipole Outdoor Aerial, Part No. 45-2926.

Philco Aerial Coupler, Part No. 76-1361.

The coupler plugs into the socket at the back of the chassis in place of the plug connected to the FM loop. The aerial transmission line then connects to the terminals on the coupler marked "red" and "black." The local-distance switch on the coupler connects or disconnects the outdoor aerial from the standard broadcast and shortwave tuning ranges. The dipole remains connected to the FM band regardless of the position of the switch.

3—For Additional Sensitivity on Standard Broadcast and Shortwave only in Areas where FM reception is not available.

Philco Safety Aerial, Part No. 40-6370.

Philco Aerial Coupler, Part No. 76-1361.

Connect the single wire lead-in of the aerial to the "black" terminal on the aerial coupler.

*Accessories for this aerial are the Philco Aerial Mast Kit, the Philco Reflector Kit and Philco High Efficiency Transmission Line. See Service Bulletin No. 396 on Dipole Aerials.

NOTE: When installing the FM Philco Outdoor Dipole Aerial, it is very important that the aerial compensating condensers of the standard and shortwave band are repadded.

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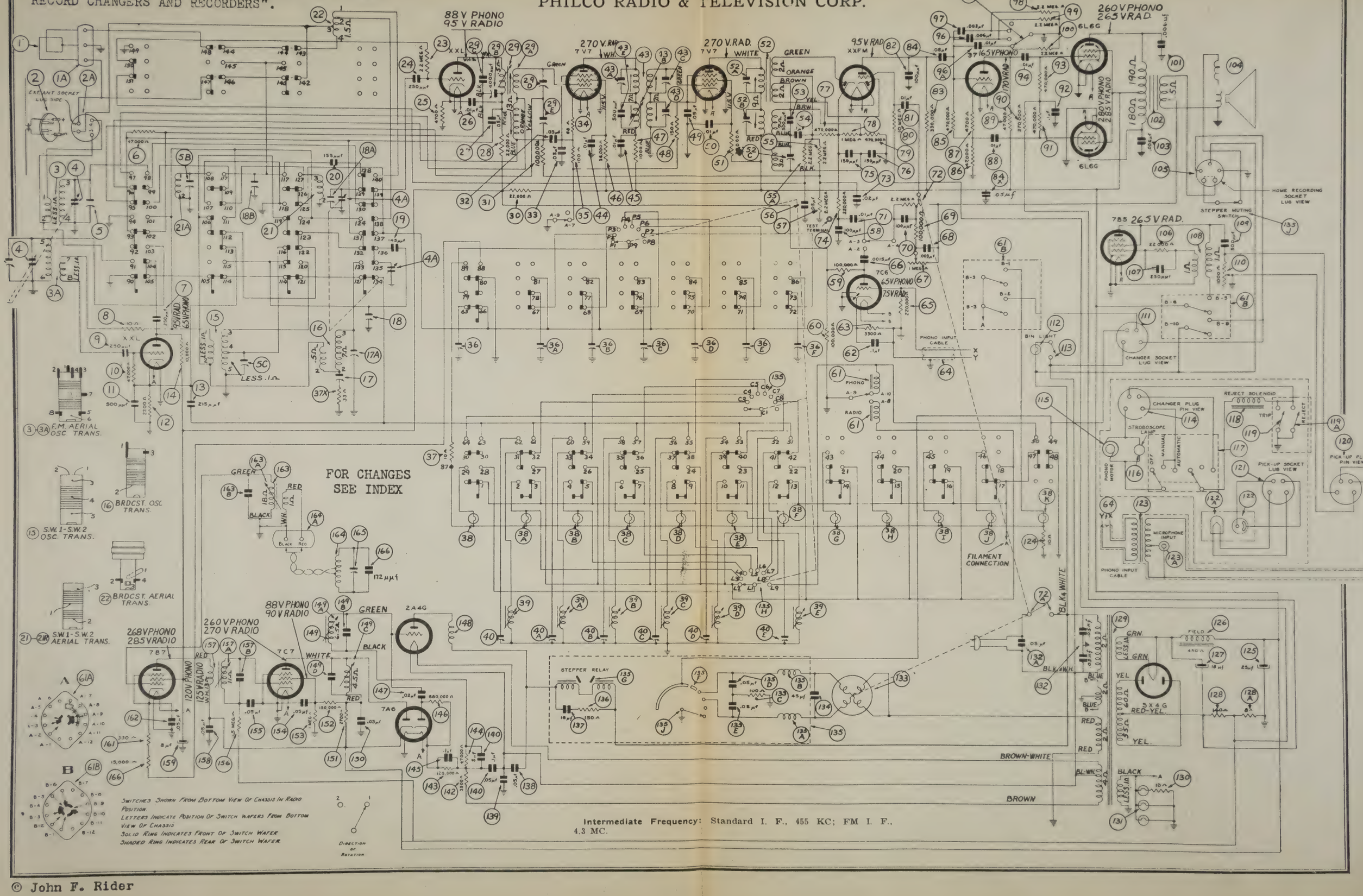
FOR RECORD CHANGER DATA, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".

PHILCO RADIO & TELEVISION CORP.

MODEL 42-1016



Intermediate Frequency: Standard I. F., 455 KC; FM I. F., 4.3 MC.

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MODEL 42-1016

PHILCO RADIO & TELEVISION CORP.

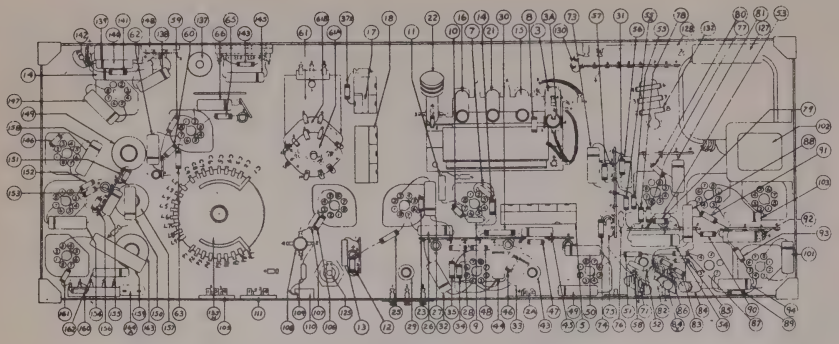

FIG. 2—PART LOCATIONS—UNDER CHASSIS, MODEL 42-1016

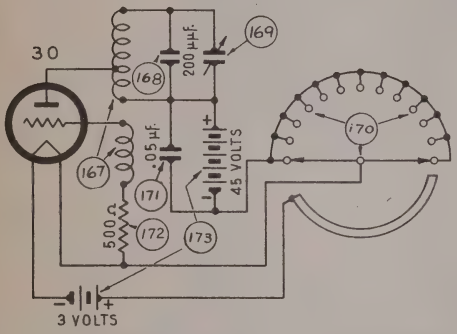

FIG. 3—SCHEMATIC DIAGRAM OF WIRELESS REMOTE CONTROL UNIT

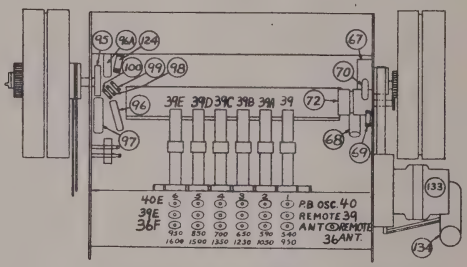

FIG. 4—LOCATIONS OF PARTS, TUNING UNIT

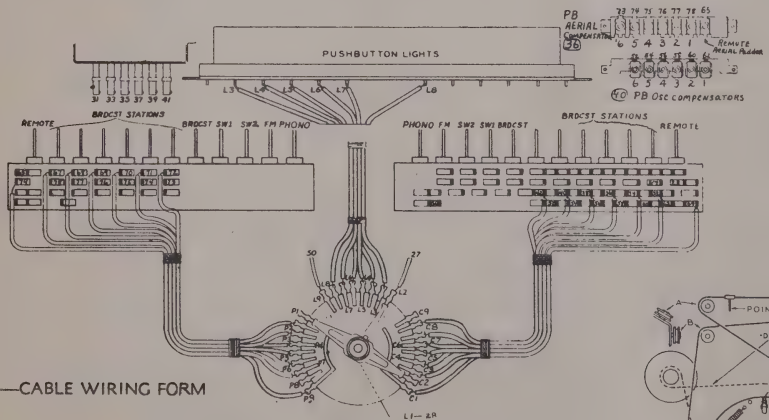

FIG. 7—CABLE WIRING FORM

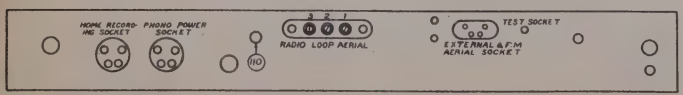

FIG. 10—TERMINAL AND SOCKET LOCATIONS, REAR OF CHASSIS

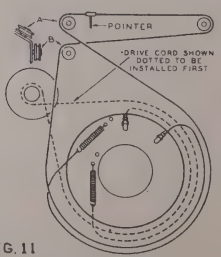

FIG. 11
(POINTER AT LOW FREQUENCY END OF DIAL)
TUNING CONDENSER MAXIMUM CAPACITY
(FULLY CLOSED)
INSTALLATION OF DRIVE CORDS

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LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

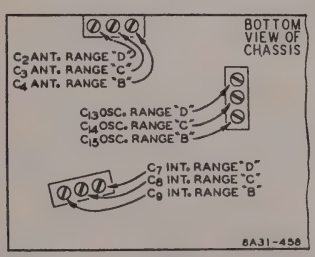
The following equipment is required for aligning:

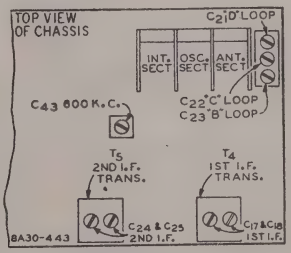
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

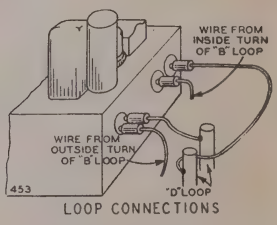
Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range See Note A	Turn Rotor to Full Open	1st I.F. (C17) & (C18) 2nd I.F. (C24) & (C25)
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C15)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note B	Ant. Range B (C4) Int. Range B (C9)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C43) Rock Rotor—See Note C
RANGE C					
7000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C14)
6000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C3) Int. Range C (C8)
RANGE D					
22,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
21,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C2) Int. Range D (C7) Rock Rotor—See Note C
LOOP RANGE B					
1500 KC See Note D	None—See Note D		B Range	Turn Rotor to Max. Output	Loop Trimmer (C23) See Note E
LOOP RANGE C					
6000 KC See Note D	None—See Note D		C Range	Turn Rotor to Max. Output	Loop Trimmer (C22) See Note E
LOOP RANGE D					
21,000 KC See Note D	None—See Note D		D Range	Turn Rotor to Max. Output	Loop Trimmer (C21) Rock Rotor—See Note C







LOOP CONNECTIONS

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—For all adjustments, with the exception of the 3 loop range adjustments, the pin tip should be in the external antenna hole of the Antenna Selection Socket—See illustration on page one.

NOTE B—If the pointer is not at 1500 KC on the dial, remove pointer from drive cord. Tune in a 1500 KC signal. Set pointer at the 1500 KC mark on the dial scale. Attach pointer to drive cord.

NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE D—Re-install set in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place signal generator so that this loop is between 3 and 10 feet from loop in cabinet. Insert pin tip in loop antenna hole of Antenna Selection Socket—See illustration on page one.

Note E (CONSOLE MODELS)—Turn knob of loop until output is maximum.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

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PHILCO RADIO & TELEVISION CORP.

MODEL 42-1016

ALIGNING R. F. AND I. F. COMPENSATORS

EQUIPMENT REQUIRED

1. SIGNAL GENERATOR: Covering the frequency of the receiver, such as the Philco Model 070.
2. ALIGNING INDICATOR: Audio Output Meter. Philco Models 027 and 025. Circuit testers contain a sensitive output meter and are recommended.
3. TOOLS: Philco Fiber Screw Driver. Part No. 45-2610.

CONNECTING ALIGNING INSTRUMENTS

Audio Output Meter: Connect the output meter to the plates of the 6L6G output tubes. The 0 to 30 volt scale of the meter should be used.

Signal Generator: When adjusting the "I. F." padders, the high side of the signal generator is connected through a .1 mfd condenser to the points indicated in signal generator column "output connections" to receiver in the tabulations below.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet and dipole aerial lead. Do not remove the receiving loops from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

After connecting the aligning instruments adjust the compensators in the order shown in the tabulation below. Location of the compensators are shown on the schematic diagram. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

STANDARD AND S. W. BANDS ALIGNING PROCEDURE

SIGNAL GENERATOR			RECEIVER			
Operations In Order	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators In Order	Special Instructions
1	1st I.F. Input Connection	455 KC	580 KC	Vol. max. push-button Brdcst. "IN"	52B	
2	1st I.F. Input Connection	455 KC	580 KC	Brdcst. Push-button "IN"	43D, 43B	
3	Aerial Tuning Condenser Lug.	455 KC	580 KC	Brdcst. Push-button "IN"	29D, 29A	
4	Use loop on generator	1500 KC	1500 KC	Brdcst. Push-button "IN"	17A, 18A	Note A
5	Use loop on generator	580 KC	580 KC	Brdcst. Push-button "IN"	17	Roll Tuning Condensers Note B
6	Use loop on generator		Readjust as given in Operation 4			
7	Use loop on generator	12 M.C.	12 M.C.	SW-1 Push-button "IN"	18, 18B Note C	Roll Tuning Condenser
8	Use loop on generator	18 M.C.	18 M.C.	SW-2 Push-button "IN"	5C, 5B Note C	Roll Tuning Condenser

FREQUENCY MODULATION ALIGNING PROCEDURE

NOTE: The Frequency Modulation Circuits Must Be Adjusted With the Dipole Aerial Connected.

SIGNAL GENERATOR			RECEIVER			
Operations In Order	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators In Order	Special Instructions
1	2nd I. F., F. M. input connection	4.3 MC	580 KC	Vol. max. F. M. push-button "IN"	52C (Note D) 52A (Note E)	
2	1st I. F., F. M. input connection	4.3 MC	580 KC	F. M. push-button "IN"	43C, 43A (Note F)	
3	F. M. aerial tuning condenser lug	4.3 MC	580 KC	F. M. push-button "IN"	29E, 29B (Note F)	
4	Use test loop on generator; place near dipole aerial	48.5 MC	85 (Note G)	F. M. push-button "IN"	5A (Note G) 5 (Note H)	Roll tuning condenser when adjusting 5. See Note B
5	"	48.5 MC	85	F. M. push-button "IN"	5A oscillator	

NOTE A.—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial pointer must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. See Fig. 11 for cord arrangement.

NOTE B.—When adjusting the low frequency compensator of the broadcast or the aerial padders of the high frequency tuning range; the receiver tuning condenser must be adjusted (rolled) as follows: First, tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C.—Adjust compensators (18 and 5C) to the second signal peak from the closed position (maximum capacity). The aerial compensators (18B and 5B) must also be adjusted to maximum on the first signal peak by rolling the tuning condenser. (See Note B.)

NOTE D.—With the signal generator set to 4.3 MC, padder (52C) is adjusted to the point where minimum signal indication is observed on the output meter.

NOTE E.—Turn the signal generator first to approximately 125 KC below 4.3 MC (4.17 MC) and then 125 KC above 4.3 MC (4.42 MC). A signal peak should be observed on the output meter at approximately each of these points (4.17 and 4.42). The two peak signals should be of equal reading on the output meter and equally spaced in frequency each side of 4.3 MC. If the peaks are unequal in amplitude, padder (52A) must be adjusted in the direction necessary to make both peaks equal. This is done by slightly turning padder and then turning signal generator above and below 4.3 to observe peaks. After equal peaks readings are obtained set the signal generator to 4.3 MC. The output meter should show zero reading at 4.3 MC. If a signal indication is observed, readjust padder (52C) until zero reading is obtained on the meter. After this adjustment is made padder No. 52A should be reset for equal peaks as given above.

NOTE F.—Adjust padders 43C, 43A, 29E, and 29B for equal signal peaks and equal frequency spacing each side of 4.3 MC.

NOTE G.—The dial scale numbers are listed in tenths of megacycles less the first digit: i. e., 49 MC is 90, 48.5 is 85. Set the tuning dial pointer to 85 on the F. M. scale. Adjust padder (5A) to the point where minimum signal indication is observed on the output meter.

NOTE H.—In order to adjust padder (5) the signal generator should be set to either the signal peak approximately 125 KC below 48.5 MC (48.375 MC), or 125 KC above 48.5 MC (48.625 MC). Adjust padder (5) to maximum output reading on either of these peak signals. As padder 5 is being adjusted roll the tuning condenser as given in Note B.

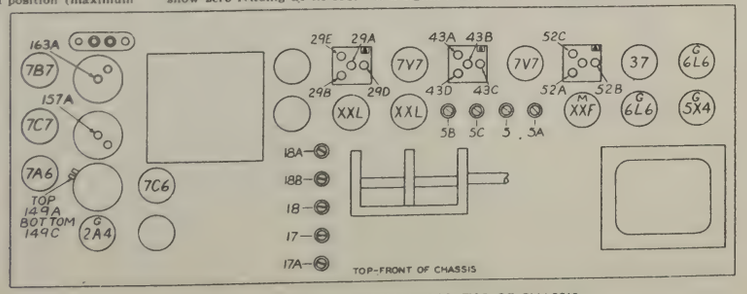

FIG. 9—LOCATIONS OF COMPENSATORS, TOP OF CHASSIS

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MODEL 42-1016

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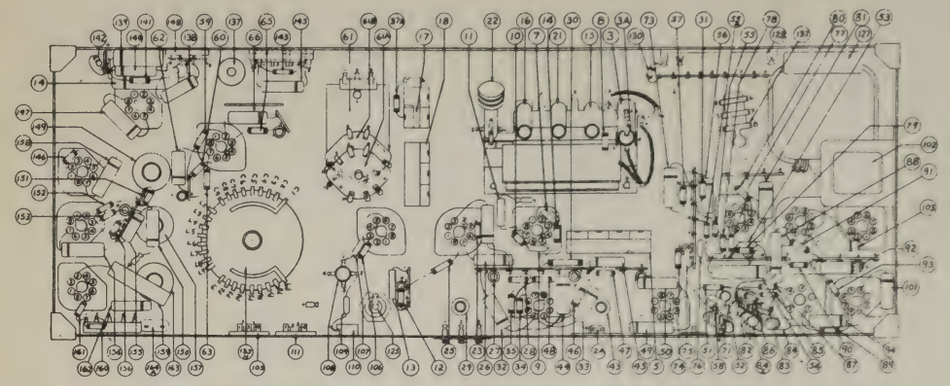

FIG. 2—PART LOCATIONS—UNDER CHASSIS, MODEL 42-1016

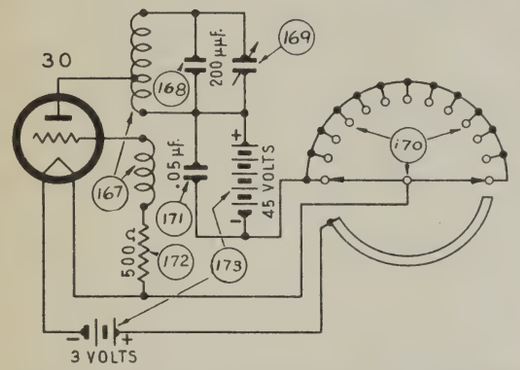

FIG. 3—SCHEMATIC DIAGRAM OF WIRELESS REMOTE CONTROL UNIT

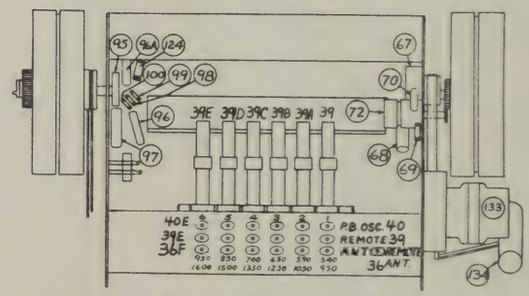

FIG. 4—LOCATIONS OF PARTS, TUNING UNIT

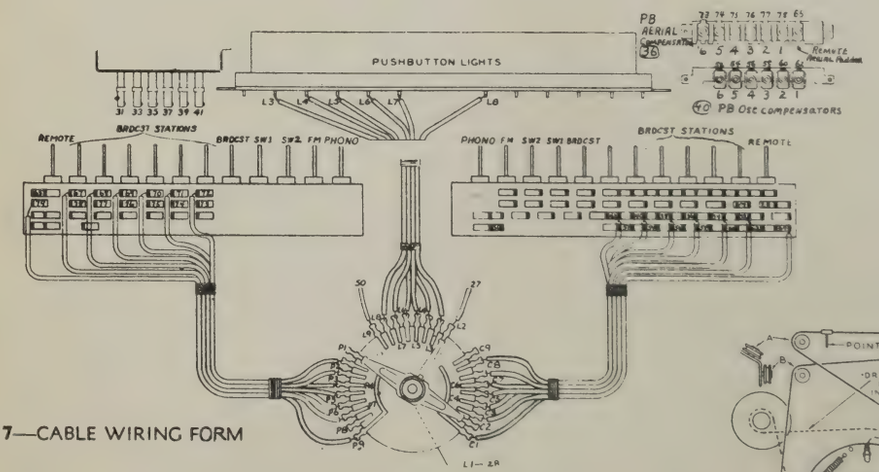

FIG. 7—CABLE WIRING FORM

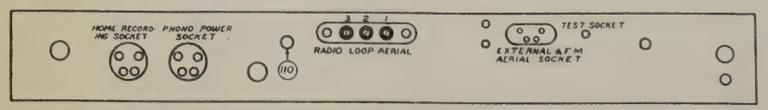

FIG. 10—TERMINAL AND SOCKET LOCATIONS, REAR OF CHASSIS

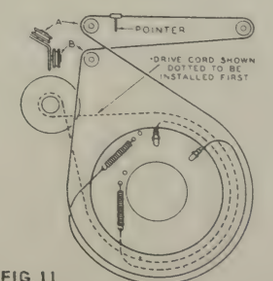

FIG. 11
(POINTER AT LOW FREQUENCY END OF DIAL)
TUNING CONDENSER MAXIMUM CAPACITY (FULLY CLOSED)
INSTALLATION OF DRIVE CORDS

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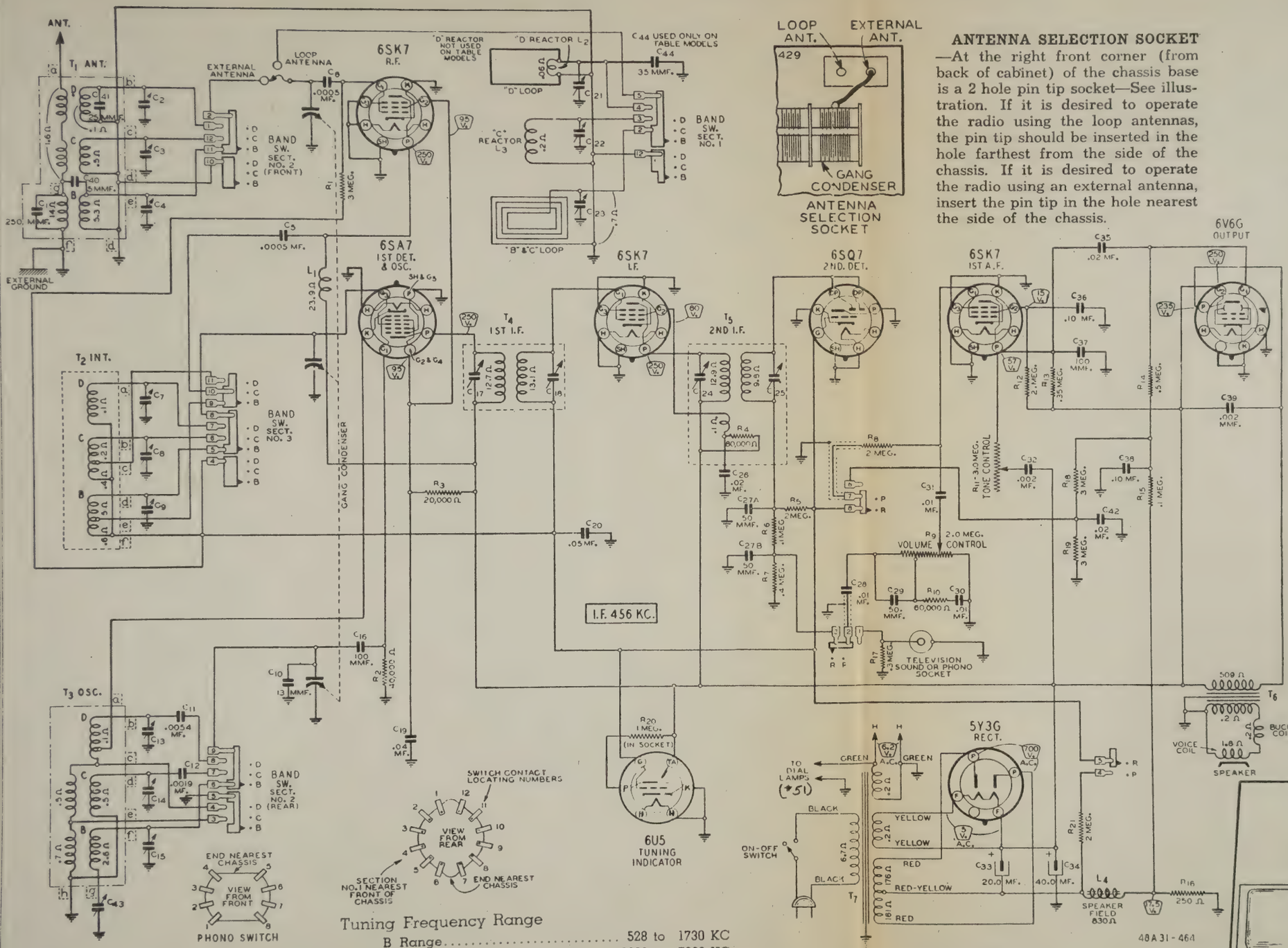


ANTENNA SELECTION SOCKET—At the right front corner (from back of cabinet) of the chassis base is a 2 hole pin tip socket—See illustration. If it is desired to operate the radio using the loop antennas, the pin tip should be inserted in the hole farthest from the side of the chassis. If it is desired to operate the radio using an external antenna, insert the pin tip in the hole nearest the side of the chassis.

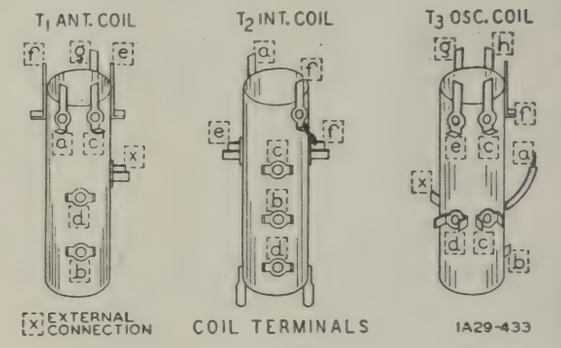
Power Consumption 70 Watts (At 117 volts 60 cycles)

Power Output - - - - - - - 4.0 Watts Undistorted
5.0 Watts Maximum

Selectivity - - 30 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - 8" or 10" Electro-Dynamic



TO REDUCE MODULATION-HUM:
Interchange 1st A-F tube with R-F and I-F tubes; select tube position which reduces hum. If appreciable hum remains, try several new 6SK7 1st A-F tubes and use the one which reduces hum to a minimum.

Tuning Frequency Range

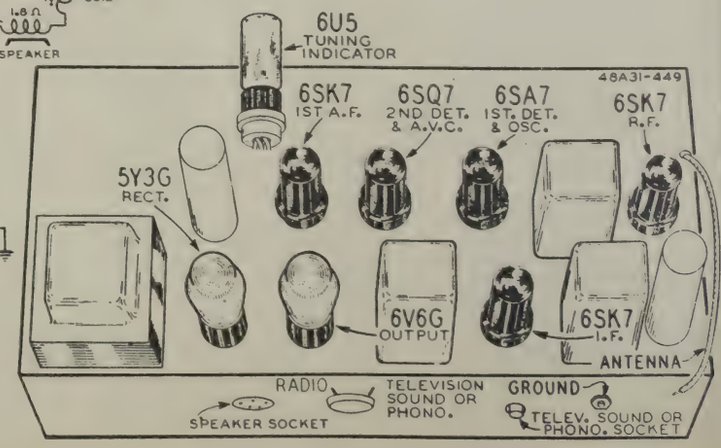
B Range	528 to 1730 KC
C Range	2200 to 7000 KC
D Range	7000 to 22000 KC

Sensitivity —External Antenna—(For 0.5 Watt output)

B Range	1.0 Microvolt Average
C Range	1.0 Microvolt Average
D Range	3.0 Microvolts Average

Dial Lamps

The dial lamps used are of the bayonet pin type (bulb No. 51). To replace any lamp, first turn the radio off. Then pull the clip off and replace the lamp.



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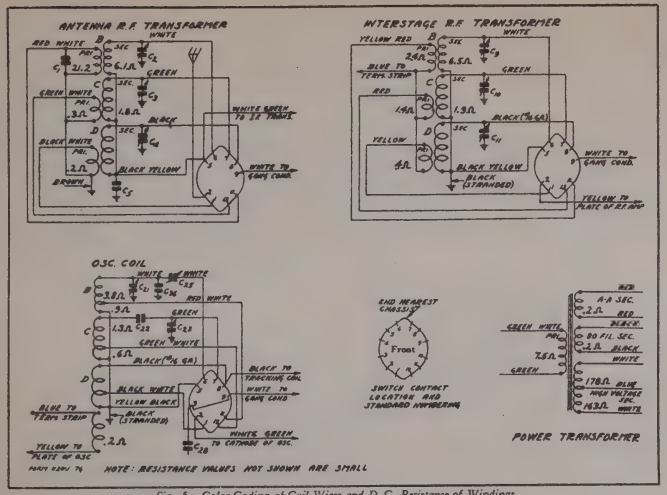

Fig. 5—Color Coding of Coil Wires and D. C. Resistance of Windings
(Also see complete D. C. Resistance List in this Manual)

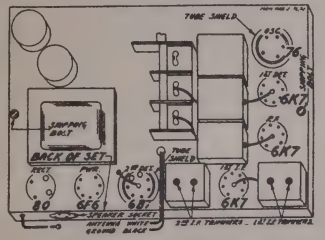

Fig. 6—Location of Tubes

VOLTAGES AT SOCKETS
Line Voltage, 115 - Volume Control at Maximum Antenna Shorted to Ground

Type of Tube	Function	Heater or Filam't	Plate to Ground	Screen to Ground	Cathode to Ground	Plate M. A.
6K7 (6D6)	R. F.	6.1	230	95	3.0	6.4
6K7 (6D6)	1st Det.	6.1	230	100	9.0	3.2
76	Osc.	6.1	100			5.2
6K7 (6J6)	I. F.	6.1	230	120	3.0	9.
6B7	2nd Det.	6.1	55(1)	40		2.3
6F6 (42)	Power	6.1	215	230	17(2)	30.0
80	Rectifier	4.7				34. per plate

(1) As read with 500,000 ohm meter
(2) As read across R16

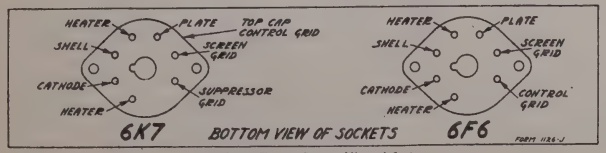

Fig. 7—Metal Tubes—Bottom View of Sockets

Servicing R. F. Coil Assemblies

The R. F. transformers and oscillator coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmers are soldered to the can, and cannot be easily disassembled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 5.

If it is ever necessary to remove one of coil assemblies from the can, proceed as follows: First remove the nuts from the screws at the top of the can. The outside lug on the trimmer condenser is inserted in a slot in the coil can, and this lug is soldered into position.

Apply a soldering iron to the can at the point of the soldered connection. Then with a screw driver lift up on the outside edge of the trimmer (edge soldered to can) until the trimmer is clear of the can. After the trimmers are all unsoldered, the coil can be taken out.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 5. In contact locations not used, the number applying to that particular location is not employed.

Changes in Early Models

In the early models of this receiver, the antenna transformer (T1) had two Range B Primary windings as shown in Fig. 8.

The oscillator Range B and C trimmer locations varied in the early and intermediate models of this receiver as shown in Figs. 3 and 4.

Referring to Fig. 2, in the early models of this receiver, contact No. 4 in the interstage section of the band selector was not used. The purpose of this contact arrangement is to short out variable resistor R2 in the second short wave position. In these models the relative positions of resistors R1 and R2 were reversed. The common connection from the suppressor grid and cathodes of the R. F. and I. F. amplifier tubes was connected to the control arm of variable resistor R2. The latter was connected to resistor R1 which was grounded at the other end. The by-pass condenser C6 remains connected as before, to the cathode and suppressor grid connection.

The type 6K7 and 6F6 metal tubes replace the types 6D6 and 42 glass tubes respectively which were used in the early models.

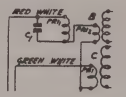

Fig. 8—Antenna Transformer in Early Models

Phonograph Connections

Phonograph connections can be made as shown in Fig. 9. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch—See Fig. 10.

For mounting the 12 mfd. 25 volt dry electrolytic condenser, two No. 27 drill holes should be drilled in the side of the chassis directly below the wet electrolytic condensers. These holes are 1¼" from the bottom, ⅞" and 3¾" from the front of chassis. The ground lug which extends out from the side of the chassis should be bent back into the chassis wall.

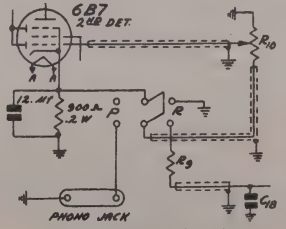

Fig. 9—Phonograph Connections

Replace the single lug insulated terminal strip (located on the rear panel, directly in back of the band selector switch) with (P-4A39) double lug insulated terminal strip with ground lug. Be sure to solder back to this new terminal strip any leads that were connected to the other terminal strip.

The connections are made by opening the diode return circuit at the volume control. Unsolder the 50,000 ohm resistor R9 (covered with saturated sleeving in early models) from the lug at the volume control and from the shielded lead which runs from the I. F. transformer. Cut this shielded lead to length and connect to the open lug on the new terminal strip. Connect one side of the 50,000 ohm resistor R9 to the same lug and the other side to the phono switch—see Fig. 9. Ground the shield to the ground lug of the terminal strip.

The extra shielded lead which is provided should be inserted into a piece of saturated sleeving.

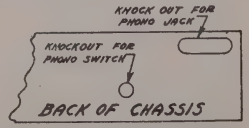

Fig. 10—Location of Phono Knockouts

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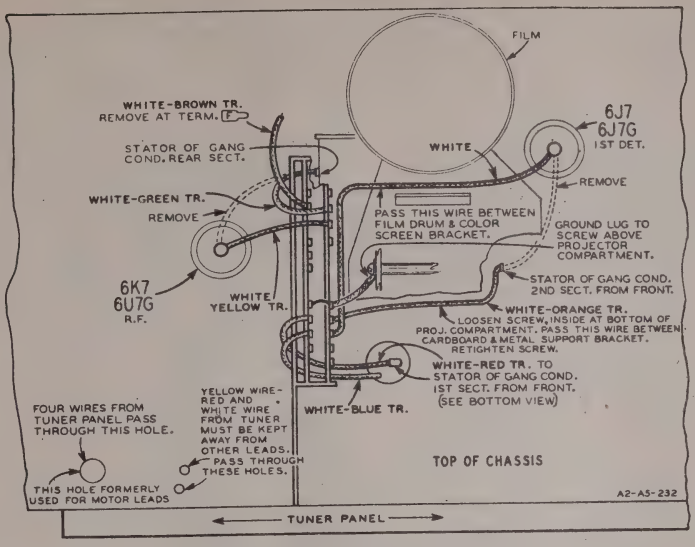
FILM
WHITE-BROWN TR. REMOVE AT TERM. F
STATOR OF GANG COND. REAR SECT.
WHITE
6J7 6J7G 1ST DET.
REMOVE
WHITE-GREEN TR.
REMOVE
PASS THIS WIRE BETWEEN FILM DRUM & COLOR SCREEN BRACKET.
GROUND LUG TO SCREW ABOVE PROJECTOR COMPARTMENT.
6K7 6U7G R.F.
WHITE YELLOW TR.
STATOR OF GANG COND. 2ND SECT. FROM FRONT.
WHITE-ORANGE TR.
LOOSEN SCREW, INSIDE AT BOTTOM OF PROJ. COMPARTMENT. PASS THIS WIRE BETWEEN CARDBOARD & METAL SUPPORT BRACKET. RETIGHTEN SCREW.
WHITE-RED TR. TO STATOR OF GANG COND. 1ST SECT. FROM FRONT. (SEE BOTTOM VIEW)
FOUR WIRES FROM TUNER PANEL PASS THROUGH THIS HOLE.
YELLOW WIRE-RED AND WHITE WIRE FROM TUNER MUST BE KEPT AWAY FROM OTHER LEADS. PASS THROUGH THESE HOLES.
WHITE-BLUE TR.
THIS HOLE FORMERLY USED FOR MOTOR LEADS
TOP OF CHASSIS
A2-A5-232
TUNER PANEL

Fig. 9—9 and 11 Tube Chassis—Top View

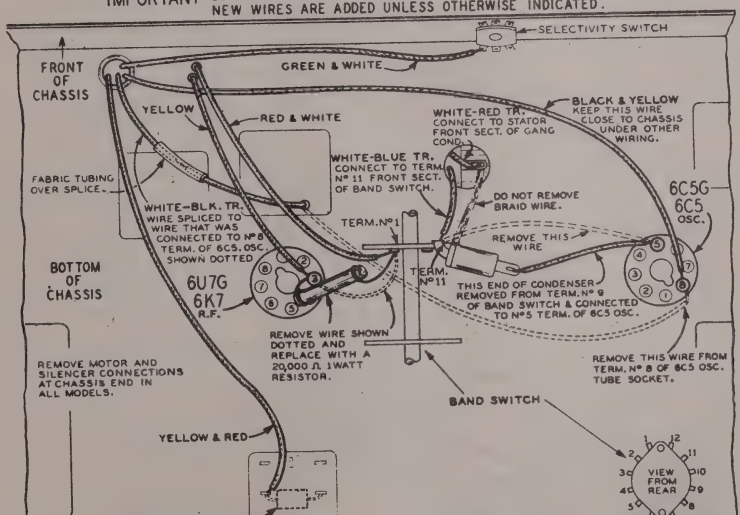
IMPORTANT—DO NOT REMOVE ANY CONNECTIONS AT TERMINALS TO WHICH NEW WIRES ARE ADDED UNLESS OTHERWISE INDICATED.
SELECTIVITY SWITCH
FRONT OF CHASSIS
GREEN & WHITE
YELLOW
RED & WHITE
WHITE-RED TR. CONNECT TO STATOR FRONT SECT. OF GANG COND.
BLACK & YELLOW KEEP THIS WIRE CLOSE TO CHASSIS UNDER OTHER WIRING.
WHITE-BLUE TR. CONNECT TO TERM. N° 11 FRONT SECT. OF BAND SWITCH.
FABRIC TUBING OVER SPLICE
DO NOT REMOVE BRAID WIRE.
6C5G 6C5 OSC.
WHITE-BLK. TR. WIRE SPLICED TO WIRE THAT WAS CONNECTED TO N°8 TERM. OF 6C5 OSC. SHOWN DOTTED
TERM. N°1
REMOVE THIS WIRE
BOTTOM OF CHASSIS
6U7G 6K7 R.F.
TERM. N°11
THIS END OF CONDENSER REMOVED FROM TERM. N° 9 OF BAND SWITCH & CONNECTED TO N°5 TERM. OF 6C5 OSC.
REMOVE WIRE SHOWN DOTTED AND REPLACE WITH A 20,000 Ω, 1 WATT RESISTOR.
REMOVE THIS WIRE FROM TERM. N° 8 OF 6C5 OSC. TUBE SOCKET.
REMOVE MOTOR AND SILENCER CONNECTIONS AT CHASSIS END IN ALL MODELS.
BAND SWITCH
YELLOW & RED
VIEW FROM REAR
REMOVE 250 MMF. CONDENSER C1
A2-A5-234
END NEAREST CHASSIS

Fig. 10—9 and 11 Tube Chassis—Bottom View

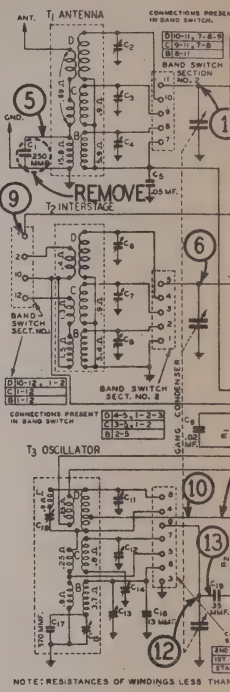

Fig. 11—9 and 11 Tube S

13 TUBE MODEL—USE A
GROUND LEAD.

9 & 11 TUBE MODELS—
—BROWN TR. (4)
CONTACT (F)

7 TUBE MODEL—CLIP O
LOWING WIRES:
WHITE-ORANGE
SWITCH CONTAC
WHITE (7) AT SW
TACT (J)
YELLOW (8) & RE
AT CONDENSER
TR3 20 000 OHM
NOT USED.

Fig. 12—Table o
Panel L

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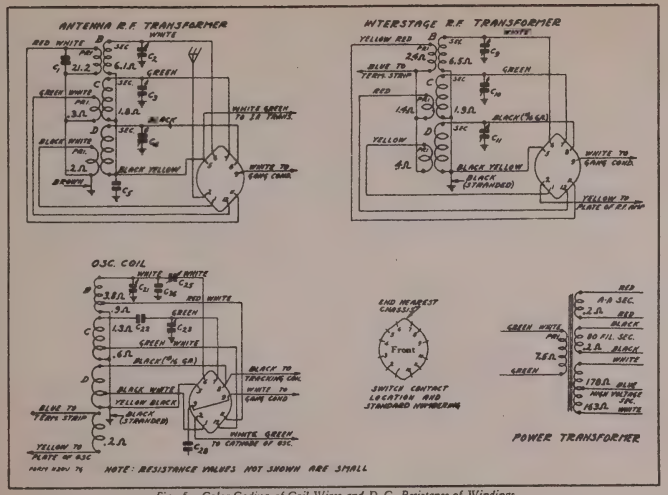


Fig. 5—Color Coding of Coil Wires and D. C. Resistance of Windings
(Also see complete D. C. Resistance List in this Manual)

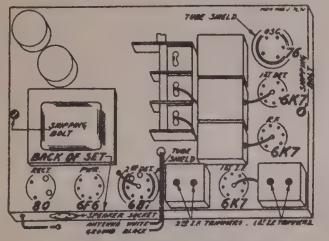


Fig. 6—Location of Tubes

VOLTAGES AT SOCKETS
Line Voltage, 115 - Volume Control at Maximum
Antenna Shorted to Ground

Type of Tube	Function	Heater or Filam't	Plate to Ground	Screen to Ground	Cathode to Ground	Plate M. A.
6K7 (6D6)	R. F.	6.1	230	95	3.0	6.4
6K7 (6D6)	1st Det.	6.1	230	100	9.0	3.2
76	Osc.	6.1	100			5.2
6K7 (6D6)	I. F.	6.1	230	120	3.0	9.
6B7	2nd Det.	6.1	55(1)	40		2.3
6F6 (42)	Power	6.1	215	230	17(2)	30.0
80	Rectifier	4.7				34. per plate

(1) As read with 500,000 ohm meter
(2) As read across R16

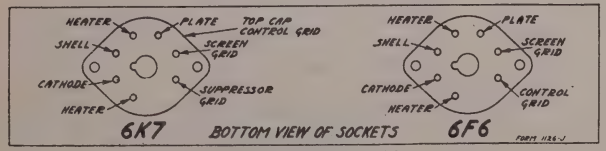


Fig. 7—Metal Tubes—Bottom View of Sockets

Servicing R. F. Coil Assemblies

The R. F. transformers and oscillator coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmers are soldered to the can, and cannot be easily disassembled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 5.

If it is ever necessary to remove one of coil assemblies from the can, proceed as follows: First remove the nuts from the screws at the top of the can. The outside lug on the trimmer condenser is inserted in a slot in the coil can, and this lug is soldered into position.

Apply a soldering iron to the can at the point of the soldered connection. Then with a screw driver lift up on the outside edge of the trimmer (edge soldered to can) until the trimmer is clear of the can. After the trimmers are all unsoldered, the coil can be taken out.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 5. In contact locations not used, the number applying to that particular location is not employed.

Changes in Early Models

In the early models of this receiver, the antenna transformer (T1) had two Range B Primary windings as shown in Fig. 8.

The oscillator Range B and C trimmer locations varied in the early and intermediate models of this receiver as shown in Figs. 3 and 4.

Referring to Fig. 2, in the early models of this receiver, contact No. 4 in the interstage section of the band selector was not used. The purpose of this contact arrangement is to short out variable resistor R2 in the second short wave position. In these models the relative positions of resistors R1 and R2 were reversed. The common connection from the suppressor grid and cathodes of the R. F. and I. F. amplifier tubes was connected to the control arm of variable resistor R2. The latter was connected to resistor R1 which was grounded at the other end. The by-pass condenser C6 remains connected as before, to the cathode and suppressor grid connection.

The type 6K7 and 6F6 metal tubes replace the types 6D6 and 42 glass tubes respectively which were used in the early models.

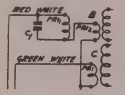


Fig. 8—Antenna Transformer in Early Models

Phonograph Connections

Phonograph connections can be made as shown in Fig. 9. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch—See Fig. 10.

For mounting the 12 mfd. 25 volt dry electrolytic condenser, two No. 27 drill holes should be drilled in the side of the chassis directly below the wet electrolytic condensers. These holes are 1¼" from the bottom, ⅞" and 3¾" from the front of chassis. The ground lug which extends out from the side of the chassis should be bent back into the chassis wall.

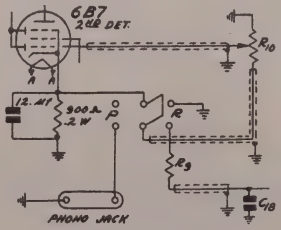


Fig. 9—Phonograph Connections

Replace the single lug insulated terminal strip (located on the rear panel, directly in back of the band selector switch) with (P-4A39) double lug insulated terminal strip with ground lug. Be sure to solder back to this new terminal strip any leads that were connected to the other terminal strip.

The connections are made by opening the diode return circuit at the volume control. Unsolder the 50,000 ohm resistor R9 (covered with saturated sleeving in early models) from the lug at the volume control and from the shielded lead which runs from the I. F. transformer. Cut this shielded lead to length and connect to the open lug on the new terminal strip. Connect one side of the 50,000 ohm resistor R9 to the same lug and the other side to the phono switch—see Fig. 9. Ground the shield to the ground lug of the terminal strip.

The extra shielded lead which is provided should be inserted into a piece of saturated sleeving.

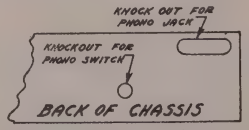


Fig. 10—Location of Phono Knockouts

MODEL BB-1-7

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

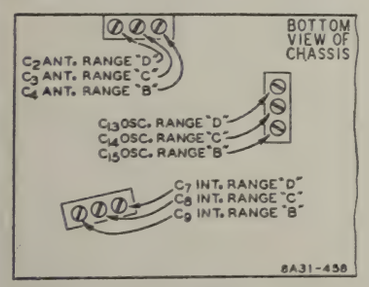
The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range See Note A	Turn Rotor to Full Open	1st I.F. (C17) & (C18) 2nd I.F. (C24) & (C25)
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C15)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note B	Ant. Range B (C4) Int. Range B (C9)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C43) Rock Rotor—See Note C
RANGE C					
7000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C14)
6000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C3) Int. Range C (C8)
RANGE D					
22,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
21,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C2) Int. Range D (C7) Rock Rotor—See Note C
LOOP RANGE B					
1500 KC See Note D	None—See Note D		B Range	Turn Rotor to Max. Output	Loop Trimmer (C23) See Note E
LOOP RANGE C					
6000 KC See Note D	None—See Note D		C Range	Turn Rotor to Max. Output	Loop Trimmer (C22) See Note E
LOOP RANGE D					
21,000 KC See Note D	None—See Note D		D Range	Turn Rotor to Max. Output	Loop Trimmer (C21) Rock Rotor—See Note C

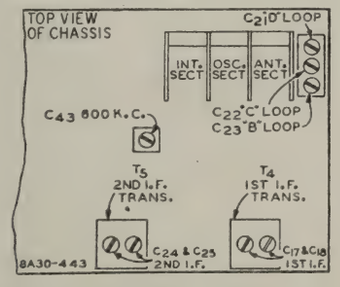


Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

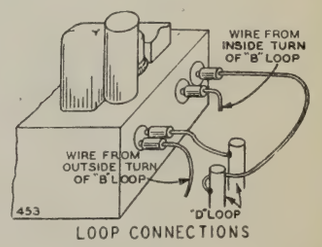
NOTE A—For all adjustments, with the exception of the 3 loop range adjustments, the pin tip should be in the external antenna hole of the Antenna Selection Socket—See illustration on page one.

NOTE B—If the pointer is not at 1500 KC on the dial, remove pointer from drive cord. Tune in a 1500 KC signal. Set pointer at the 1500 KC mark on the dial scale. Attach pointer to drive cord.



NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE D—Re-install set in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place signal generator so that this loop is between 3 and 10 feet from loop in cabinet. Insert pin tip in loop antenna hole of Antenna Selection Socket—See illustration on page one.



LOOP CONNECTIONS

Note E (CONSOLE MODELS)—Turn knob of loop until output is maximum.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

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MODELS BL1, B15

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 1. In contact locations not used, the number applying to that particular location is not employed.

Changes in Early Models

In the early models of this receiver, the antenna transformer (T1) had two Range B Primary windings as shown in Fig. 3.

The oscillator Range B and C trimmer locations varied in the early and intermediate models of this receiver as shown in Figs. 3 and 4.

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The type 6K7 and 6F6 metal tubes replace the types 6D6 and 42 glass tubes respectively which were used in the early models.

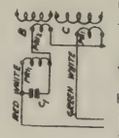

Fig. 8—Antenna Transformer in Early Models

Servicing R. F. Coil Assemblies

The R. F. transformers and oscillator coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmers are soldered to the can, and cannot be easily disassembled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 5.

If it is ever necessary to remove one of coil assemblies from the can, proceed as follows: First remove the nuts from the screws at the top of the can. The outside lug on the trimmer condenser is inserted in a slot in the coil can, and this lug is soldered into position.

Apply a soldering iron to the can at the point of the soldered connection. Then with a screw driver lift up on the outside edge of the trimmer (edge soldered to can) until the trimmer is clear of the can. After the trimmers are all unsoldered, the coil can be taken out.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 9. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch—See Fig. 10.

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The extra shielded lead which is provided should be inserted into a piece of saturated sleeving.

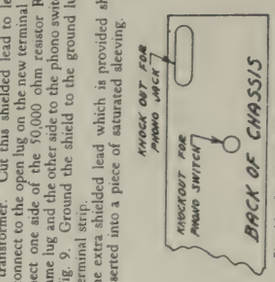

Fig. 10—Location of Phono Knockouts

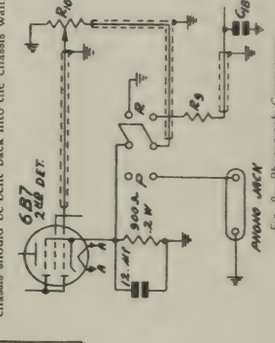

Fig. 9—Phonograph Connections

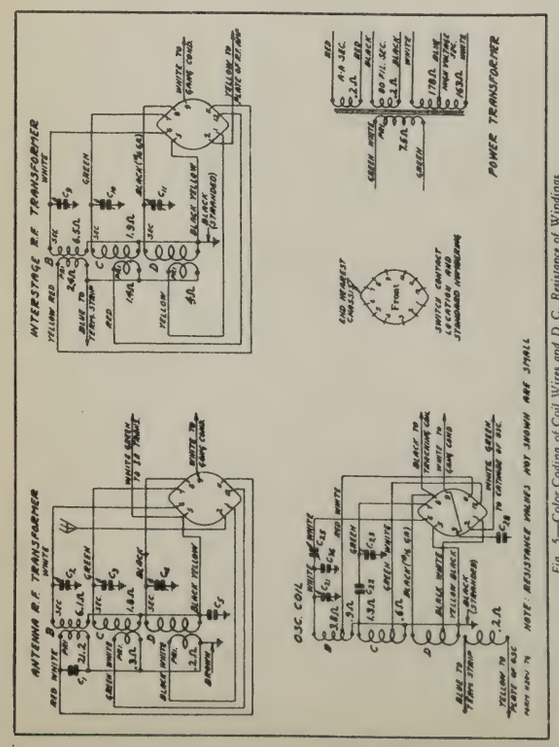

Fig. 5—Color Coding of Coil Wires and D.C. Resistance of Windings (Also see complete D.C. Resistance List in this Manual)

VOLTAGES AT SOCKETS
Line Voltage, 115 - Volume Control at Maximum
Antenna Shorted to Ground

Type Tube	Function	Heater Volts	Plate (1) (2)	Screen (1) (2)	Cathode to Ground	Plate M.A.
6K7 (6D6)	R. F.	6.1	230	95	3.0	6.4
6K7 (6D6)	1st Det.	6.1	230	100	9.0	3.2
76	Osc.	6.1	100			5.2
6K7 (6I6)	I. F.	6.1	230	120	3.0	9.
6B7	2nd Det.	6.1	55(1)	40		2.3
6F6 (42)	Power	6.1	215	230	17(2)	30.0
80	Rectifier	4.7				34. per plate

(1) As read with 100,000 ohm meter
(2) As read across R16

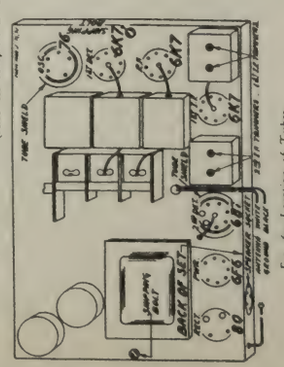

Fig. 6—Location of Tubes

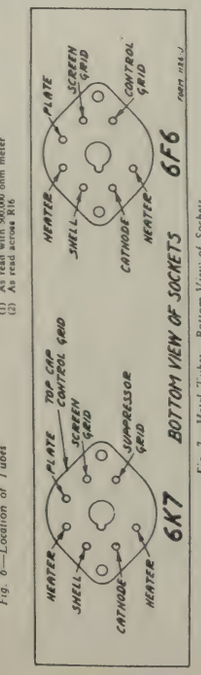

Fig. 7—Metal Tubes—Bottom View of Sockets

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LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

Instructions for Mounting the New 7 Station Automatic Tuning Panel on the 7, 9, 11 and 13 Tube Chassis

(REPLACING MOTOR DRIVE PANEL)

New 7 Station Automatic Tuning Panel

There are 8 push buttons. Buttons Nos. 1 to 3 and 5 to 8 are Automatic Tuning Station Buttons. Button No. 4 is the Manual Tuning Button - See Fig.1. When this button is depressed, the radio is in the manual tuning position.

The small buttons above the push buttons are still used for setting the stations. However, with the new panel, this is done by turning the button clockwise or counter-clockwise until the desired station is tuned in.

The aligning screw, shown in Fig. 1, when turned, moves the iron core of the antenna coil for aligning purposes.

Old Parts Used

Use the following parts of the old assembly:

Escutcheon Plate,
Station Buttons and Hairpin Springs,
Setting Buttons,
Glass Screen and Rubber Bands.

The Following New Parts are Supplied

7 Station Automatic Tuning Panel Assembly.

The parts shown in the list at the end of these instructions.

Removing Old Motor Drive Panel from Chassis

Remove the knobs. Two are set screw knobs and three are the push-on type.

Remove the station buttons by pushing down the lower end of the small hairpin spring at the back of the button and, at the same time, pulling the button off the shaft. Remove the setting buttons by pulling them off.

The screws in the wooden support behind the electric drive panel must be unscrewed and the support removed from the cabinet.

Remove the speaker plug from the socket at the back of the chassis and also the tuning eye tube from its clamp bracket. Loosen the screw holding the bottom shield connection to the back of the chassis. Unscrew and remove the shipping bolts and the "L" bolts from beneath the chassis shelf.

The chassis may then be removed.

Remove the old tuning eye tube bracket from the cabinet.

Turn the electric-manual lever to the electric position.

Unsolder the wire to the silencer switch at the chassis end. Also, unsolder the two motor leads at the A. C. terminal strip under the chassis. Early models used a metal shell condenser which was connected at the same terminal strip. Remove this condenser if one is installed.

Take off the collars from the volume and tone control shafts.

Remove the glass screen by taking out the two screws and removing the two brackets.

Remove the four red mounting screws.

The panel can then be pulled straight out from the chassis.

Mounting New Automatic Tuning Panel on the Chassis

Put a piece of insulating tape on the surface of the support casting at the point shown in Fig. 2. This will prevent possible short circuiting of the switch contatts.

Before mounting the new panel on the chassis, cut off any leads not required as shown in the table - Fig. 7. Bring the tuner panel near the chassis and pass the white-blue tracer and white-red tracer leads through the hole in the chassis under the front section of the gang condenser. Turn the gang condenser until the spring clip on the drive drum is at its lowest position - See Fig. 2 lower left. Line up the drive arm on the large panel drive pulley with the spring clip on the gang condenser drive drum. Since the drive arm will line up with the spring clip under two conditions, refer to Fig. 2 lower left for the correct relation of drive cord winding to drive arm.

Spread the spring clip SLIGHTLY with a small screw driver, bringing this screw driver up from beneath the chassis. Then push the panel toward the chassis, lowering it slightly so that the large drive pulley may be brought up in back of the bracket below the projector compartment. Insert the drive arm in the spring clip.

Mount the panel on the chassis using the four mounting screws at the four points shown in Fig.1.

Secure the two braces to the back of the panel as shown in Fig. 2.

Remove the two screws at the top of the lens housing support bracket. Using the two 8-32 X 3/8" screws supplied, secure the back end of the braces in place. When attaching the brace to the tuner switch side of the lens housing bracket, ground the lug of the braided wire under the screw head as illustrated.

Replace the glass screen using clamps, nuts, and lock washers supplied.

Replace the collars on the volume control and tone control shafts.

Wire the panel in the circuit following Figs. 3,4, 9, 10, 15, and 16.

Replace chassis in cabinet reversing procedure followed when removing the chassis. The wooden shipping support is not used.

The electric-manual lever is not used. A cover plate is supplied which covers the opening left by the removal of this lever. This plate is so made that the back portion should fit snugly. into the opening in the cabinet. If it does not, file the cabinet until it fits snugly in place.

Then put the tuning knob on the shaft.

Knobs and Cover Plate

The 5 control knobs formerly used with the motor drive panel are also used with the new automatic tuning panel.

The cover plate used under the tuning knob is described in the previous article.

Alignment

After the new panel is installed, realign the chassis using as a guide the alignment procedure given in the service manual for each chassis.

If a definite peak cannot be reached when making the 1830 KC adjustment on the B range, cut off the compensating condenser C16 in the 9 and 11 tube models, C14 in the 13 tube model and C13 in the 7 tube model.

If a definite peak cannot be reached when making the 22,000 KC adjustment on the D range, simply back off this trimmer as far as it will go and proceed with the 20,000 KC adjustment.

Next align the automatic tuner. The automatic tuning system is aligned by turning the aligning screw which shifts the position of the iron core of the antenna coil while the coil remains stationary.

Depress station button No. 1 - See Fig. 1. Tune in a signal of the frequency shown below for button No. 1. Turn setting button No. 1 clockwise or counter-clockwise until this signal is accurately tuned in. Then turn the aligning screw of button No. 1 clockwise or counter-clockwise until maximum output is obtained.

Follow the same procedure with regard to the other station tuning buttons using the frequencies shown below.

Button No. 1...Aligning Frequency 700 KC
Button No. 2...Aligning Frequency 700 KC
Button No. 3...Aligning Frequency 850 KC
Button No. 5...Aligning Frequency 850 KC
Button No. 6...Aligning Frequency 850 KC
Button No. 7...Aligning Frequency 1100 KC
Button No. 8...Aligning Frequency 1100 KC

Mounting New Panel on Early Chassis Equipped with First Motor Drive Panels

Chassis equipped with the early type motor drive panel may be identified by the fact that when the chassis is removed from the cabinet and the electric-manual lever is in the electric position, all four red mounting screws can be seen - See Fig. 23. On late models, the two top red screws are behind the glass screen and cannot be seen unless this screen is removed - See Fig. 22.

To mount the new automatic tuning panel on the early chassis, first, using a hack saw, cut off the portion of the bracket assembly below the projector compartment as shown in Fig. 21.

Mount the new panel on the chassis using the two bottom mounting screws. Extend a pencil or pointed instrument through the center of the two upper panel mounting holes and place a mark on the bracket extending down from the projector compartment.

Remove the two lower mounting screws and take off the new panel. Drill and tap two holes for the two upper 8-32 mounting screws in the bracket. The new panel can then be mounted by means of the four mounting screws.

Parts Shipped With 7 Station Automatic Tuning Panel

QUANTITY	ITEM	APPLICATION
1.....	20,000 Ohm Resistor.....	To be used when installing panel on 9, 11, and 13 tube chassis only.
2.....	Braces.....	To secure the panel to top of projector assembly.
4.....	8-32 X 3/8" screws.....	2 used for front end of above brace. 2 used for back end of above brace.
2.....	#8 Shakeproof Lock Washers.....	To secure above brace to panel.
2.....	8-32 Hex Nuts.....	To secure above brace to panel.
2.....	Glass Retainer Clamps.....	To hold the glass screen in place.
2.....	6-32 X 1/4" Round Head Screws...	For above.
2.....	#6 Split Lock Washers.....	For above.
1.....	Circular Cardboard Tab with Words "Manual Tuning" on it.....	To be put into manual switch button (4th button from left).
1.....	Round Celluloid Tab.....	To be pushed into above mentioned button over the cardboard tab.
4.....	6-32 X 1/4" Mounting Screws..... (Heads Red)	To mount panel to chassis.
4.....	#8 Split Lock Washers.....	For above.
1.....	Round Cover Plate.....	To cover opening in front panel of cabinet left by removal of the electric-manual lever.

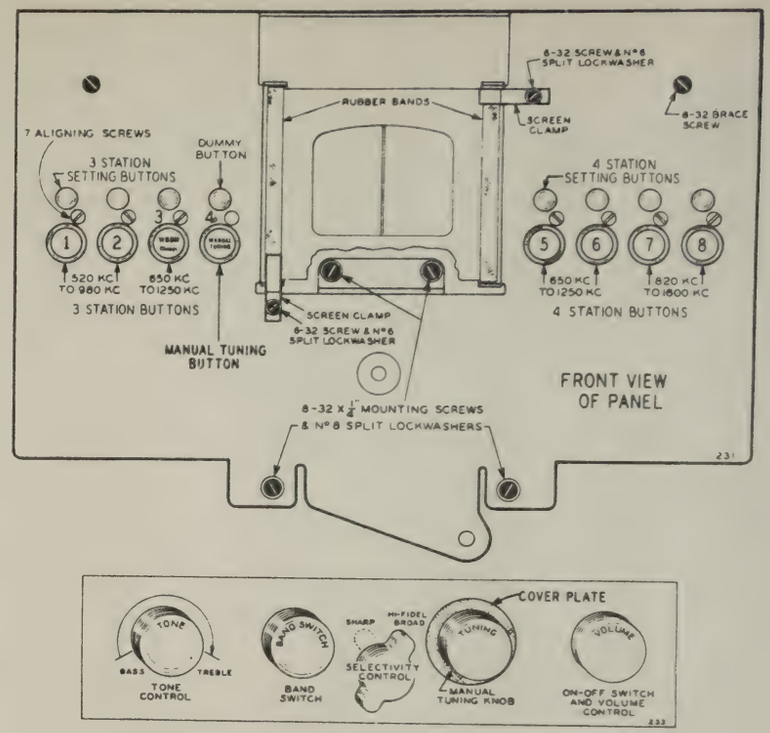

Fig. 1—Automatic Tuning Panel—Front View

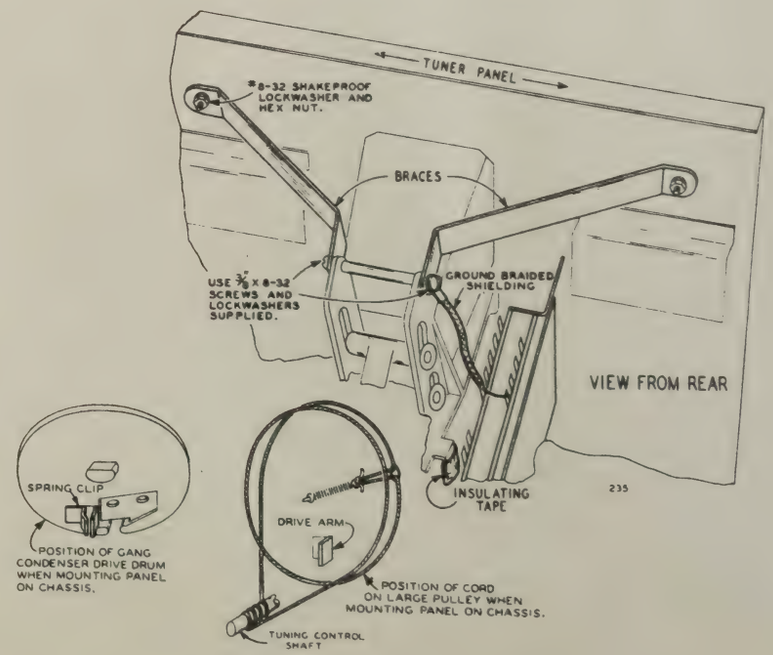
TUNER PANEL
*8-32 SHAKEPROOF LOCKWASHER AND HEX NUT.
BRACES
USE 3/8 X 8-32 SCREWS AND LOCKWASHERS SUPPLIED.
GROUND BRAIDED SHIELDING
VIEW FROM REAR
235
INSULATING TAPE
SPRING CLIP
POSITION OF GANG CONDENSER DRIVE DRUM WHEN MOUNTING PANEL ON CHASSIS.
DRIVE ARM
POSITION OF CORD ON LARGE PULLEY WHEN MOUNTING PANEL ON CHASSIS.
TUNING CONTROL SHAFT

Fig. 2 Automatic Tuning Panel--Back View

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MODEL B33

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

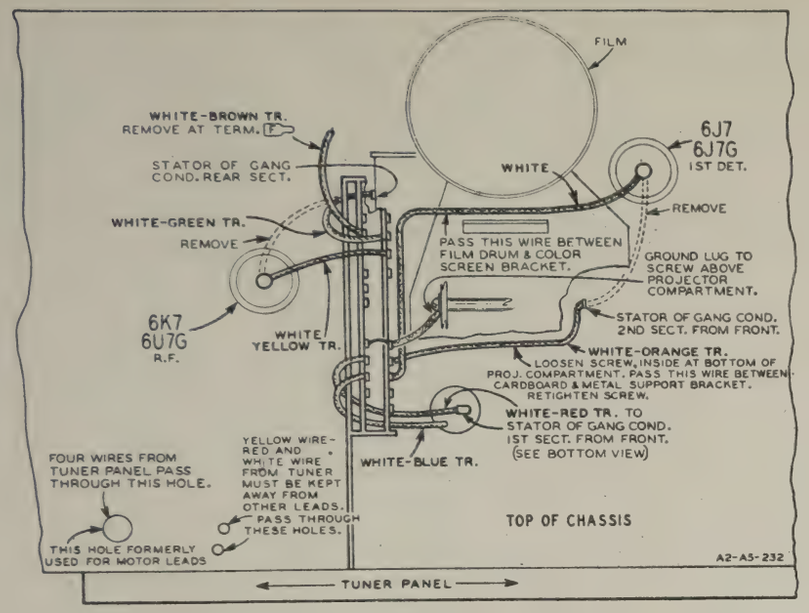
FILM
WHITE-BROWN TR.
REMOVE AT TERM. F
STATOR OF GANG COND. REAR SECT.
WHITE
6J7
6J7G
1ST DET.
REMOVE
WHITE-GREEN TR.
REMOVE
PASS THIS WIRE BETWEEN FILM DRUM & COLOR SCREEN BRACKET.
GROUND LUG TO SCREW ABOVE PROJECTOR COMPARTMENT.
6K7
6U7G
R.F.
WHITE YELLOW TR.
STATOR OF GANG COND. 2ND SECT. FROM FRONT.
WHITE-ORANGE TR.
LOOSEN SCREW, INSIDE AT BOTTOM OF PROJ. COMPARTMENT. PASS THIS WIRE BETWEEN CARDBOARD & METAL SUPPORT BRACKET. RETIGHTEN SCREW.
WHITE-RED TR. TO STATOR OF GANG COND. 1ST SECT. FROM FRONT. (SEE BOTTOM VIEW)
FOUR WIRES FROM TUNER PANEL PASS THROUGH THIS HOLE.
YELLOW WIRE-RED AND WHITE WIRE FROM TUNER MUST BE KEPT AWAY FROM OTHER LEADS. PASS THROUGH THESE HOLES.
WHITE-BLUE TR.
TOP OF CHASSIS
THIS HOLE FORMERLY USED FOR MOTOR LEADS
A2-A5-232
TUNER PANEL

Fig. 9—9 and 11 Tube Chassis—Top View

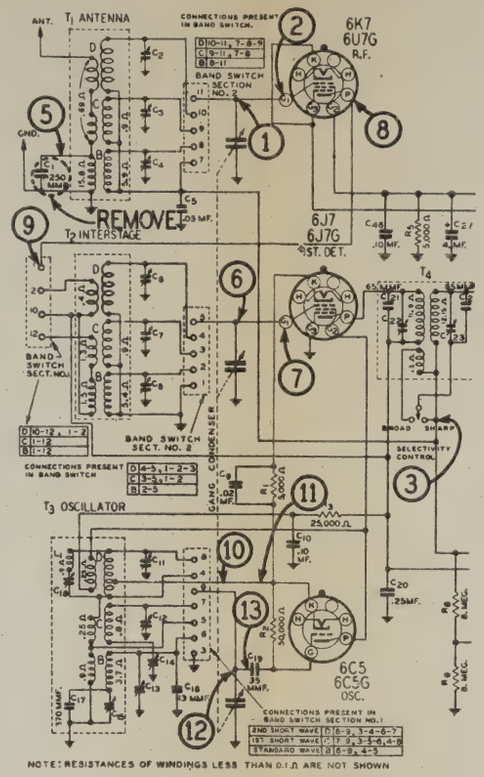

Fig. 11—9 and 11 Tube Schematic Diagram

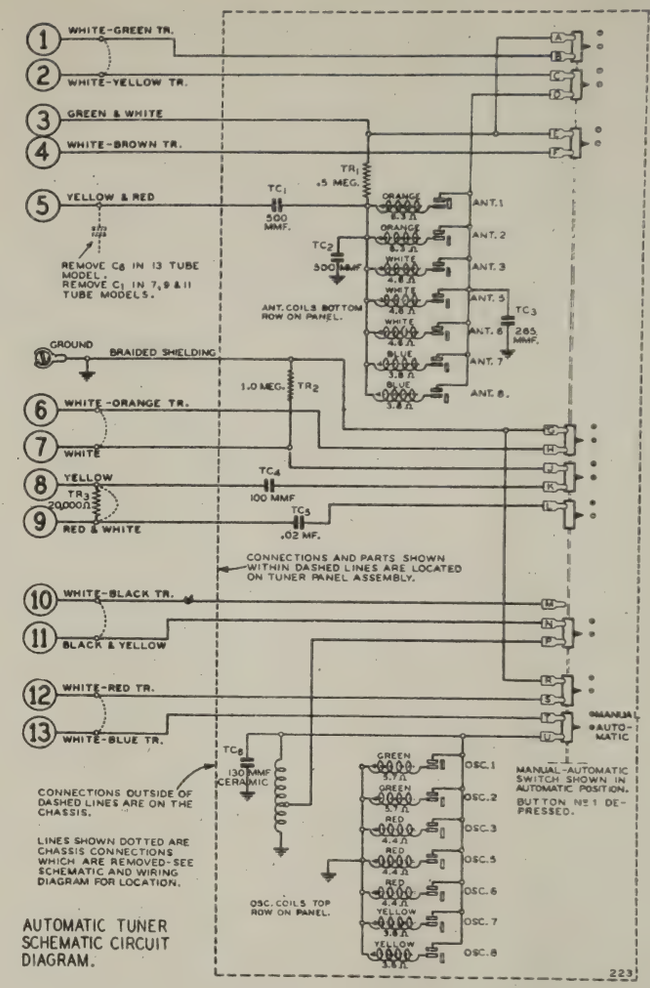

Fig. 13—Tuning Panel Schematic Diagram

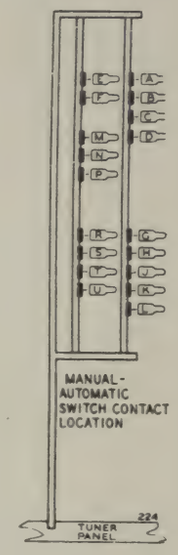

Fig. 14—Tuning Panel Switch Terminals

IMPORTANT—DO NOT REMOVE ANY CONNECTIONS AT TERMINALS TO WHICH NEW WIRES ARE ADDED UNLESS OTHERWISE INDICATED.

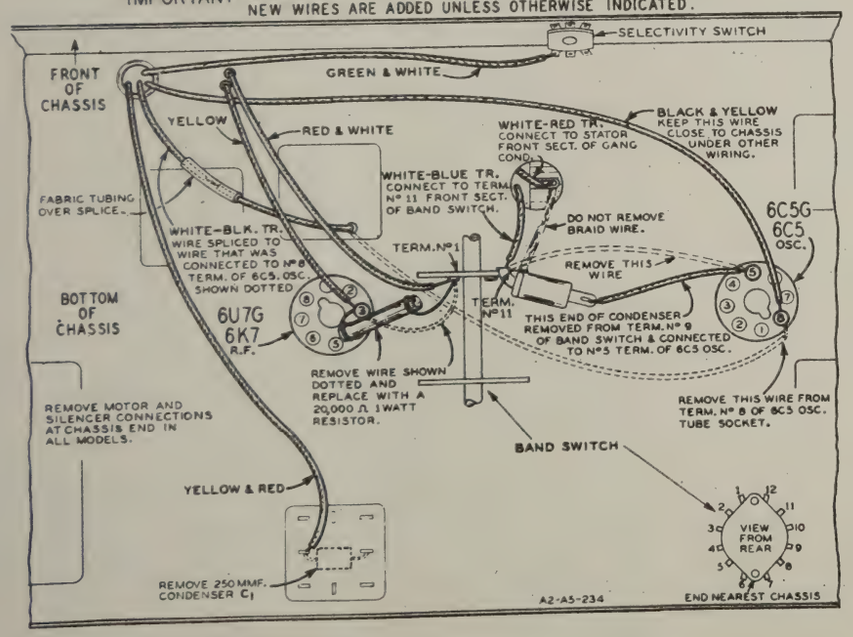
SELECTIVITY SWITCH
FRONT OF CHASSIS
GREEN & WHITE
YELLOW
RED & WHITE
WHITE-RED TR. CONNECT TO STATOR FRONT SECT. OF GANG COND.
BLACK & YELLOW KEEP THIS WIRE CLOSE TO CHASSIS UNDER OTHER WIRING.
WHITE-BLUE TR. CONNECT TO TERM. Nº 11 FRONT SECT. OF BAND SWITCH.
FABRIC TUBING OVER SPLICE.
WHITE-BLK. TR. WIRE SPLICED TO WIRE THAT WAS CONNECTED TO Nº8 TERM. OF 6C5 OSC. SHOWN DOTTED
DO NOT REMOVE BRAID WIRE.
6C5G
6C5
OSC.
TERM. Nº1
REMOVE THIS WIRE
TERM. Nº11
THIS END OF CONDENSER REMOVED FROM TERM. Nº 9 OF BAND SWITCH & CONNECTED TO Nº3 TERM. OF 6C5 OSC.
BOTTOM OF CHASSIS
6U7G
6K7
R.F.
REMOVE WIRE SHOWN DOTTED AND REPLACE WITH A 20,000Ω 1 WATT RESISTOR.
REMOVE THIS WIRE FROM TERM. Nº 8 OF 6C5 OSC. TUBE SOCKET.
REMOVE MOTOR AND SILENCER CONNECTIONS AT CHASSIS END IN ALL MODELS.
BAND SWITCH
YELLOW & RED
VIEW FROM REAR
REMOVE 250 MMF. CONDENSER C1
A2-A5-234
END NEAREST CHASSIS

Fig. 10—9 and 11 Tube Chassis—Bottom View

13 TUBE MODEL—USE ALL 13 WIRES & GROUND LEAD.

9 & 11 TUBE MODELS—CLIP OFF WHITE-BROWN TR. (4) AT SWITCH CONTACT (F)

7 TUBE MODEL—CLIP OFF THE FOLLOWING WIRES:
WHITE-ORANGE TR. (6) AT SWITCH CONTACT (H)
WHITE (7) AT SWITCH CONTACT (J)
YELLOW (8) & RED & WHITE (9) AT CONDENSER TERMINAL STRIP.
TR3 20000 OHM RESISTOR IS NOT USED.

236

Fig. 12—Table of Tuning Panel Leads Used

9 AND 11 TUBE RADIOS

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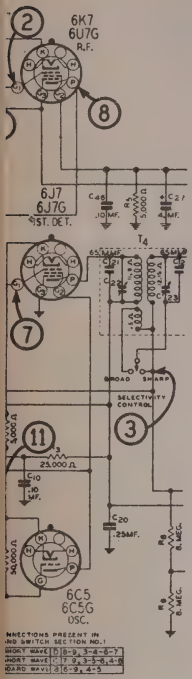
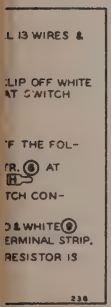


hematic Diagram



Tuning
ads Used

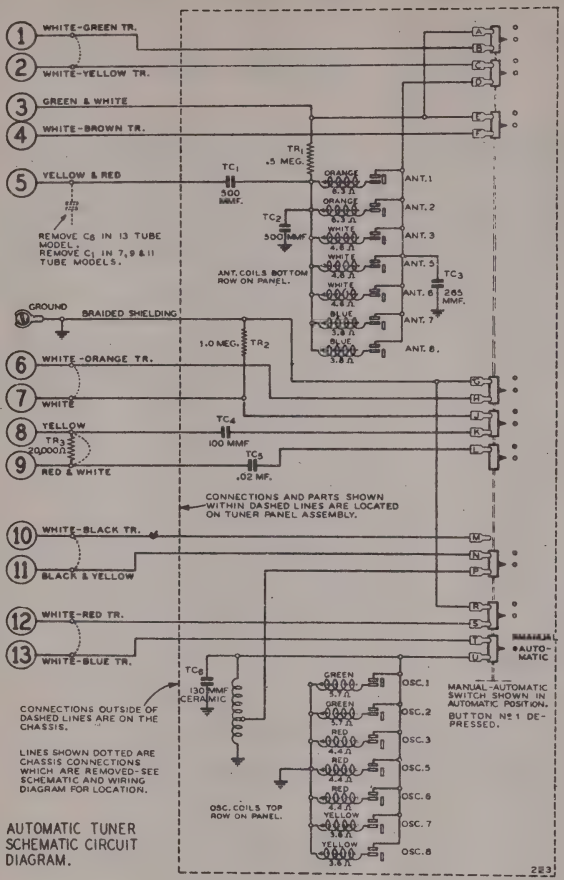


Fig. 13—Tuning Panel Schematic Diagram

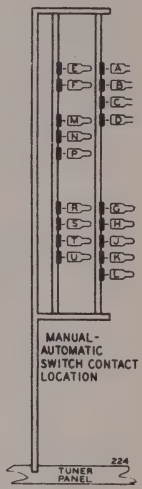
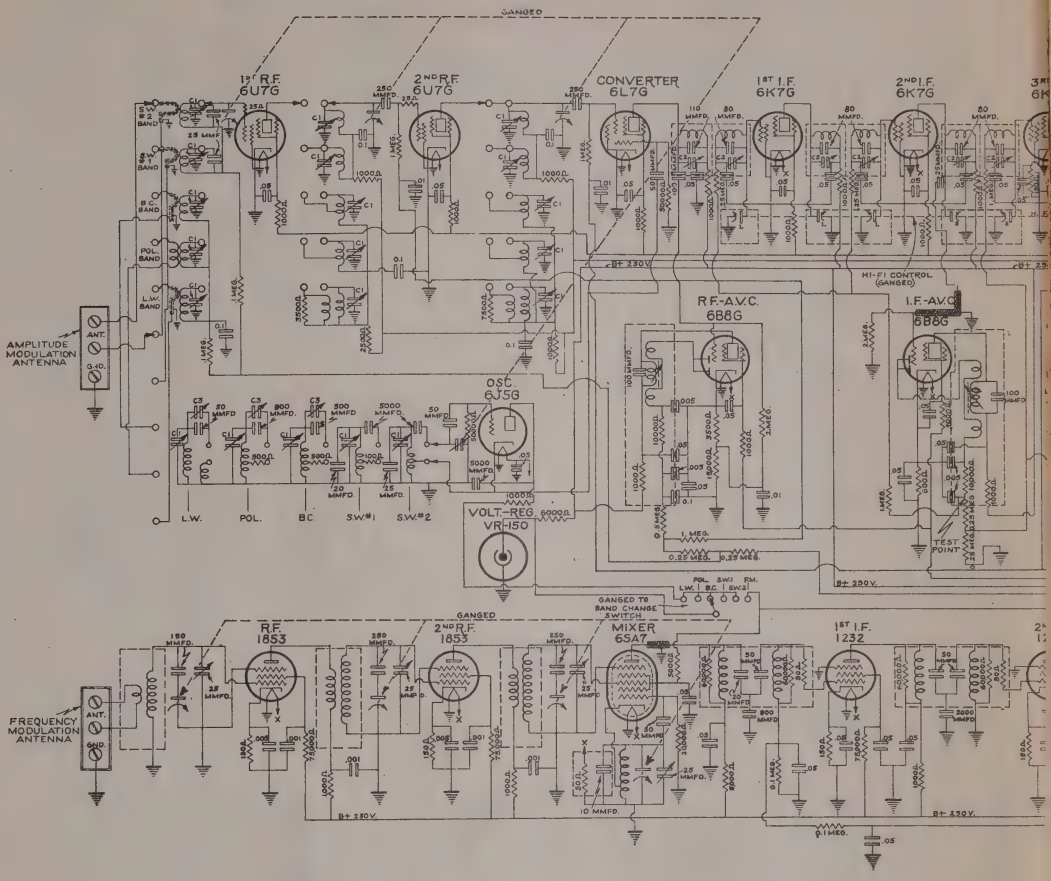


Fig. 14—Tuning Panel Switch Terminals

9 AND 11 TUBE RADIOS

MODEL Philharmonic Combination

E. H. SCOTT RA



THE MIXER STAGE

A 6SA7 tube is used as a mixer because of its relatively good behavior in the ultra high frequency range. Loading of the mixer input circuit is to be avoided as much as possible and in this respect the 6SA7 is good. A high conversion ratio obtained and a net overall stage gain is realized despite the high intermediate frequency.

THE OSCILLATOR

While some minor and insignificant benefit might be obtained with a separate oscillator, the internal triode section of the 6SA7 can be made to oscillate readily and with remarkable stability at 41 to 50 megacycles. By providing temperature compensation of an element of the oscillator circuit capacity a high degree of stability of the oscillator frequency with respect to time can be maintained. It is also important that the oscillator frequency shall not shift with variations in the strength of the received signal. The 6SA7 oscillator-mixer combination is excellent in this respect.

The oscillator frequency is below the frequency of the incoming signal in order to avoid image signals from television transmitters and also to maintain greater stability.

The oscillator plate voltage is supplied from a VR150 regulated source and stability with respect to line voltage is insured

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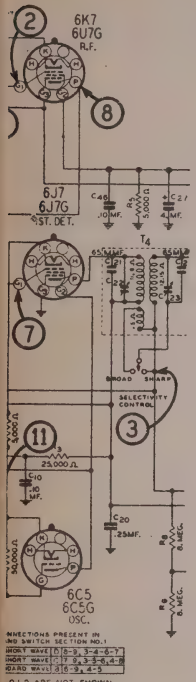


hematic Diagram

L 13 WIRES &

LIP OFF WHITE
AT SWITCH

F THE FOL-

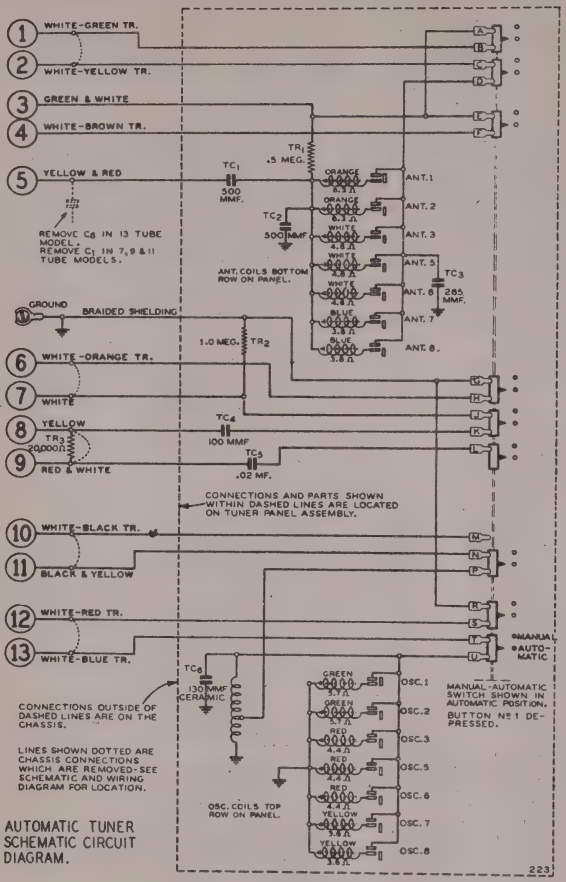
TR. ⑥ AT
H

TCH CON-

D & WHITE ⑧
ERMINAL STRIP.
RESISTOR 13

236

Tuning
ads Used



AUTOMATIC TUNER SCHEMATIC CIRCUIT DIAGRAM.

Fig. 13—Tuning Panel Schematic Diagram

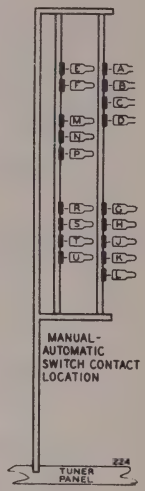


Fig. 14—Tuning Panel Switch Terminals

9 AND 11 TUBE RADIOS

E. H. SCOTT RADIO LABS., INC.

MODEL Phantom Deluxe

SCOTT FREQUENCY MODULATION DATA

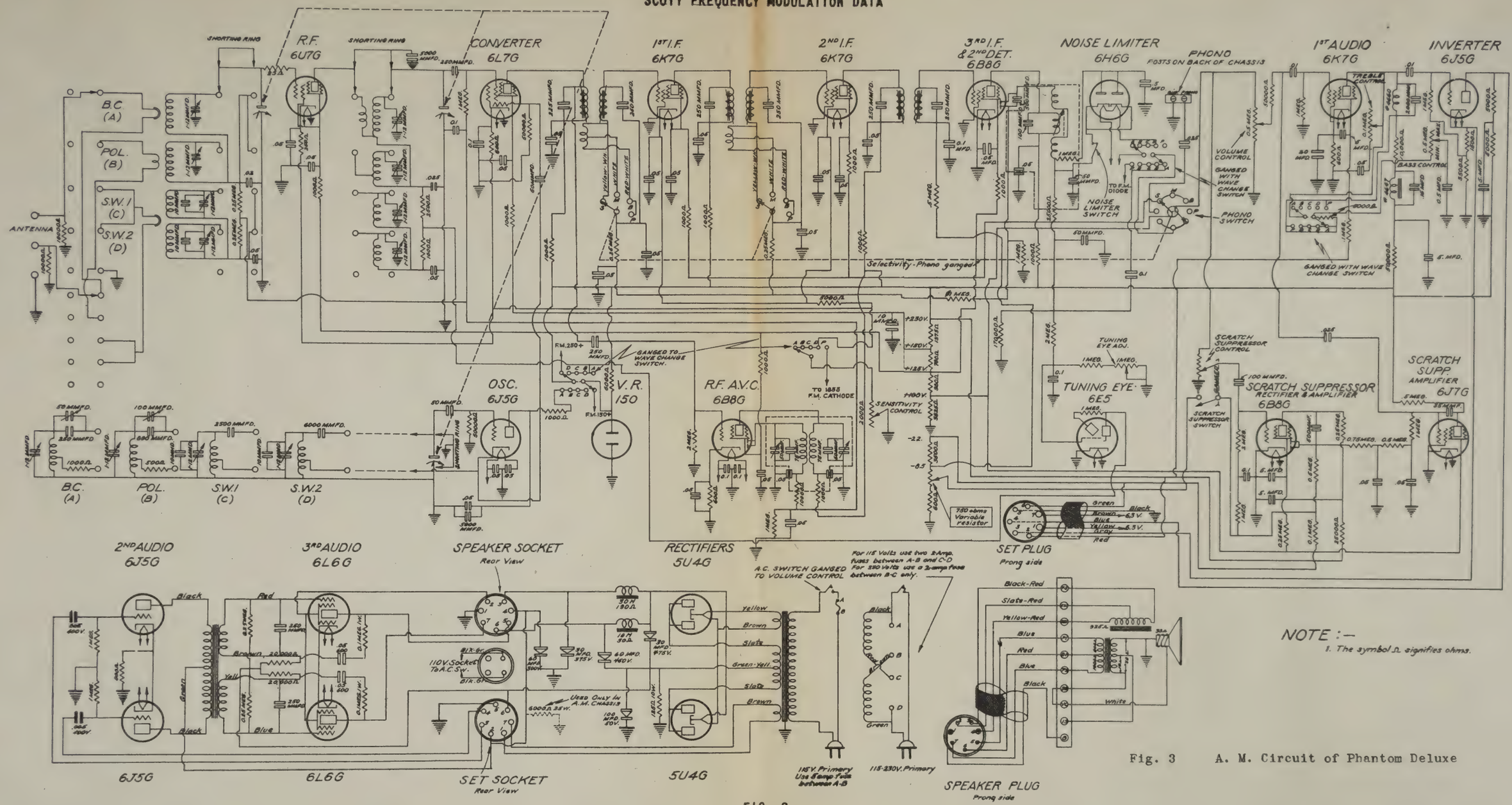


FIG. 3.

Fig. 3 A. M. Circuit of Phantom Deluxe

ANTENNA INPUT CIRCUIT

The coupling between the primary and secondary of the antenna transformer is such that a lead-in impedance of 75 to 100 ohms is suitably matched for optimum results. By disconnecting the jumper wire from one side of the primary winding to ground a floating dipole or doublet connection is provided to minimize capacitive coupling for noise picked up in the lead-in If a single wire horizontal or vertical antenna is used, the antenna input is connected to the terminal remote from ground and the one adjacent to ground is returned to that point by means of the jumper wire. However, the balanced dipole connection is recommended for maximum signal-to-noise ratio. In Figure 8 the details of a horizontal dipole are shown.

In the FM Tuner the input conductance of the 1853 r. f tube is neutralized to a certain extent by connecting the grid return condenser of the antenna transformer secondary to the cathode terminal of that tube. This circuit is not used in the combination receivers, because the leads required for it are too long to avoid regeneration in production sets. Input conductance neutralization increases the effective shunt resistance across the input circuit and allows it to function with higher gain and selectivity. The result is more sensitivity and a better image ratio.

THE R. F. STAGE

In all models an 1853 high Gm tube is used for r. f. amplification. Its output impedance operates into a bifilar winding tightly coupled to the secondary circuit feeding the mixer tube. The variable mu characteristic of the 1853 is employed to advantage in the control of the r. f. gain by a variable bias resistor. Ultra high frequency circuits are much broader for a given frequency deviation from resonance than low frequency circuits and strong signals are more likely to produce spurious responses. Hence, in the presence of strong FM signals it is advisable to reduce the r. f. gain to avoid repeat signals on the dial. This function is accomplished by the left hand control on the Tuner and the conventional sensitivity control on all of the FM-AM combinations, except the Philharmonic. In this receiver two r. f stages using 1853 tubes are employed and a somewhat higher attenuation of unwanted signals is present, with the result that spurious responses are not serious and an r. f. gain control is not necessary there.

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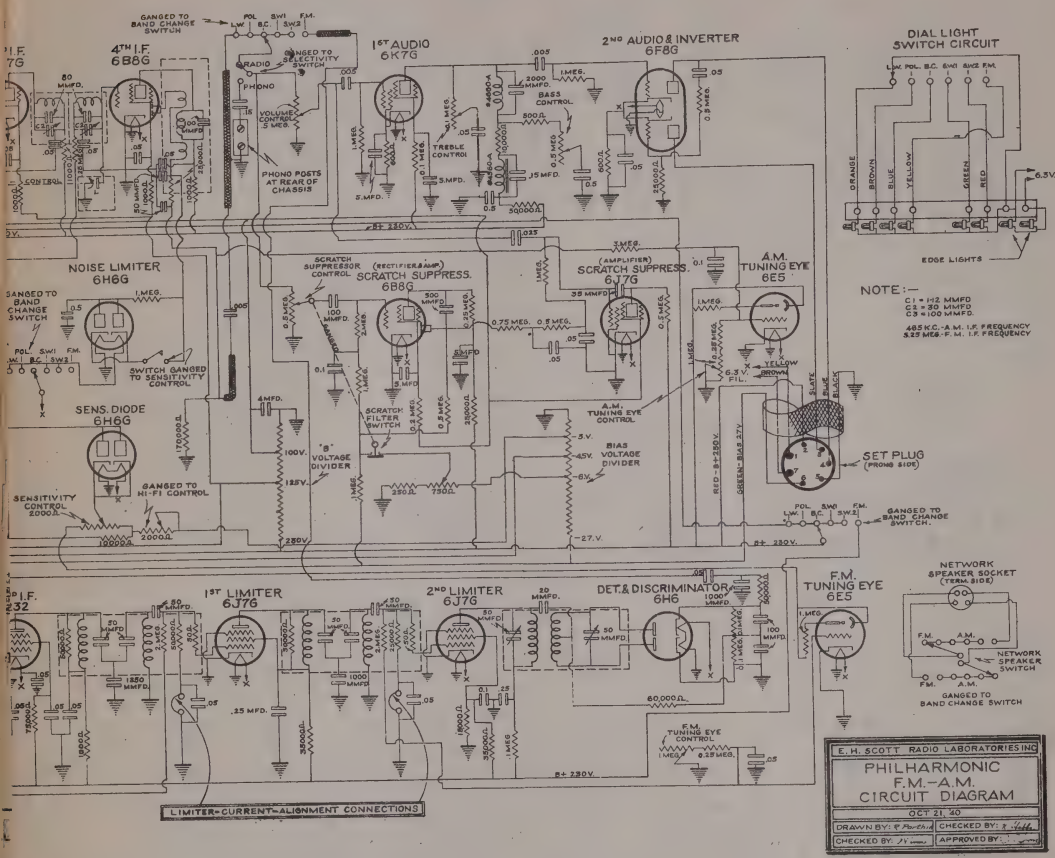


THE I. F. AMPLIFIER

The intermediate frequency used in all Scott FM sets is 5.25 megacycles.

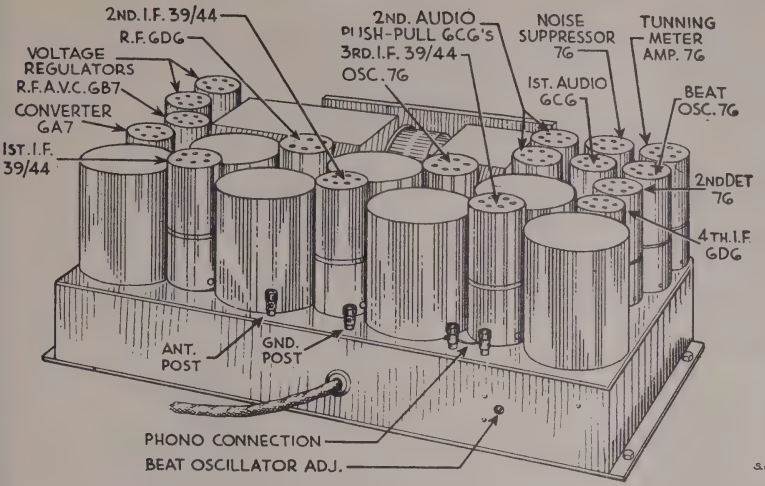
The first two i. f. stages employ high Gm 1232 type tubes and provide a large share of the gain and selectivity at this frequency. Each circuit is inductively tuned by low loss powdered iron cores and primary and secondary fixed silvercap tuning condensers are capacitively coupled by common fixed condensers to reduce the effects of tuning upon the coupling of each transformer. While there is a small amount of inductive coupling between the primary and secondary windings, the larger percentage of the coupling is derived from the common capacity between each grid and plate tuning condenser.

Each circuit is loaded with the correct amount of resistance to obtain the proper selectivity and to avoid transient distortion possible with a frequency modulated signal.

The third and fourth i. f. stages are somewhat similar to the first two, but differ by the fact that they act as limiting amplifiers thus performing a function peculiar only to frequency modulation receivers

E. H. SCOTT RADIO LABS., INC.

MODEL Hi-Fidelity
All Wave



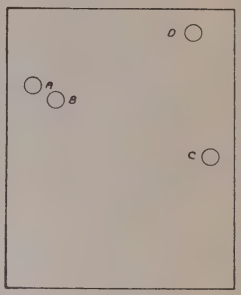


FIG. 7

FIG. 1 - TOP VIEW OF CHASSIS

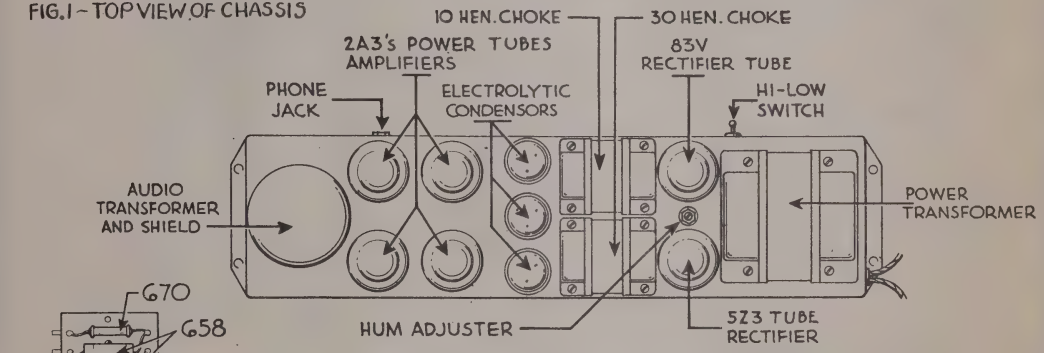
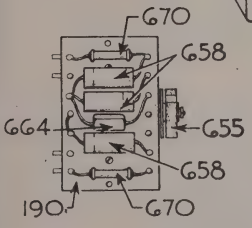
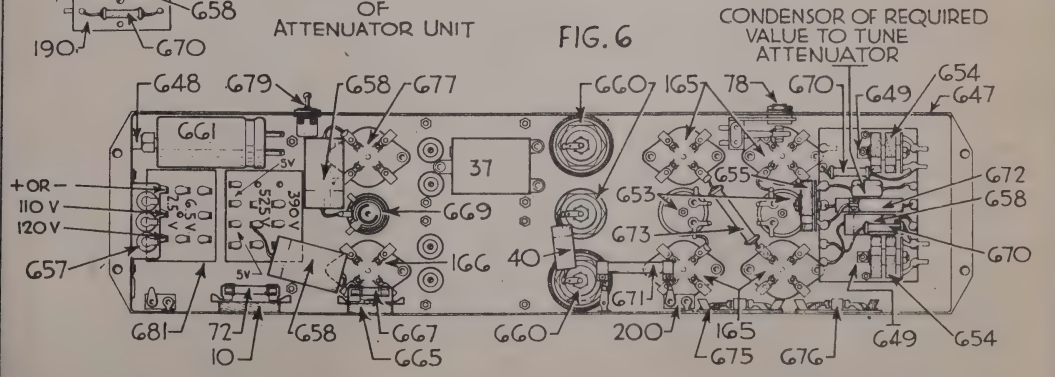


FIG. 2 - TOP VIEW OF AMPLIFIER



BOTTOM VIEW OF ATTENUATOR UNIT

FIG. 6



BOTTOM VIEW OF AMPLIFIER SHOWING PART NUMBERS

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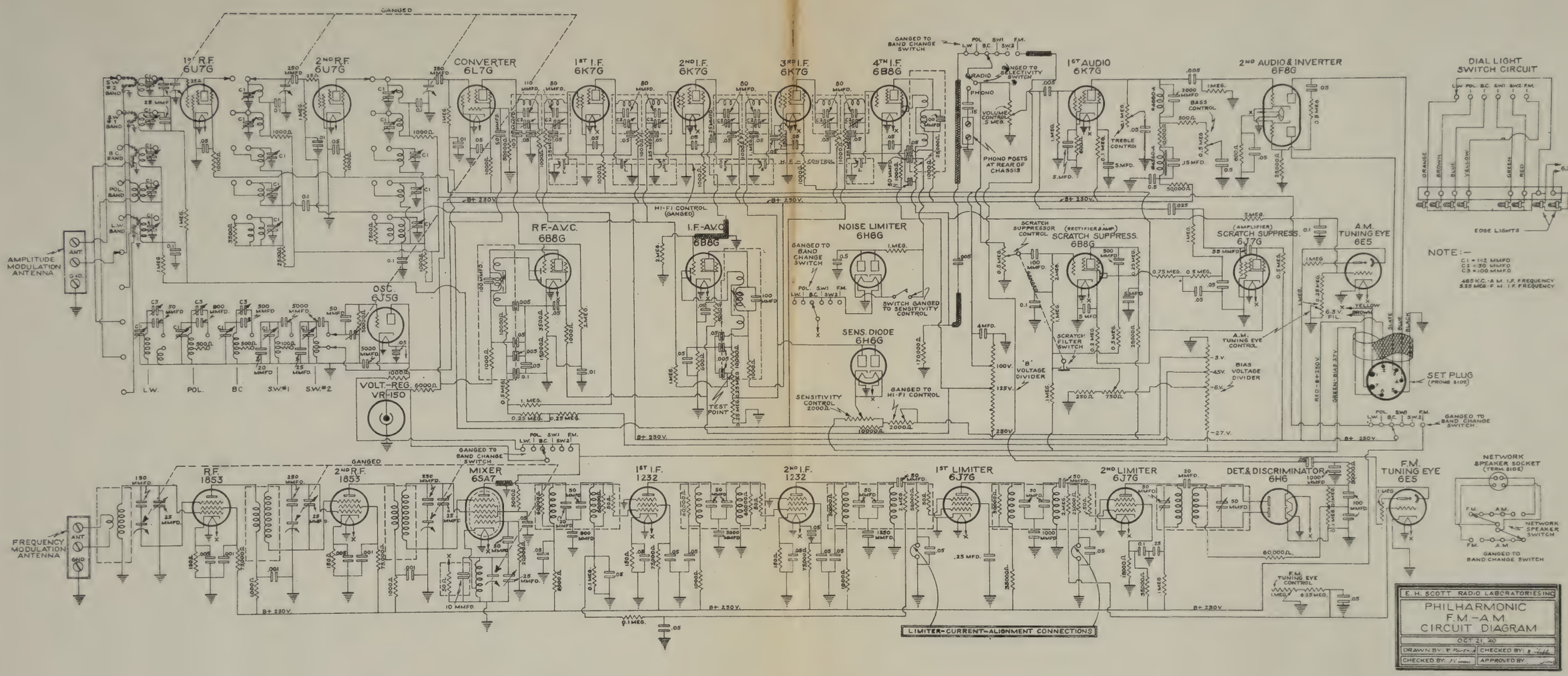
MODEL Philharmonic Combination

E. H. SCOTT RADIO LABS., INC.



NOTE:—
C1 = 112 MMFD
C2 = 30 MMFD
C3 = 100 MMFD
465 K.C. - A.M. I.F. FREQUENCY
5.25 MEG. - F.M. I.F. FREQUENCY

THE MIXER STAGE

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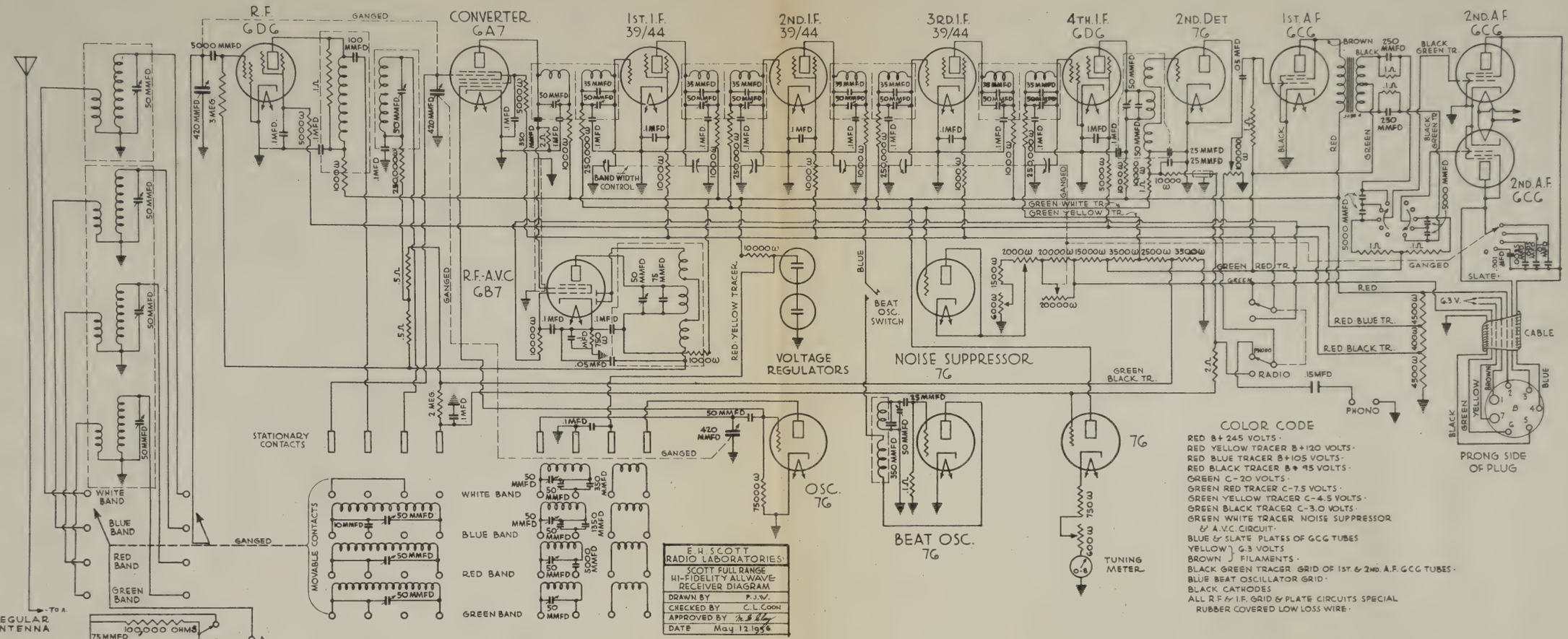
E. H. SCOTT RADIO LABS., INC.

MODEL Hi-Fidelity All Wave

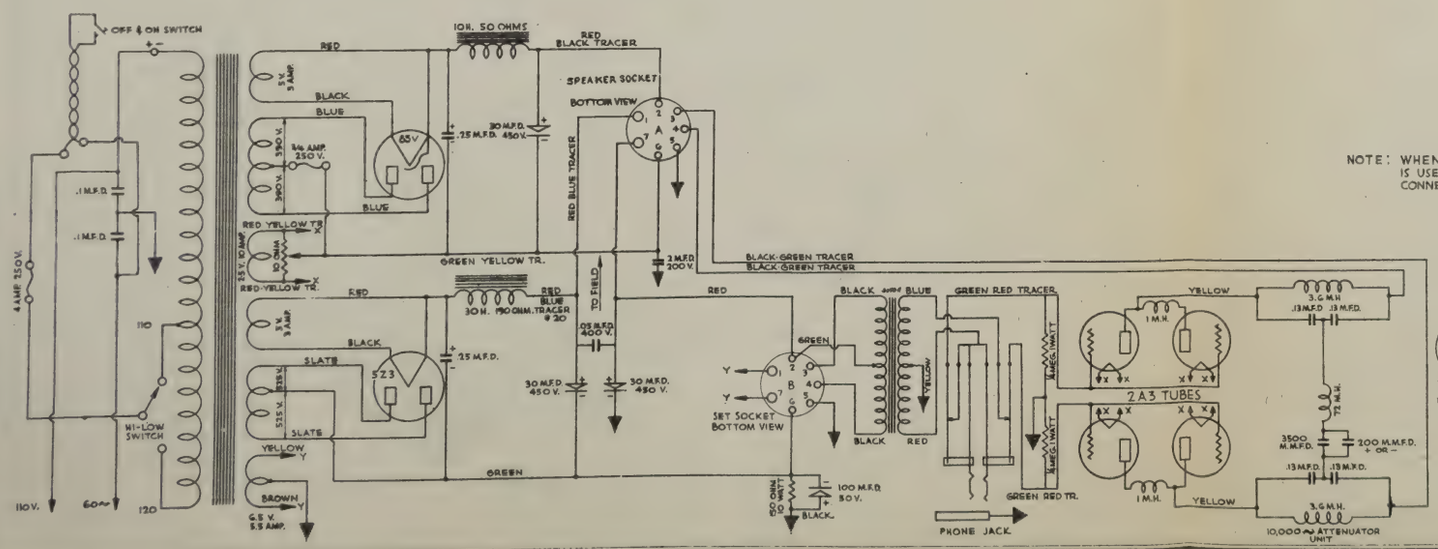


COLOR CODE

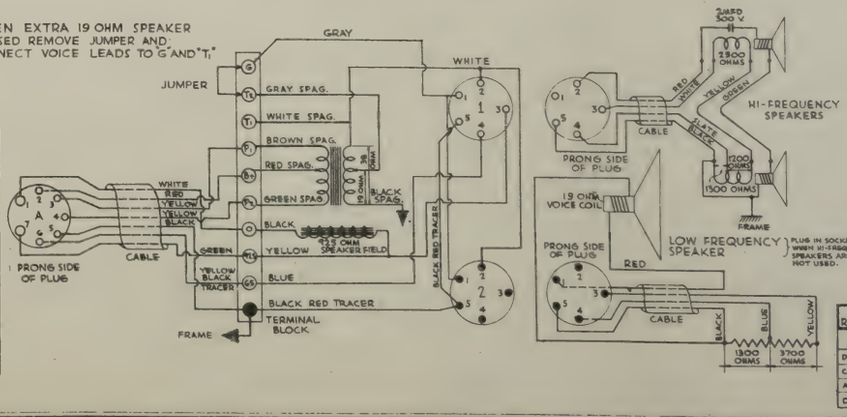
RED B+ 245 VOLTS.
RED YELLOW TRACER B+120 VOLTS.
RED BLUE TRACER B+105 VOLTS.
RED BLACK TRACER B+ 95 VOLTS.
GREEN C-20 VOLTS.
GREEN RED TRACER C-7.5 VOLTS.
GREEN YELLOW TRACER C-4.5 VOLTS.
GREEN BLACK TRACER C-3.0 VOLTS.
GREEN WHITE TRACER NOISE SUPPRESSOR & A.V.C. CIRCUIT.
BLUE & SLATE PLATES OF GCG TUBES
YELLOW } 6.3 VOLTS
BROWN } FILAMENTS.
BLACK GREEN TRACER GRID OF 1ST. & 2ND. A.F. GCG TUBES.
BLUE BEAT OSCILLATOR GRID.
BLACK CATHODES
ALL R.F. & I.F. GRID & PLATE CIRCUITS SPECIAL RUBBER COVERED LOW LOSS WIRE.

PRONG SIDE OF PLUG

E. H. SCOTT RADIO LABORATORIES	
SCOTT FULL RANGE HI-FIDELITY ALLWAVE RECEIVER DIAGRAM	
DRAWN BY	P.J.W.
CHECKED BY	C.L.COON
APPROVED BY	H.H.S.
DATE	May 12, 1936



NOTE: WHEN EXTRA 19 OHM SPEAKER IS USED REMOVE JUMPER AND CONNECT VOICE LEADS TO "G" AND "T".



E. H. SCOTT RADIO LABORATORIES	
35 WATT POWER AMPLIFIER.	
DRAWN BY:	P.J.W.
CHECKED BY:	C.L.COON
APPROVED BY	H.H.S.
DATE	MAY 12 1936

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MODEL Hi-Fidelity
All Wave

E. H. SCOTT RADIO LABS., INC.

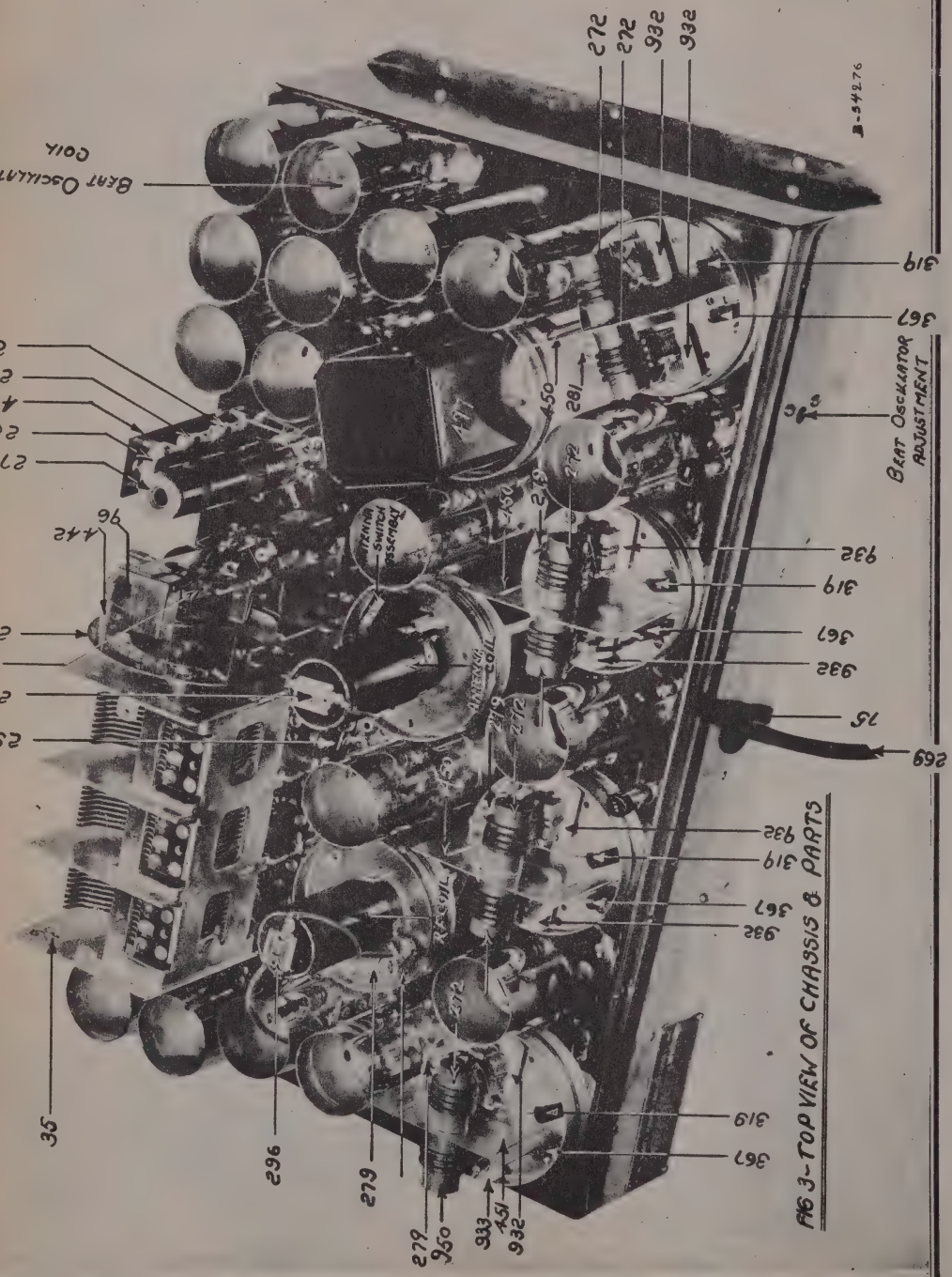

FIG 3-TOP VIEW OF CHASSIS & PARTS

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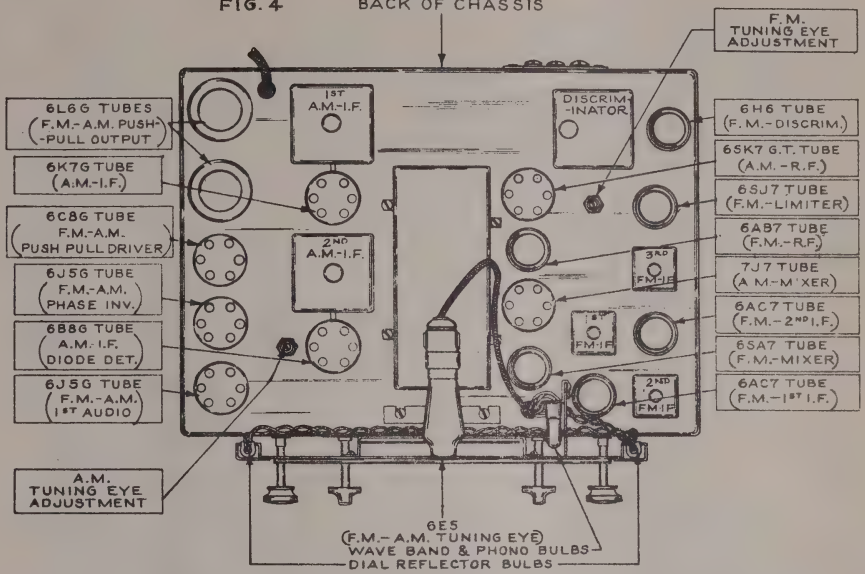
E. H. SCOTT RADIO LABS., INC.

MODEL Laureate

LAUREATE TUBE LAYOUT

TOP VIEW
BACK OF CHASSIS

FIG. 4



VOLTAGE MEASUREMENTS

Line Voltage... 117 volts, 60 cycles
Voltage... 265 volts

SECTION	TUBE TYPE	FUNCTION	Ef	Ek	Eg	Esg	Eop	Ep
	6SK7GT	RF Amp.	6.1	7.5	+3.7	104	-	255
	7J7	Mixer-Osc.	6.1	3.0	+3.7	66	140	255
	6K7G	First IF Amp	6.1	6.3	+3.7	100	-	252
	6B8G	Second IF Amp AVC, Second Det.	6.1	3.7	0	100	-	252

FM SECTION	TUBE TYPE	FUNCTION	Ef	Ek	Eg	Esg	Ep
	6AB7	RF Amp	6.1	1.3	-	110	252
	6SA7	Mixer-Osc	6.1	0	0	100	250
	6AC7	First IF Amp	6.1	3.0	0	146	255
	6AC7	Second IF Amp.	6.1	0	0	76	250
	6SJ7	Limiter	6.1	0	-	63	5
	6H6	Frequency Det	6.1	0	0	0	-

AUDIO SECTION	TUBE TYPE	FUNCTION	Ef	Ek	Eg	Esg	Ep
	6J5G	First Audio	6.1	3.4	0	-	92
	6J5G	Phase Inverter	6.1	6.7	15		210
	6C8G	Push Pull Driver	6.1	3.0	0		102-102
	6L6G	Push Pull Output	6.1	20.5	0	310	388
	6L6G	" " "	6.1	20.5	0	310	388

COMMON FUNC-TIONS	TUBE TYPE	FUNCTION	Ef	Ek	Ep
	6E5	A-FM Tuning Ind	6.1	0	265
	5U4G	Power Supply	4.9	420	
	5U4G	" "	4.9	420	

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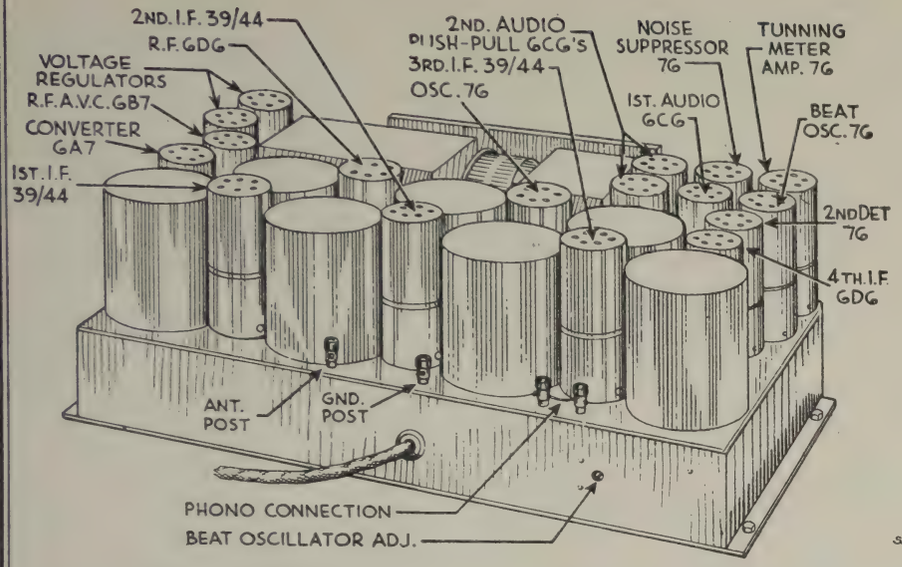
E. H. SCOTT RADIO LABS., INC.

MODEL Hi-Fidelity
All Wave



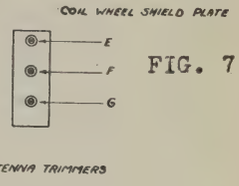


FIG. 7

FIG. 1 – TOP VIEW OF CHASSIS

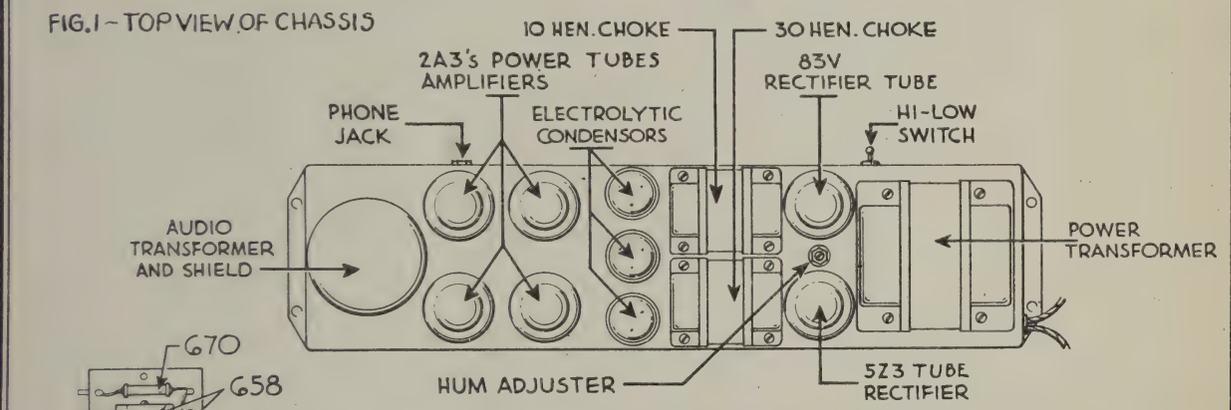
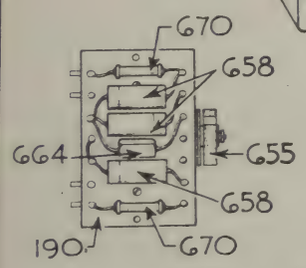
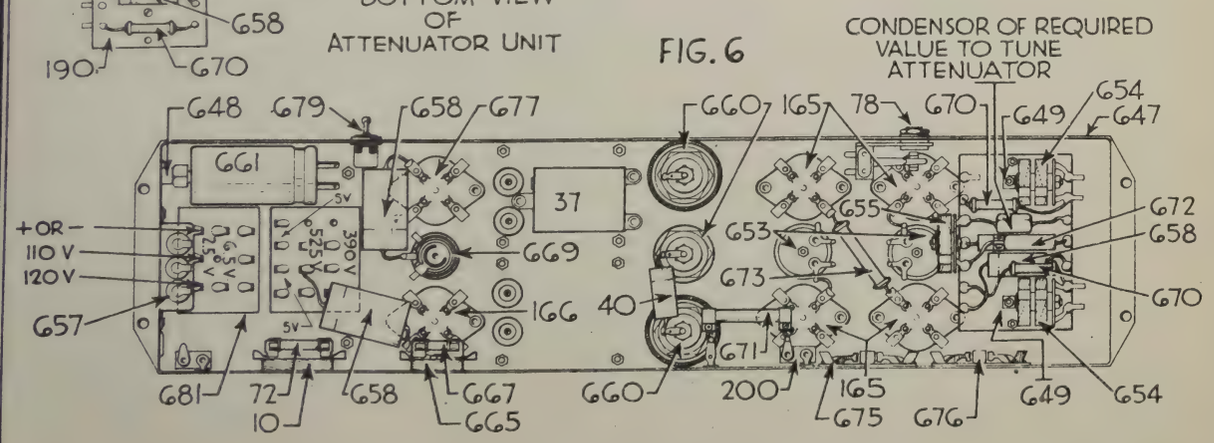


FIG. 2 – TOP VIEW OF AMPLIFIER



BOTTOM VIEW OF ATTENUATOR UNIT

FIG. 6



BOTTOM VIEW OF AMPLIFIER SHOWING PART NUMBERS

©John F. Rider

MODEL Hi-Fidelity
All Wave

E. H. SCOTT RADIO LABS., INC.

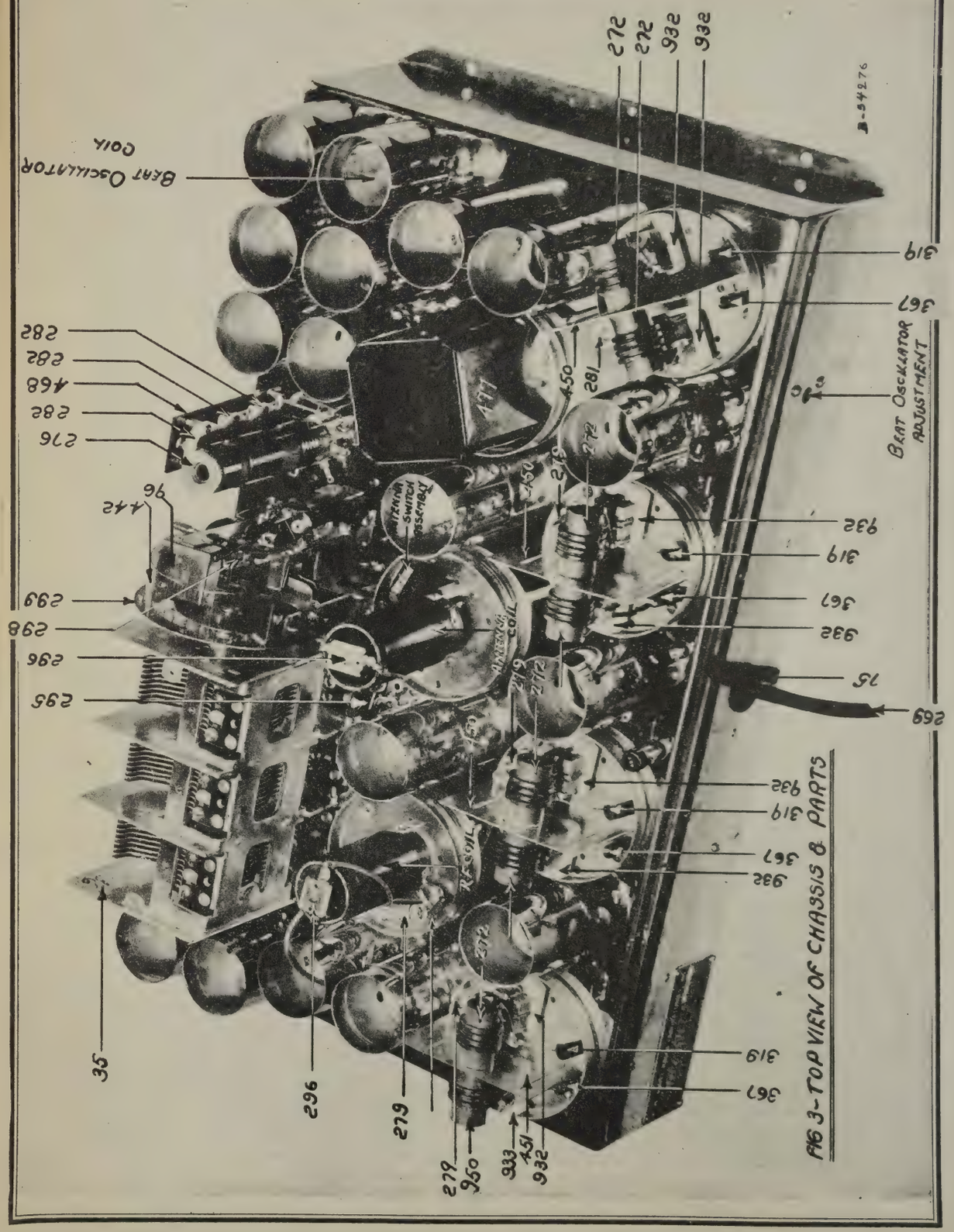


FIG 3-TOP VIEW OF CHASSIS & PARTS

©John F. Rider

E. H. SCOTT RADIO LABS., INC.

MODEL Laureate

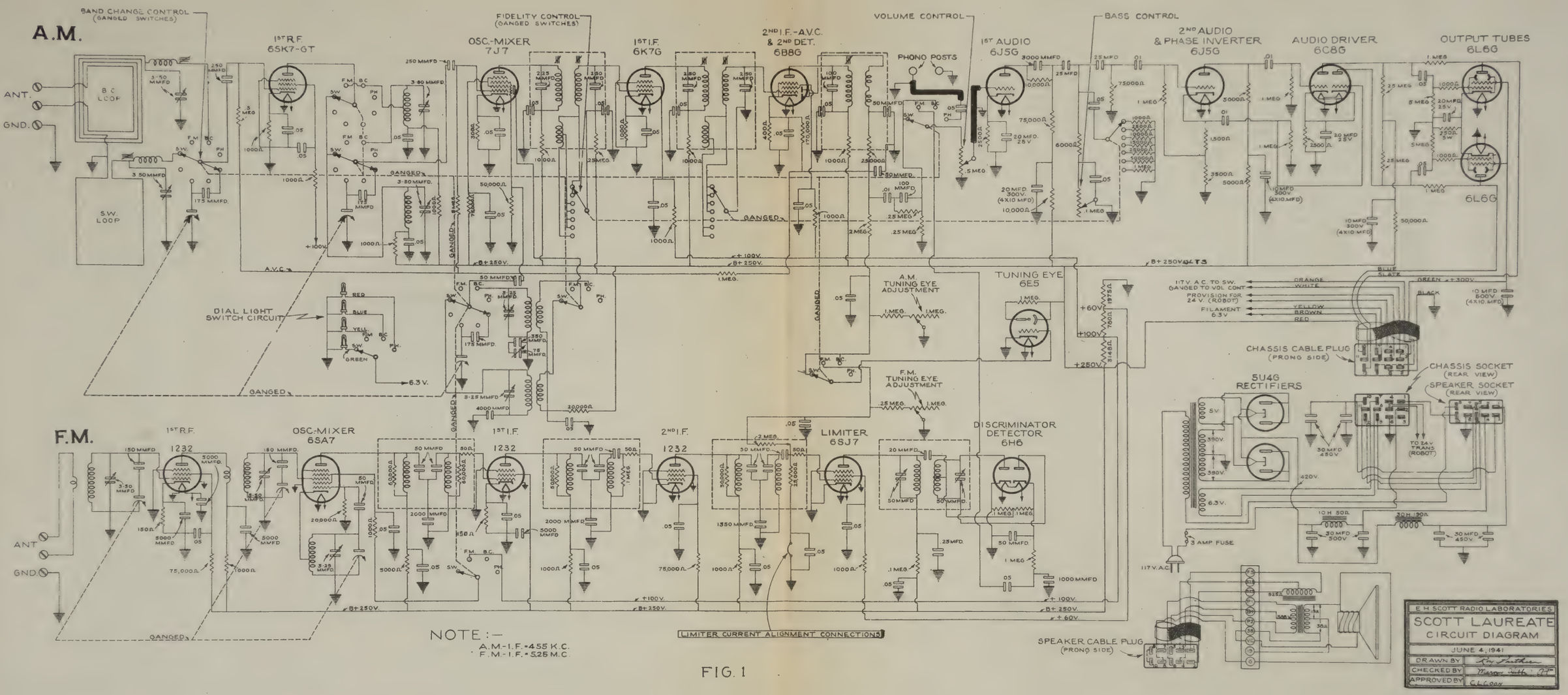


FIG. 1

ELECTRICAL SPECIFICATIONS

Voltage Rating . . . . 117 volts
Frequency Rating . . . 60 cycles

NOTE: Power transformers can be furnished for any special frequency or voltage rating.

TYPE CIRCUIT

AM - Superheterodyne with built-in duplex antenna - 1 r-f stage 2 tuning ranges - 2 i-f stages with variable selectivity.

FM - Superheterodyne covering 42 to 50 mc range, having 1 r-f stage - 3 stage high-gain 5.25-mc i-f amplifier, including 1 limiter stage - balanced diode detector - 4-stage a-f amplifier with bass and treble controls - phase inverter, inverse feedback - beam power output stage- RC tone compensation circuits.

AM AUDIO-FREQUENCY RANGE . . . . . 30 - 9000 cycles

FM AND PHONE FREQUENCY RANGE . . . . . 30 - 15,000 cycles

RADIO-FREQUENCY COVERAGE . . . . . 540 - 1600 kc
9.2 - 15.6 mc
42 - 50 mc

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ALIGNMENT OF AM SECTION

ALIGNMENT OF IF SECTION

Turn the wave band switch to the broadcast band and set dial pointer to high frequency end of the dial. Ground the AVC line by connecting a jumper wire from it to chassis. Set the selectivity-treble switch to the sharpest position (extreme counter-clockwise position). Open the 170,000 ohms diode load resistor at the point where it connects to the cathode of the 6B8G and insert a 0-30 or 0-50 microammeter in series with this resistor.

Connect the output of a good signal generator through a .05 mfd. condenser to the grid of the 6B8G second IF Amplifier. Apply an unmodulated 455KC signal of sufficient strength to produce a diode meter reading of 20 microamperes. Adjust the diode transformer alignment screw for maximum diode current, retarding the signal generator input so that the tuning meter reading is kept on scale.

Connect the signal generator to the grid of the 6K7G tube and align the primary and secondary adjustment screws of second IF transformer for maximum diode current.

Reduce the signal generator input so that the diode current is held close to 20 microamperes.

Now connect the signal generator output to the signal control grid of the 7J7 tube and adjust the primary and secondary alignment screws of the first IF transformer.

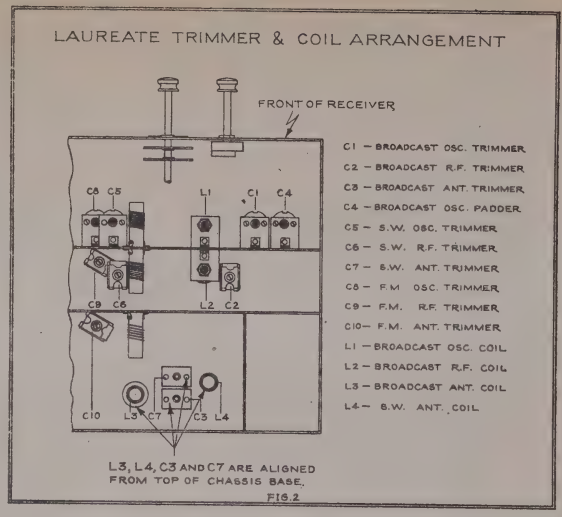
The selectivity characteristics of the receiver may be checked to a certain degree by rotating the treble control in a clockwise direction and detuning the signal generator above and below 455 Kc. The four degrees of selectivity are arranged in the following order: (1-2) sharp; (3-4) medium sharp; (5-6) medium broad and (7) broad. In the last two positions double peaks about the 455 Kc. point should appear in the diode current as the generator is detuned.

ALIGNMENT OF RF SECTIONS

It will be noted that the antenna, RF and oscillator coils and trimmers are located in clusters around their respective wave change switch sections. This arrangement is most satisfactory from the standpoint of circuit efficiency and, although the application of a tuning wand to check alignment may not be particularly applicable, the broadcast band coils are equipped with moveable iron cores which allow their inductances to be varied readily. The short wave and FM coils can be adjusted only by sliding turns. However, little difficulty is likely to be encountered with this arrangement since suitably matched laboratory coils must be used for replacement purposes. The arrangement of R.F. trimmers and coils is shown in Fig. 2.

AM BROADCAST BAND ALIGNMENT

First turn the dial pointer completely to the low frequency end of the dial scale. In this position the pointer coincides with the heavy vertical mark which is located to the left of the marking "kilocycles" which is just above the regular dial calibration. Turn the wave band switch to the position in which the Blue dot on the dial, marked AM, lights; set the bass control at maximum, treble control to minimum and connect an output meter across the voice coil. Adjust oscillator trimmer C, until a 1400 kc signal as set on the dial is tuned in from the generator, whose output is being fed in at the 6SK7GT RF grid. Rotate the dial to 600 kc and tune in a 600 kc signal from the generator by adjusting the padding condenser C4. Check the dial at 1000 kc and if it tunes high in frequency turn the adjusting screw of L outward, to decrease it. If it is low in frequency turn the adjusting screw of L in to increase the inductance. Then readjust trimmer condenser C, and padder condenser C4, as before.


LAUREATE TRIMMER & COIL ARRANGEMENT
FRONT OF RECEIVER
C8 C5
L1
C1 C4
C9 C6
L2 C2
C10 L3 C7 C3 L4
C1 — BROADCAST OSC. TRIMMER
C2 — BROADCAST R.F. TRIMMER
C3 — BROADCAST ANT. TRIMMER
C4 — BROADCAST OSC. PADDER
C5 — S.W. OSC. TRIMMER
C6 — S.W. R.F. TRIMMER
C7 — S.W. ANT. TRIMMER
C8 — F.M. OSC. TRIMMER
C9 — F.M. R.F. TRIMMER
C10 — F.M. ANT. TRIMMER
L1 — BROADCAST OSC. COIL
L2 — BROADCAST R.F. COIL
L3 — BROADCAST ANT. COIL
L4 — S.W. ANT. COIL
L3, L4, C3 AND C7 ARE ALIGNED FROM TOP OF CHASSIS BASE.
FIG.2

With the oscillator circuit correctly spotted, one can proceed to align the RF and Antenna circuits. With the signal generator input still connected to the RF grid, tune in a signal from the generator at 1400 kc and use the output meter to observe the alignment for maximum sensitivity. Have as weak a signal as possible and adjust C2 for maximum output. Turn the dial to 600 kc and check the alignment of the RF coil, by noting whether the sensitivity is normal. Decrease the inductance of L2 by the adjusting screw, where necessary, or increase it by means of the screw if more inductance is required. Readjust C2 for maximum at 1400 kc. Turn the dial to 1000 kc and check the alignment of the RF stage.

The alignment of the Loop Antenna Circuit is covered in a separate section at the end of this alignment procedure.

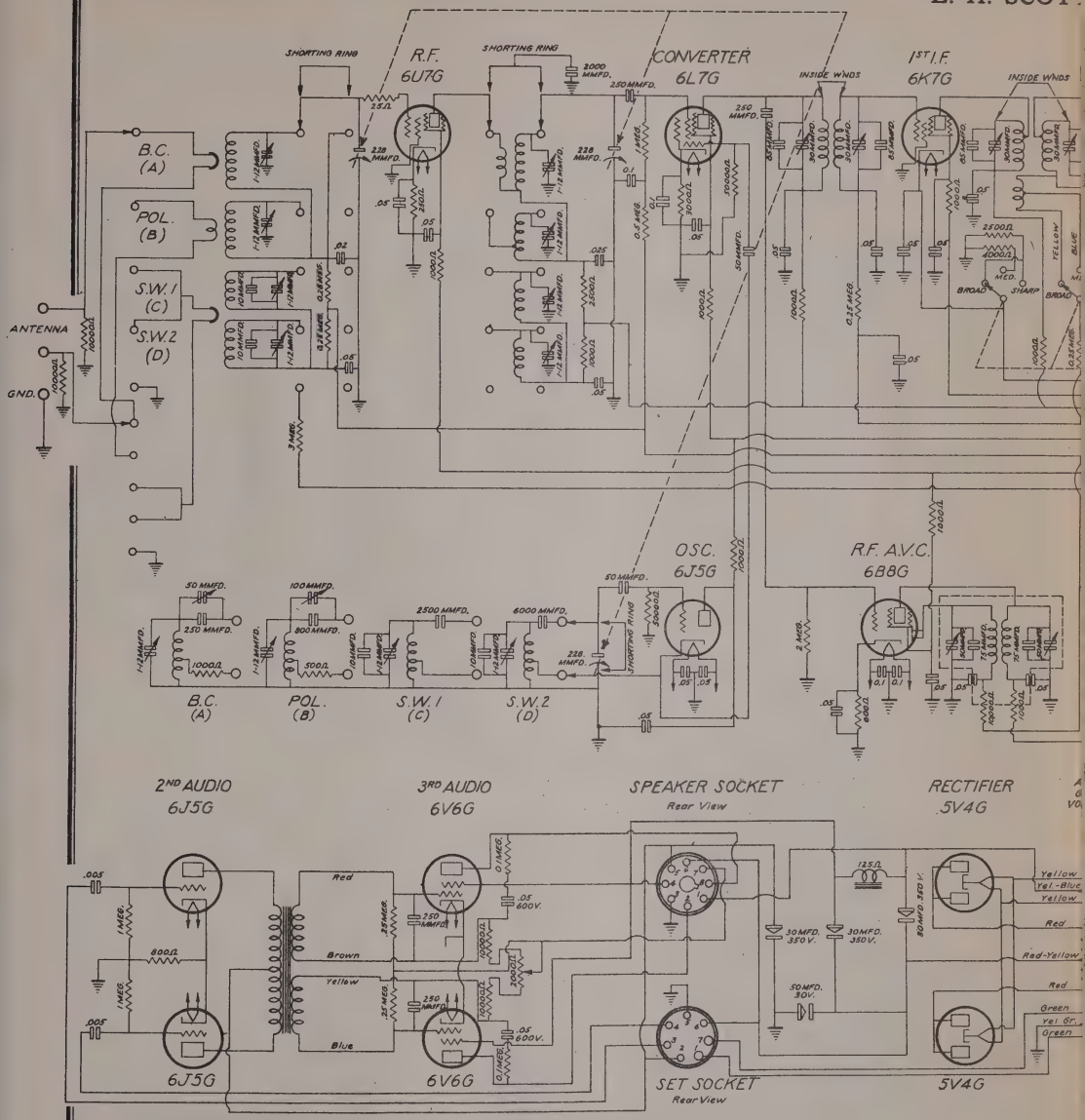
SHORT WAVE BAND ALIGNMENT

Set the wave change switch to the position in which the Green dot, marked SW, lights and turn the dial to 15 megacycles. Leave the signal generator connected to the RF grid, and adjust it to 15 megacycles. Tune the signal from generator by adjusting trimmer C5. Turn the dial to 10 megacycles and if necessary to correct the calibration do so by spreading or pushing turns on the coil. Readjust trimmer C5 at the 15 megacycles point and check the calibration at 12 megacycles.

With the oscillator correctly aligned tune in a signal at 15 megacycles and adjust trimmer C6 for maximum output. Check the alignment at 12 and 10 megacycles and make necessary corrections by pushing or spreading turns on the coils. Now readjust trimmer C6 at the 15 megacycle point.

MODEL Phantom

E. H. SCOTT



NOTE :—

1. The symbol Ω signifies ohms.

E.H. SCOTT RADIO LABORATORIES INC.	
SCOTT PHANTOM CIRCUIT DIAGRAM	
October 21, 1938	
Drawn by	R.G. Parthie
Checked by	
Approved by	

Voltage Rating	115 volts, 60 cy
Power Consumption	135 watts
A-F Power Output	13.5 watts undist
	16 watts peak
I-F Peak	455 kc
R-F Coverage	550 kc to 22.2 m

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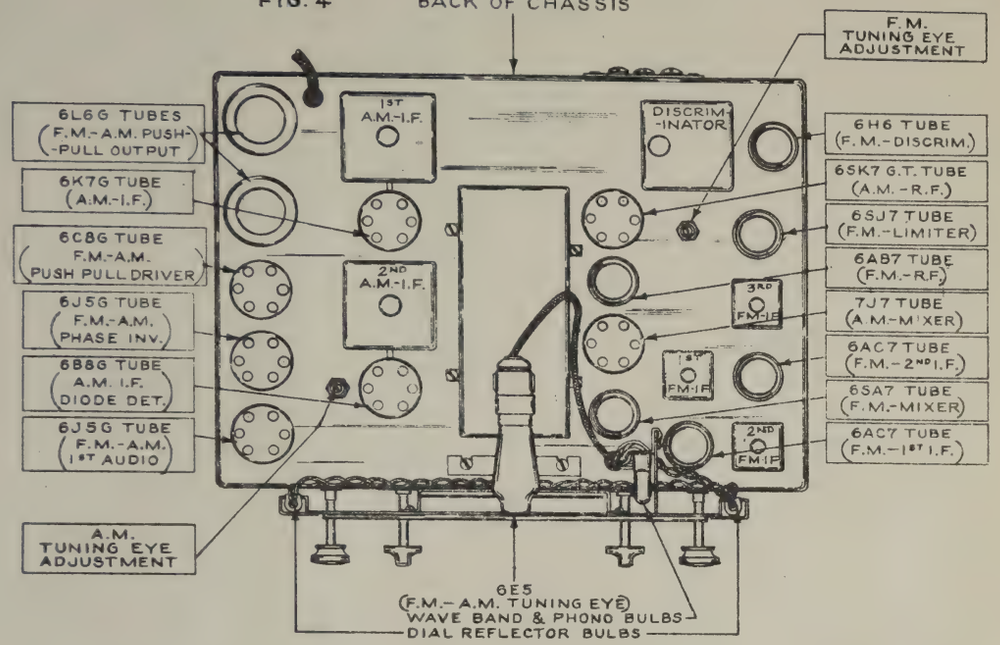
E. H. SCOTT RADIO LABS., INC. MODEL Laureate

LAUREATE TUBE LAYOUT

FIG. 4 TOP VIEW BACK OF CHASSIS



Line Voltage... 117 volts,60 cycles
Voltage... 265 volts

VOLTAGE MEASUREMENTS

SECTION	TUBE TYPE	FUNCTION	Ef	Ek	Eg	Esg	Eop	Ep
	6SK7GT	RF Amp.	6.1	7.5	+3.7	104	-	255
	7J7	Mixer-Osc.	6.1	3.0	+3.7	66	140	255
	6K7G	First IF Amp	6.1	6.3	+3.7	100	-	252
	6B8G	Second IF Amp AVC, Second Det.	6.1	3.7	0	100	-	252
FM SECTION	TUBE TYPE	FUNCTION	Ef	Ek	Eg	Esg	Ep	
	6AB7	RF Amp	6.1	1.3	-	110	252	
	6SA7	Mixer-Osc	6.1	0	0	100	250	
	6AC7	First IF Amp	6.1	3.0	0	146	255	
	6AC7	Second IF Amp.	6.1	0	0	76	250	
	6SJ7	Limiter	6.1	0	-	63	5	
	6H6	Frequency Det	6.1	0	0	0	-	
AUDIO SECTION	TUBE TYPE	FUNCTION	Ef	Ek	Eg	Esg	Ep	
	6J5G	First Audio	6.1	3.4	0	-	92	
	6J5G	Phase Inverter	6.1	6.7	15		210	
	6C8G	Push Pull Driver	6.1	3.0	0		102-102	
	6L6G	Push Pull Output	6.1	20.5	0	310	388	
	6L6G	" " "	6.1	20.5	0	310	388	
COMMON FUNC-TIONS	TUBE TYPE	FUNCTION	Ef	Ek	Ep			
	6E5	A-FM Tuning Ind	6.1	0	265			
	5U4G	Power Supply	4.9	420				
	5U4G	" "	4.9	420				

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MODEL Laureate E. H. SCOTT RADIO LABS., INC.

LAUREATE TRIMMER & COIL ARRANGEMENT

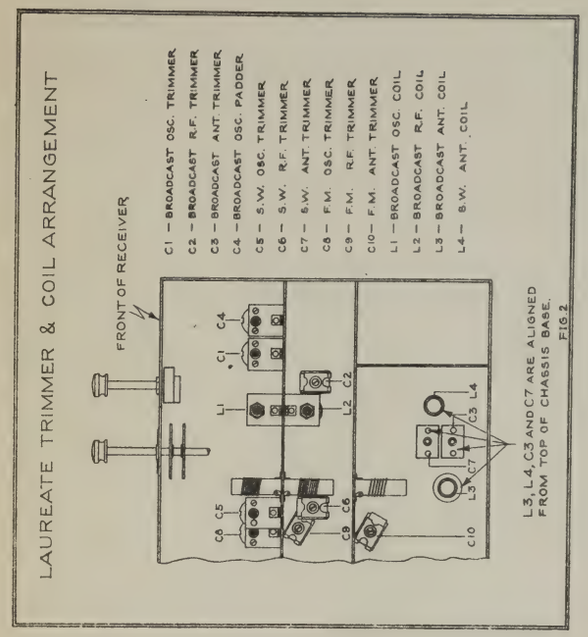
FRONT OF RECEIVER
C1 — BROADCAST OSC. TRIMMER
C2 — BROADCAST R.F. TRIMMER
C3 — BROADCAST ANT. TRIMMER
C4 — BROADCAST OSC. PADDER
C5 — S.W. OSC. TRIMMER
C6 — S.W. R.F. TRIMMER
C7 — S.W. ANT. TRIMMER
C8 — F.M. OSC. TRIMMER
C9 — F.M. R.F. TRIMMER
C10 — F.M. ANT. TRIMMER
L1 — BROADCAST OSC. COIL
L2 — BROADCAST R.F. COIL
L3 — BROADCAST ANT. COIL
L4 — S.W. ANT. COIL
L3, L4, C3 AND C7 ARE ALIGNED FROM TOP OF CHASSIS BASE.

FIG 2

ALIGNMENT OF AM SECTION

ALIGNMENT OF IF SECTION

Turn the wave band switch to the broadcast band and set dial pointer to high frequency end of the dial. Ground the AVC line by connecting a jumper wire from it to chassis. Set the selectivity-treble switch to the sharpest position (extreme counter-clockwise position). Open the 170,000 ohms diode load resistor at the point where it connects to the cathode of the 6B8G and insert a 0-30 or 0-50 microammeter in series with this resistor.

Connect the output of a good signal generator through a .05 mfd. condenser to the grid of the 6B8G second IF Amplifier. Apply an unmodulated 455KC signal of sufficient strength to produce a diode meter reading of 20 microamperes. Adjust the diode transformer alignment screw for maximum diode current, retarding the signal generator input so that the tuning meter reading is kept on scale.

Connect the signal generator to the grid of the 6K7G tube and align the primary and secondary adjustment screws of second IF transformer for maximum diode current.

Reduce the signal generator input so that the diode current is held close to 20 microamperes.

Now connect the signal generator output to the signal control grid of the 7J7 tube and adjust the primary and secondary alignment screws of the first IF transformer.

The selectivity characteristics of the receiver may be checked to a certain degree by rotating the treble control in a clockwise direction and detuning the signal generator above and below 455 Kc. The four degrees of selectivity are arranged in the following order: (1-2) sharp; (3-4) medium sharp; (5-6) medium broad and (7) broad. In the last two positions double peaks about the 455 Kc. point should appear in the diode current as the generator is detuned.

ALIGNMENT OF RF SECTIONS

It will be noted that the antenna, RF and oscillator coils and trimmers are located in clusters around their respective wave change switch sections. This arrangement is most satisfactory from the standpoint of circuit efficiency and, although the application of a tuning wand to check alignment may not be particularly applicable, the broadcast band coils are equipped with movable iron cores which allow their inductances to be varied readily. The short wave and FM coils can be adjusted only by sliding turns. However, little difficulty is likely to be encountered with this arrangement since suitably matched laboratory coils must be used for replacement purposes. The arrangement of R.F. trimmers and coils is shown in Fig. 2.

AM BROADCAST BAND ALIGNMENT

First turn the dial pointer completely to the low frequency end of the dial scale. In this position the pointer coincides with the heavy vertical mark which is located to the left of the marking "kilocycles" which is just above the regular dial calibration. Turn the wave band switch to the position in which the Blue dot on the dial, marked AM, lights; set the bass control at maximum, treble control to minimum and connect an output meter across the voice coil. Adjust oscillator trimmer C, until a 1400 kc signal as set on the dial is tuned in from the generator, whose output is being fed in at the 6SK7GT RF grid. Rotate the dial to 600 kc and tune in a 600 kc signal from the generator by adjusting the padding condenser C4. Check the dial at 1000 kc and if it tunes high in frequency turn the adjusting screw of L outward, to decrease it. If it is low in frequency turn the adjusting screw of L in to increase the inductance. Then readjust trimmer condenser C, and padder condenser C4, as before.

With the oscillator circuit correctly spotted, one can proceed to align the RF and Antenna circuits. With the signal generator input still connected to the RF grid, tune in a signal from the generator at 1400 kc and use the output meter to observe the alignment for maximum sensitivity. Have as weak a signal as possible and adjust C2 for maximum output. Turn the dial to 600 kc and check the alignment of the RF coil, by noting whether the sensitivity is normal. Decrease the inductance of L2 by the adjusting screw, where necessary, or increase it by means of the screw if more inductance is required. Readjust C2 for maximum at 1400 kc. Turn the dial to 1000 kc and check the alignment of the RF stage.

The alignment of the Loop Antenna Circuit is covered in a separate section at the end of this alignment procedure.

SHORT WAVE BAND ALIGNMENT

Set the wave change switch to the position in which the Green dot, marked SW, lights and turn the dial to 15 megacycles. Leave the signal generator connected to the RF grid, and adjust it to 15 megacycles. Tune the signal from generator by adjusting trimmer C5. Turn the dial to 10 megacycles and if necessary to correct the calibration do so by spreading or pushing turns on the coil. Readjust trimmer C5 at the 15 megacycle point and check the calibration at 12 megacycles.

With the oscillator correctly aligned tune in a signal at 15 megacycles and adjust trimmer C6 for maximum output. Check the alignment at 12 and 10 megacycles and make necessary corrections by pushing or spreading turns on the coils. Now readjust trimmer C6 at the 15 megacycle point.

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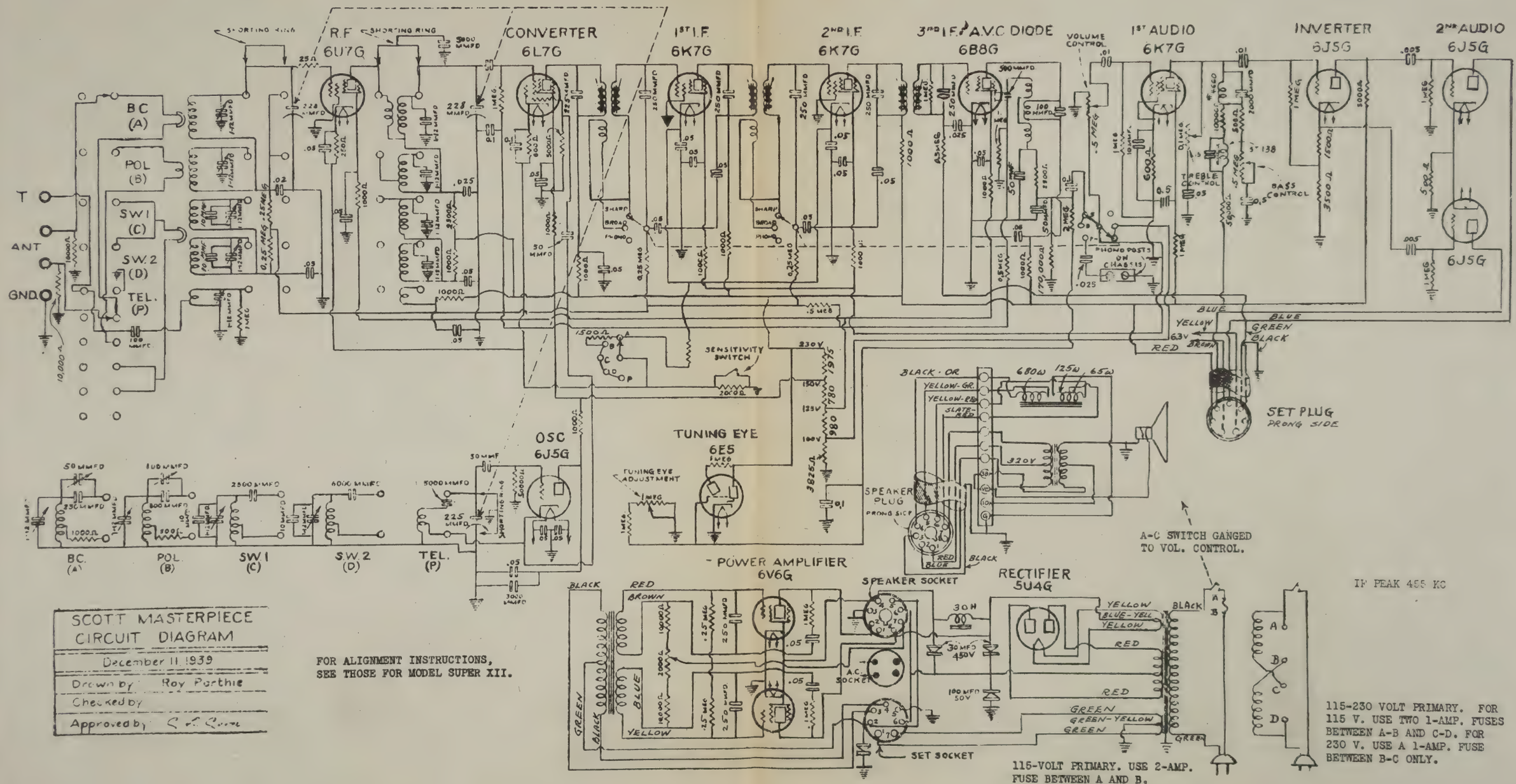

SCOTT MASTERPIECE CIRCUIT DIAGRAM
December 11 1939
Drawn by Roy Parthie
Checked by
Approved by E. H. Scott

FOR ALIGNMENT INSTRUCTIONS, SEE THOSE FOR MODEL SUPER XII.

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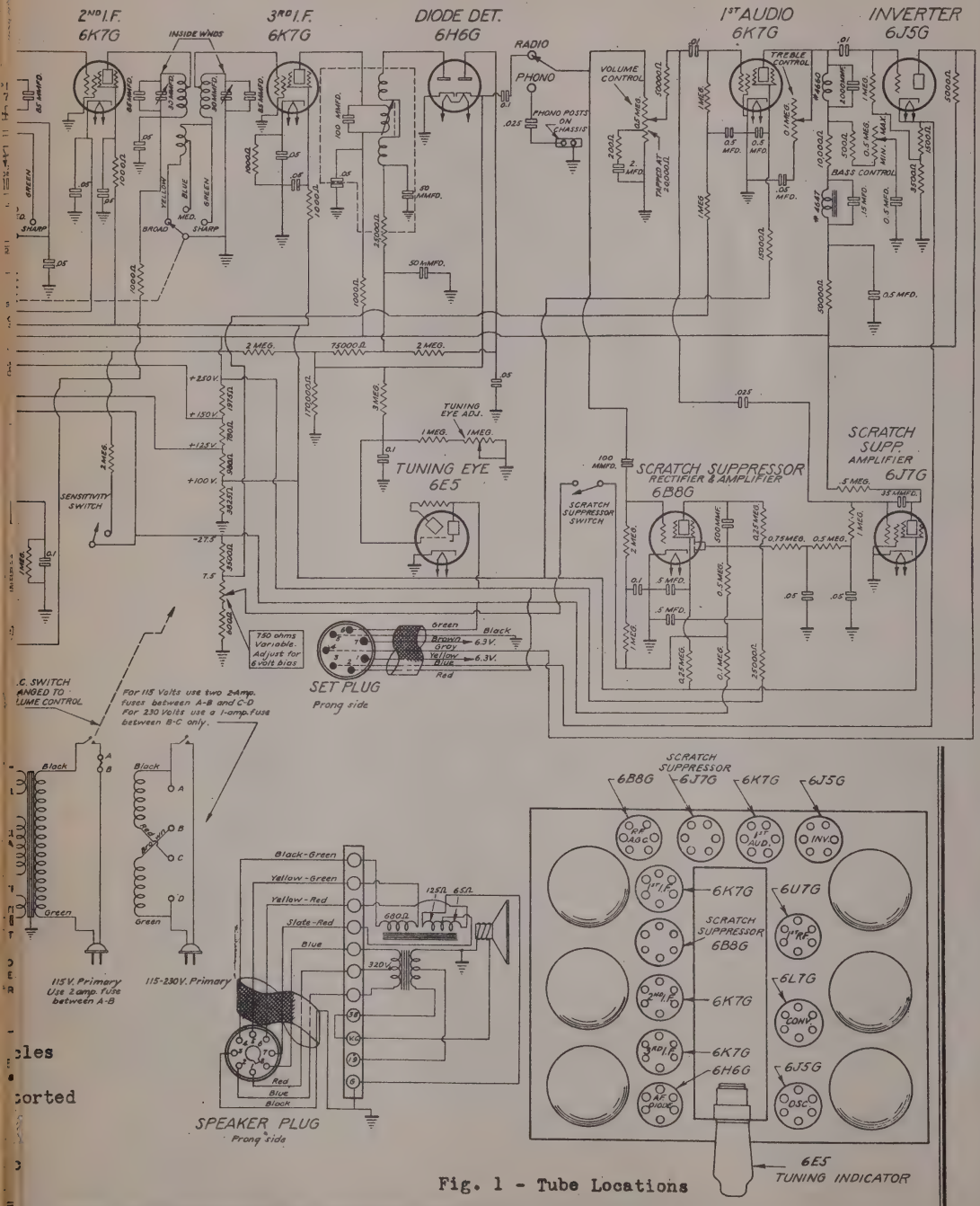
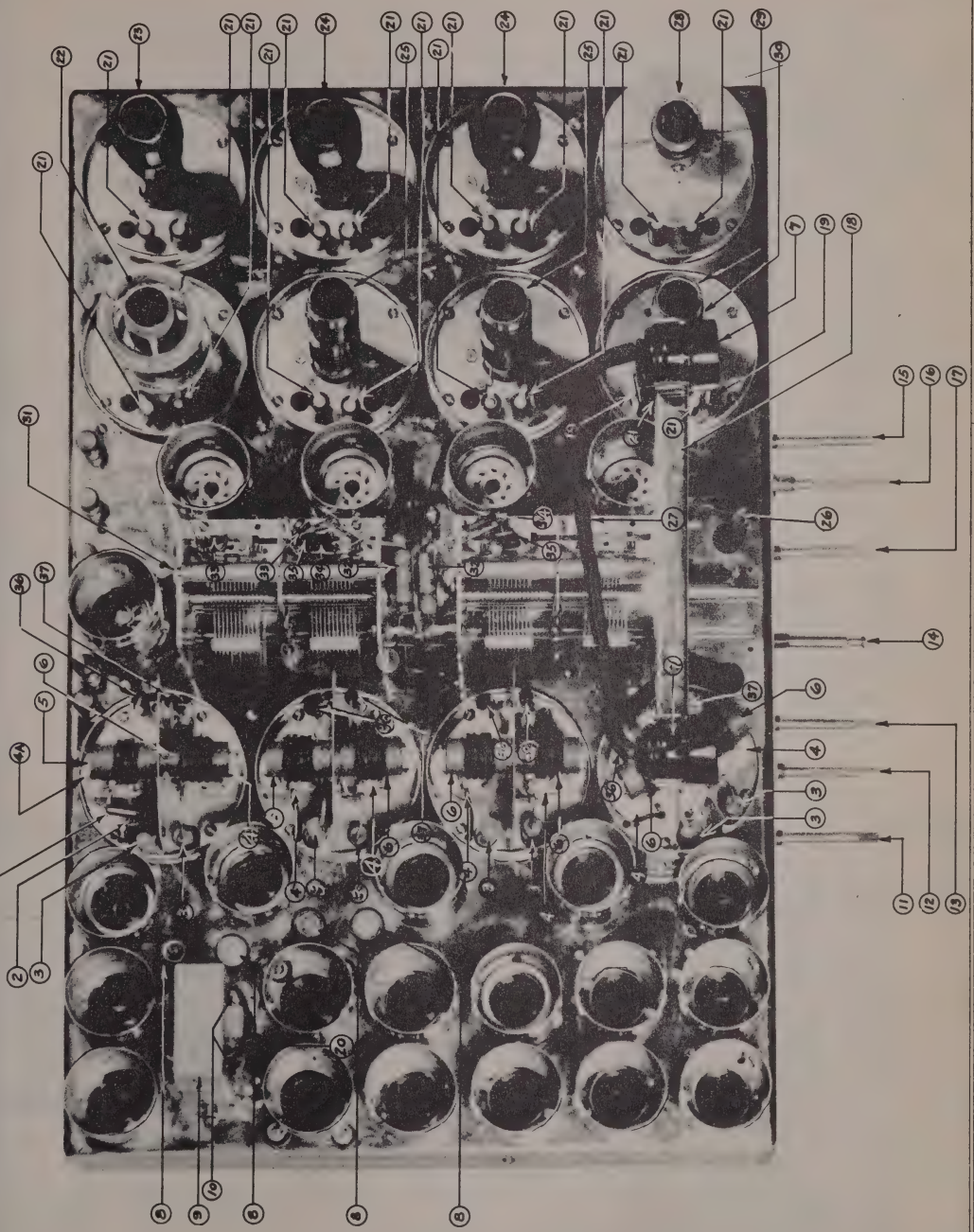


Fig. 1 - Tube Locations

MODEL Philharmonic

E. H. SCOTT RADIO LABS., INC.



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MODEL Phantom

E. H. SCOTT RADIO LABS., INC.

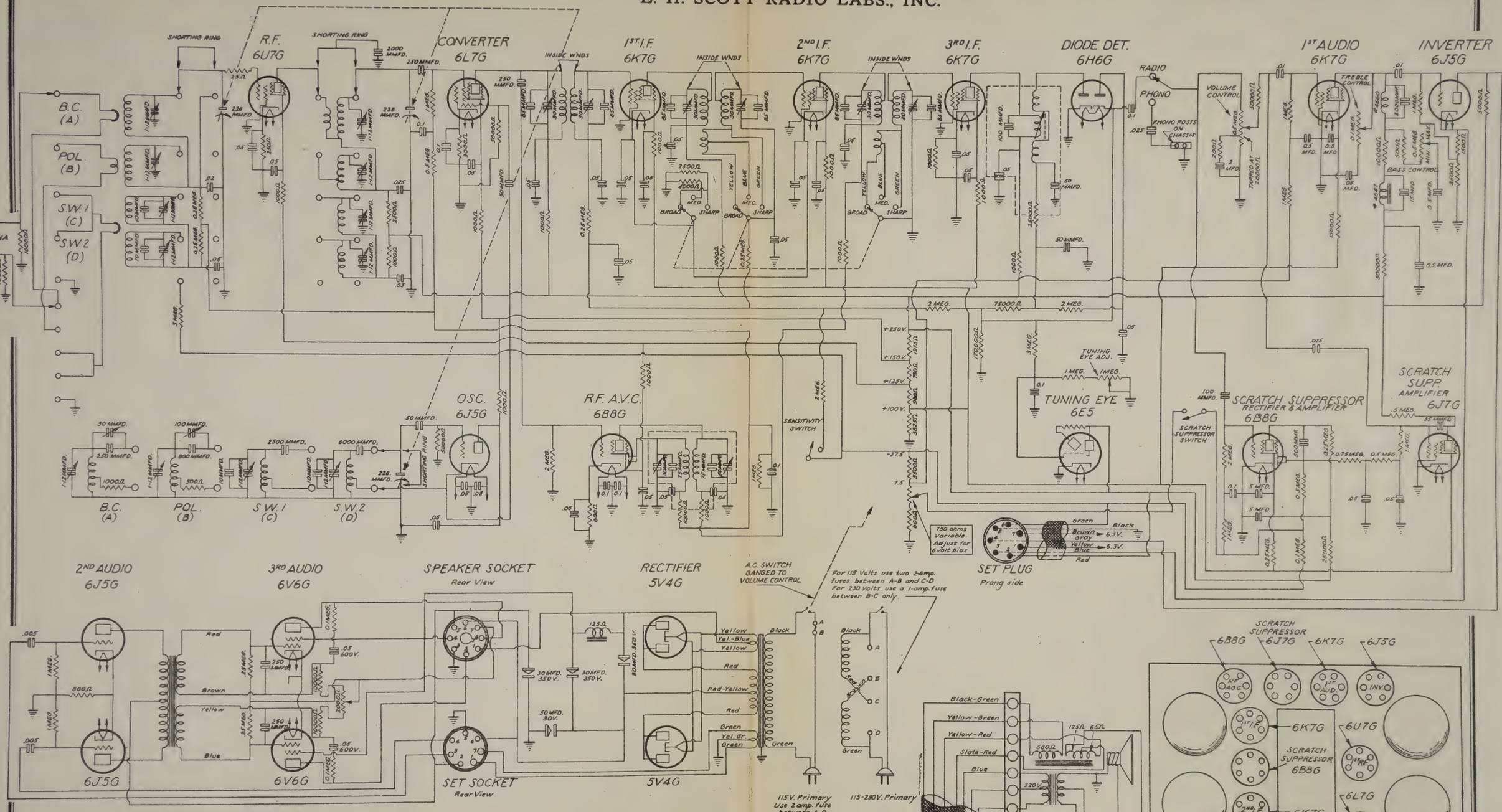

Fig. 1 - Tube Locations

NOTE:—

1. The symbol Ω signifies ohms.

E.H. SCOTT RADIO LABORATORIES INC.	
SCOTT PHANTOM CIRCUIT DIAGRAM	
October 21, 1938	
Drawn by	R.G. Parthie
Checked by	
Approved by	

Voltage Rating	115 volts, 60 cycles
Power Consumption	135 watts
A-F Power Output	13.5 watts undistorted 16 watts peak
I-F Peak	455 kc
R-F Coverage	550 kc to 22.2 mc

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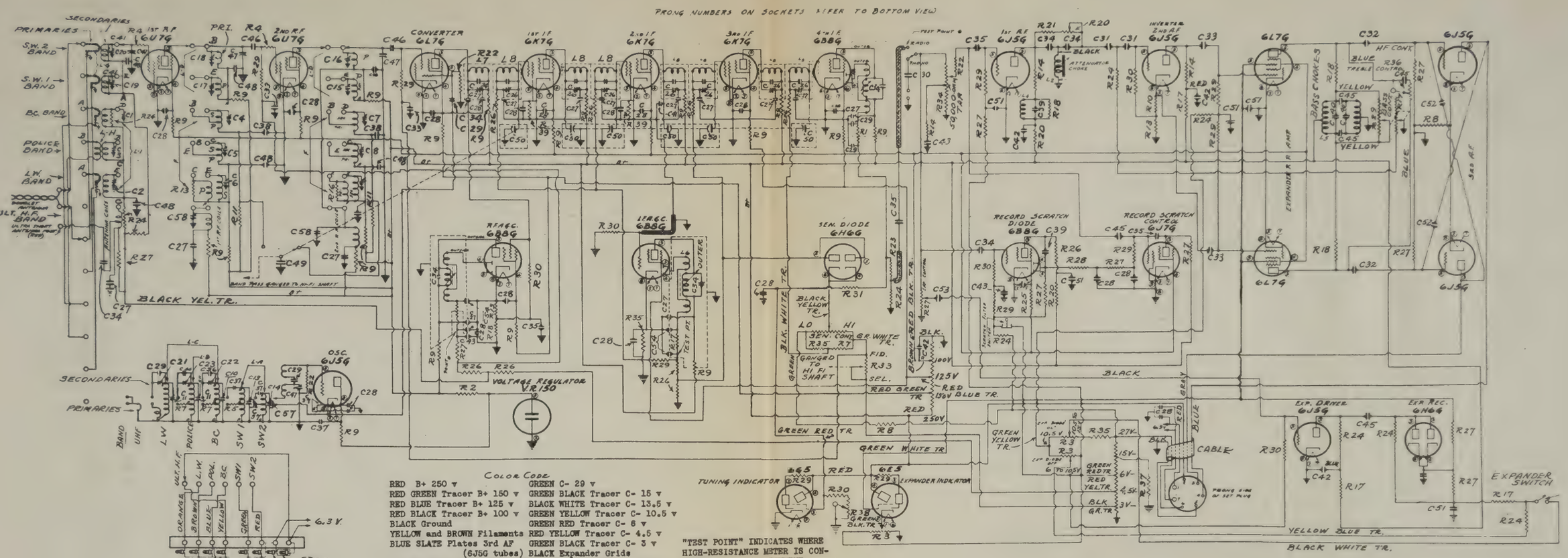
MODEL Philharmonic



Color Code

RED B+ 250 v	GREEN C- 29 v
RED GREEN Tracer B+ 150 v	GREEN BLACK Tracer C- 15 v
RED BLUE Tracer B+ 125 v	BLACK WHITE Tracer C- 13.5 v
RED BLACK Tracer B+ 100 v	GREEN YELLOW Tracer C- 10.5 v
BLACK Ground	GREEN RED Tracer C- 6 v
YELLOW and BROWN Filaments	RED YELLOW Tracer C- 4.5 v
BLUE SLATE Plates 3rd AF (6J5G tubes)	GREEN BLACK Tracer C- 3 v
	BLACK Expander Grids

ALL RF AND IF GRID AND PLATE CIRCUITS SPECIAL RUBBER-COVERED LOW LOSS WIRE

"TEST POINT" INDICATES WHERE HIGH-RESISTANCE METER IS CONNECTED FOR I-F ALIGNMENT

C1 to C20	1-12	C41	25 mmf mica	R1	125 ohms 10 w
C21 to C23	100 mmf air	C42	4 mf 300 v	R2	6500 ohms 2 w
C24	85 mmf and 30 mmf	C43	.1 mf 200 v	R3	300 ohms (variable)
C26	60 mmf air / 30 mmf air	C44	900 mmf mica	R4	25 ohms 1/4 w
C27	.05 mf 400 v	C45	.025 mf 400 v	R5	100 ohms 1/4 w
C28	.05 mf 200 v	C46	250 mmf mica	R6	150 ohms 1/4 w
C29	50 mmf mica	C47	320 mmf gang	R7	500 ohms 1/4 w
C30	.1 mf 600 v	C48	.1 mf 400 v	R8	800 ohms 1/4 w
C31	6000 mmf mica	C49	.15 mf 400 v	R9	1000 ohms 1/4 w
C32	2500 mmf mica	C50	HF Control	R10	1500 ohms 1/4 w
C33	.01 mf 400 v	C51	7 X .5 (200v / 400v)	R11	2500 ohms 1/4 w
C34	100 mmf mica	C52	5 mmf mica	R12	3000 ohms 1/4 w
C35	.01 mf 200 v	C53	1000 mmf mica	R13	3500 ohms 1/4 w
C36	300 mmf mica	C54	2 X .005 mf 200 v	R14	5000 ohms 1/4 w
C37	5000 mmf mica	C55	35 mmf mica	R15	6000 ohms 1/4 w
C38	8000 mmf mica	C56	1 mf 200 v	R16	7500 ohms 1/4 w
C39	500 mmf mica	C57	20 mmf mica	R17	10,000 ohms 1/4 w
C40	.02 mf 400 v	C58	50 mmf mica	R18	15,000 ohms 1/4 w
				R19	20,000 ohms 1/4 w
				R20	25,000 ohms 1/4 w

R21	40,000 ohms 1/4 w	L-A	SW1 and SW2 Osc. coil
R22	50,000 ohms 1/4 w	L-B	Police Osc. coil
R23	75,000 ohms 1/4 w	L-C	LW and BC Osc. coil
R24	.1 megohm 1/4 w	L-G	SW1 and SW2 Ant. coil
R25	.2 megohm 1/4 w	L-H	Police Ant. coil
R26	.25 megohm 1/4 w	L-I	LW and BC Ant. coil
R27	.5 megohm 1/4 w	L-D	SW1 and SW2 RF1 and RF2 coils
R28	.75 megohm 1/4 w	F	LW and BC RF1 and RF2 coils
R29	1 megohm 1/4 w	E	Police RF1 and RF2 coils
R30	2 megohms 1/4 w		
R31	3 megohms 1/4 w		
R32	75,000 ohms 1 w		
R33	2000 ohms control		
R34	.5 megohm control		
R35	600 ohms		
R36	.1 megohm control		
R37	300 ohms		
R38	1 megohm variable		
R39	400 ohms 1/4 w		

L1	1 henry choke
L2	24 mh choke
L3	.7 henry
L4	175 henrys
L5	Diode coil
L6	.8 mh
L7	1.2 mh
L8	

Revised

E. H. SCOTT RADIO LABORATORIES INC.

PHILHARMONIC RECEIVER DIAGRAM

DRAWN BY: R.E.S.

CHECKED BY:

APPROVED BY:

DATE April 4, 1939

Undistorted Output	40 Watts Class A
Audio Frequency Range	30 16,000 cycles.
Wave Length Range	3.75 to 2,000 meters.
Voltage Rating	100-130 volts
Frequency rating	60 cycles
NOTE Designs are obtainable on special order for any commercial frequency or voltage	
Power Consumption	Average around 300 watts.

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MODEL Philharmonic

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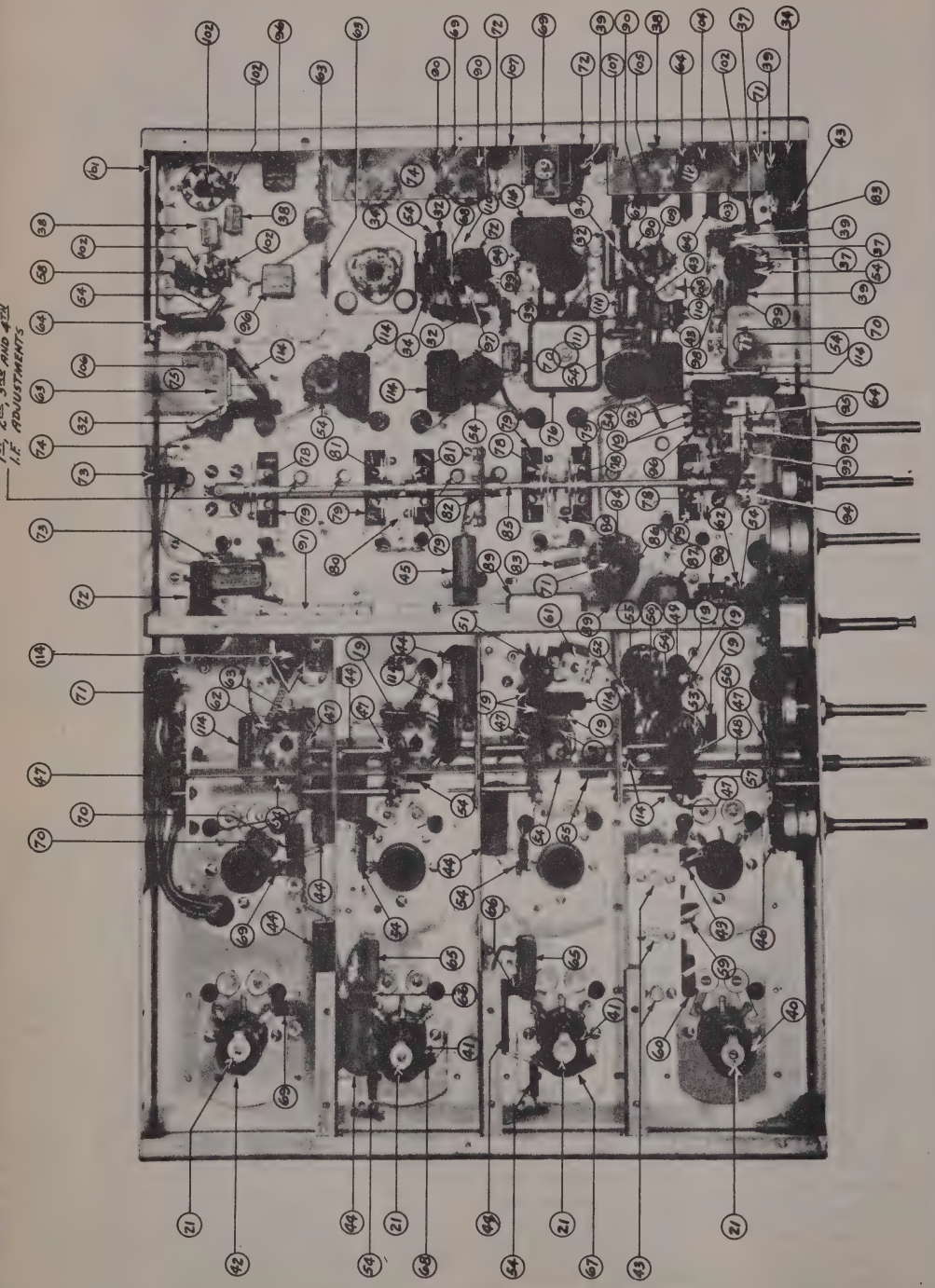

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HUM TESTS ON RECEIVER

The hum is very low in the Scott Super XII. Under normal conditions the hum cannot be read on an output meter. In case of bad hum, replace the 6V6's, or it may be due to the 6F8 or 6K7. The 6K7 is the worst offender for causing hum.

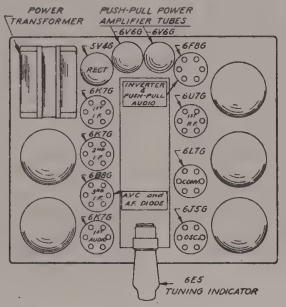

Fig. 1 - Location of Tubes

AUDIO GAIN TEST

With an audio input signal of 0.5 volt at 400 cycles an output reading of 11 volts should be obtained on the output meter which is connected across the voice coil. Make this test with volume full, bass control full, fidelity full and band switch in phono position. If the gain is low it may be due to defective tubes, wrong voltages, shorts or open circuits, either in the set or power amplifier. Both should be checked.

AUDIO FIDELITY TESTS

For correct high fidelity reproduction it is important that the electrical frequency response of the audio system for the phono posts to a 38 or 40 ohm dummy voice coil resistor be approximately 1 1/2 volts at 100 cycles and 4 volts at 6,000 cycles with the bass and fidelity controls on full, after the output has been carefully adjusted, by means of the volume control, to 1 volt at 400 cycles with an input of 0.1 volt at each frequency. Failure of the system to approximate this response (if you are certain that your meters are accurate and that no series meter condenser, which would "cut" low frequencies, is being used) should lead to analysis of the low or high frequency circuit involved to determine and eliminate the trouble.

Alignment of I.F. Section

Connect a good signal generator to the input of the I.F. system. Turn the wave band switch to the broadcast band; have selectivity switch to sharp position (to left); turn tuning dial pointer to Hi-Freq. end of dial.

Connect the negative terminal of a 20,000 ohm per volt DC voltmeter using the 25 volt scale, (or a sensitive microammeter with a 0.5 meg. resistor connected in series with its negative terminal) to the "I.F. Diode Output Point", and connect the positive terminal to the chassis.

Apply an unmodulated 455 Kc. signal of sufficient strength to produce a diode output voltage reading of approximately 10 v. (or 20 microamperes for the microammeter) and very carefully adjust the 1st, 2nd, 3rd, I.F. transformers by removing two buttons from two large round cans. The top adjustment is primary and the adjustment under chassis is secondary.

Adjust the I.F. diode trimmers for maximum meter reading, reducing the input, if necessary, to avoid exceeding the above figures.

Alignment of R.F. Sections

Before starting on this portion of the set, it is important to understand how the tuning wand tool works. One end of this device has a core of material such as Polyiron while the other end is brass. When the inductance of a coil is high, insertion of the brass end will decrease it to the proper resonant value; whereas, insertion of the other end will increase the effective inductance. This gives a very convenient means of determining whether or not it is necessary to add or remove turns from the coil. In the following instructions only a slight adjustment of trimmers and padders should be necessary where original coils are used. Full instructions, however, are given to cover the case where new coils are to be used.

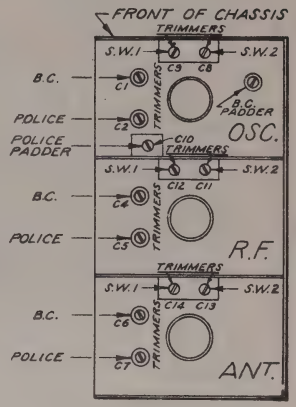

Fig. 2 - Location of Trimmers

Broadcast Band Alignment

First turn the dial pointer completely to the low frequency dial stop and center the pointer between the two heavy marks. Turn the wave band switch to the "Broadcast A" position, set the bass control to minimum, treble control to minimum and connect an output meter across the voice coil. Adjust oscillator trimmer C1, until a 1,400 Kc. signal as set on the dial is tuned in from the generator. Rotate the dial to 600 Kc. and tune in a 600 Kc. signal from the generator by adjusting the padding condenser C3. Check the dial at 950 Kc. and if it tunes high in frequency spread turns on the oscillator secondary. If it is low in frequency push the turns together and then readjust trimmer condenser C1, and padder condenser C3, as before.

With the oscillator circuit correctly spotted, tune in a signal from the generator at 1,400 Kc. and use the output meter as indicated.

Have as weak a signal as possible and adjust trimmers C4 and C6 for maximum output. Turn the dial to 600 Kc. and check the alignment of the R.F. and antenna stages with a tuning wand, spreading turns on the coil where less inductance is needed and pushing turns together if more inductance is required. Readjust the trimmer condenser C4 and C6 for maximum at 1,400 Kc. Turn the dial to 950 Kc. and check the alignment of the R.F. and antenna stages.

Police Band

Set the wave band switch to the Police "B" band position and turn the dial to 3.7 megacycles. Tune in a signal from the generator by adjusting trimmer C2, then turn the dial to 1.8 megacycles and tune in a signal from the generator by adjusting the padder C10. Check the alignment at 2.5 megacycles and if off, either push together or spread turns on the oscillator secondary as described under "Broadcast Band Alignment". Readjust trimmer C2 and padder C10 until correctly aligned. Tune in a signal at

MODEL Philharmonic

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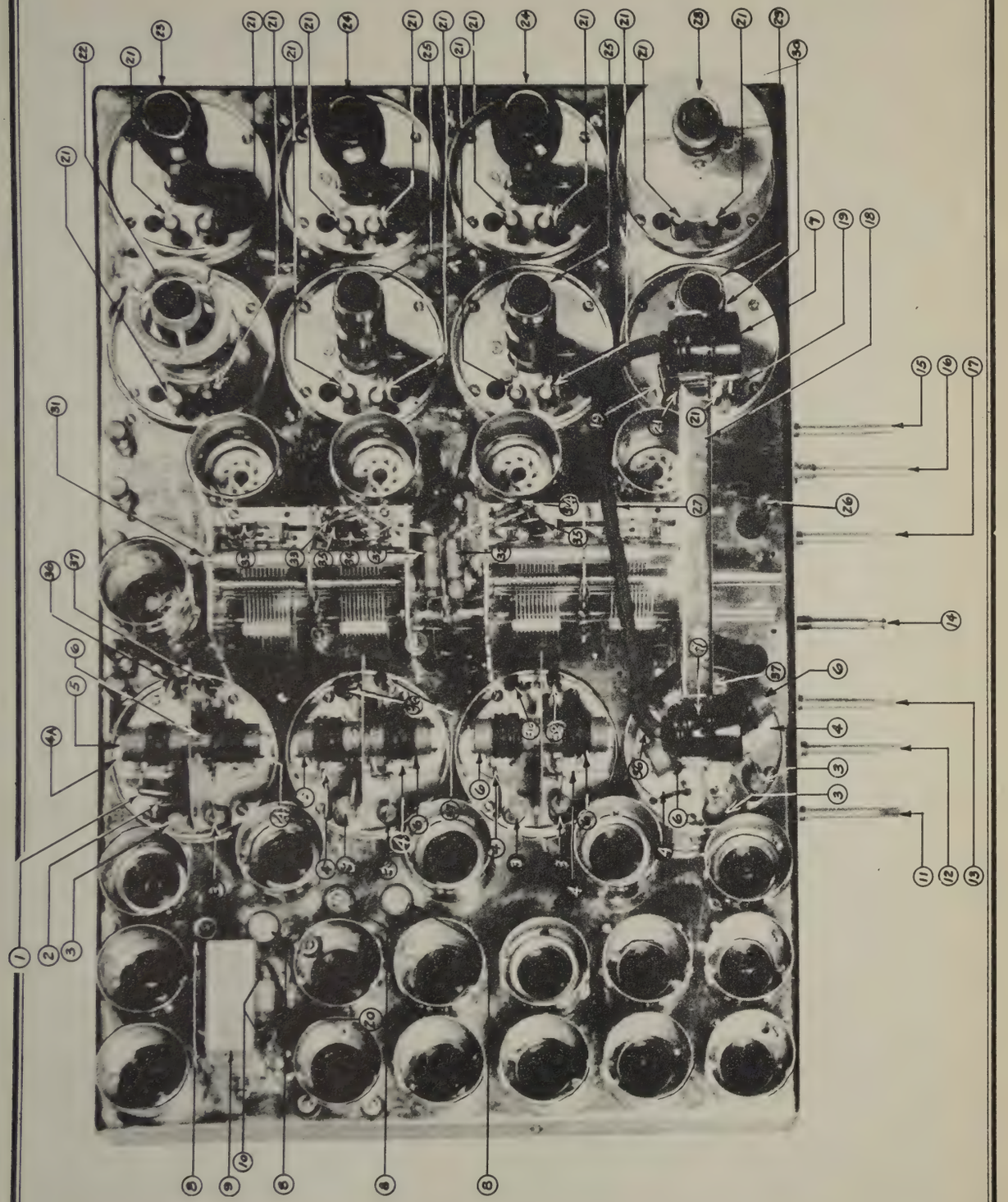

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MODEL Philharmonic

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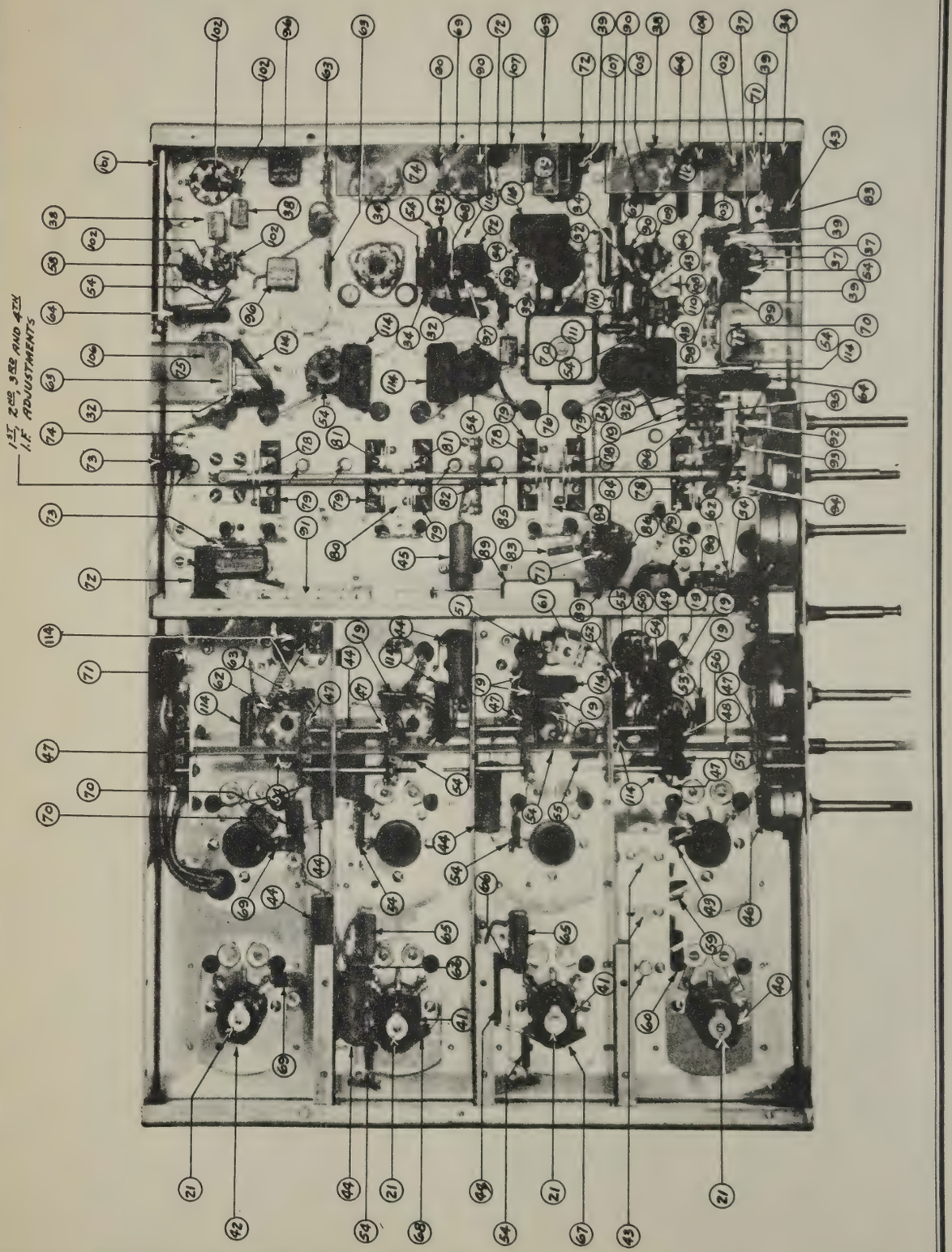

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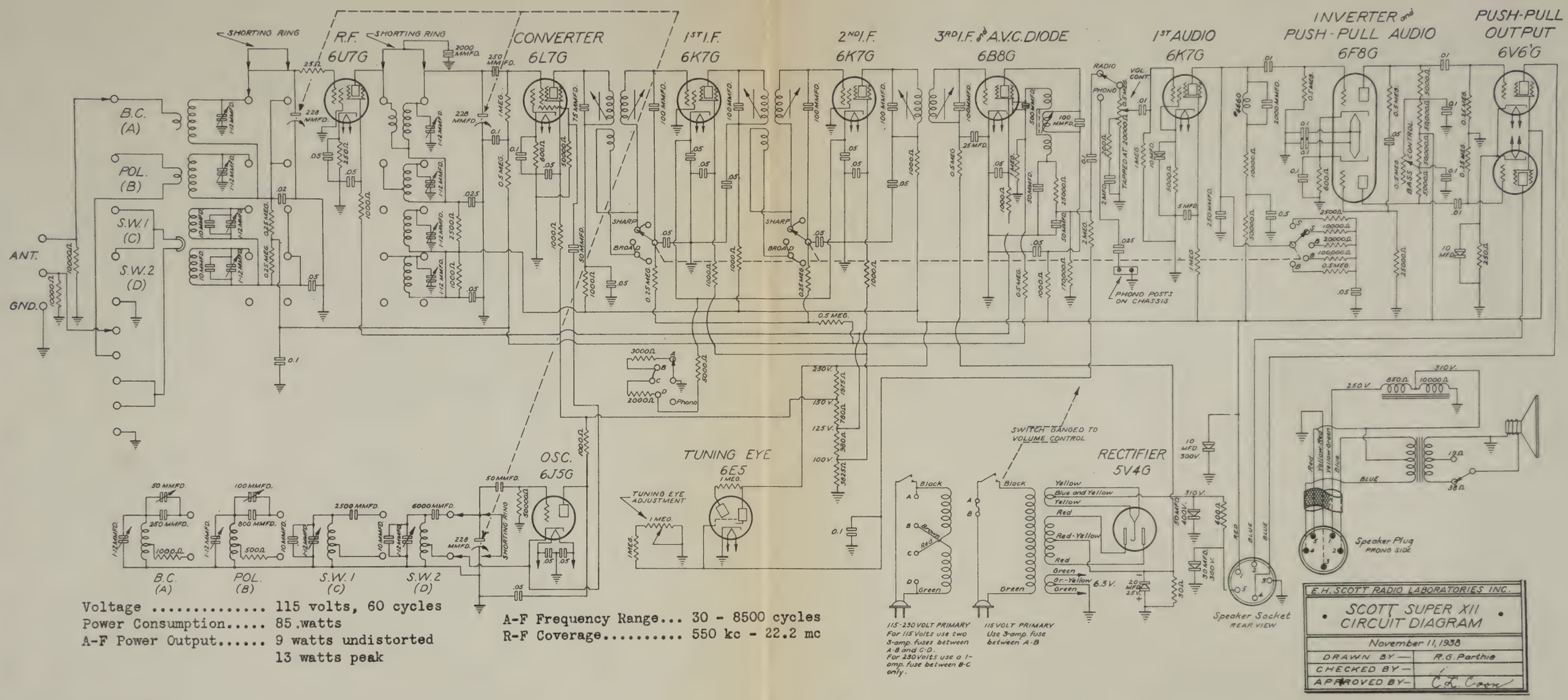

Voltage ..... 115 volts, 60 cycles
Power Consumption..... 85 watts
A-F Power Output..... 9 watts undistorted
13 watts peak

A-F Frequency Range... 30 - 8500 cycles
R-F Coverage..... 550 kc - 22.2 mc

Audio Amplifier

When the wave change switch is set to position "P" the input to the three stage audio system is automatically connected to the phonograph input terminals on the rear of the chassis. A volume control tapped for bass compensation is employed at the input circuit of the 6K7G first audio tube and in the plate circuit of this tube five position treble control circuits are connected. The bass circuit utilizes a special bass boost system giving about 6 db boost at 100 cycles, and is connected in the plates of the 6F8.

The first audio tube is followed by a 6F8 tube which has two functions, acting as a phase inverter and pushpull audio resistance coupled to pushpull 6V6's acting as pentode power tubes.

Power Supply

The power supply employs one of the new 5V4G heater type rectifier tubes. The primary of the power transformer is arranged for standard 115 volts on the domestic model. On the foreign model it is designed to accommodate either 115 volts or 230 volts AC by proper placement of the fuses. This is clearly shown on the schematic diagram. The rectified plate voltages are filtered by the use of two special high capacity electrolytics, the speaker field being employed as a filter choke. In addition, the bias voltage is further filtered by the use of a 20 mfd. condenser.

Loud Speaker

The loud speaker employed is arranged to provide connections for an external speaker. It is necessary only to remove the terminal cover, disconnect the jumper wire between terminals V.C. and 38, and connect it between V.C. and 19 instead. Now connect a 38 ohm speaker to the terminals marked 19 and G. "T" pads may be added by reference to the diagram showing these connections.

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3.7 megacycles and adjust trimmers C5 and C7 to maximum output. Now check the alignment on 1.8 megacycles with a tuning wand and make any necessary corrections by pushing or spreading turns on the coils and readjusting trimmers C5 and C7. Recheck the alignment at 2.5 megacycles.

Foreign S.W. -C- (SW1)

Set the wave band switch to the "C" position and tune in a signal at 9 megacycles by adjusting trimmer condenser C9. Turn the dial to 5 megacycles and if necessary to correct the calibration do so by spreading or pushing turns on the coil and readjusting the trimmer condenser C9. Check the calibration at 6.0 megacycles.

With the oscillator calibrated, tune in a signal at 9 megacycles and adjust trimmer condensers C12 and C14 for maximum output. Check the alignment at 5 and 9 megacycles and make any necessary corrections by pushing or spreading turns on the coils and readjusting trimmers C12 and C14.

Foreign S.W. -D- (SW2)

Set the wave band switch to "D" position and tune in a signal at 20 megacycles by adjusting trimmer C8. Check and if necessary correct the calibration at 12 megacycles by pushing or spreading the turns on the oscillator coil. Check the calibration at 15 megacycles.

With the oscillator correctly aligned tune in a signal at 20 megacycles and adjust trimmers C11 and C13 for maximum output. Check the alignment at 12 and 15 megacycles and make necessary corrections by pushing or spreading turns on the coils. Now, readjust trimmers C11 and C13.

CONNECTING EXTRA SPEAKER

The new type high-fidelity Scott permanent magnet 38-ohm voice coil speaker may be readily connected to a Scott receiver with the optional "T" pad inserted in the voice coil leads where separate control of the extension speaker volume is desired. In case the extension speaker is disconnected, the jumper might be changed to connect terminals "V.C." and "38" together.

ELECTROLYTIC CONDENSERS

The electrolytic condensers are special and in case a replacement is necessary, it must be purchased from the Scott Laboratories.

WAVE CHANGE SWITCH TROUBLE

Poor contact in the wave-change switch can generally be corrected by slightly bending the contacts involved. However, in case a switch section is accidentally damaged beyond repair, this section can be replaced by first removing the dial face, then removing the two screws which support the wave change detent plate and very carefully pulling out the wave change switch shaft. The damaged section can then be unsoldered, removed, and replaced with a new unit, which should be obtained from the Scott Laboratories in Chicago before the change is made in order to insure exact duplication of switch position and connections. Note particularly that the small notch near the center of the switch rotor must be in the same position in each switch section.

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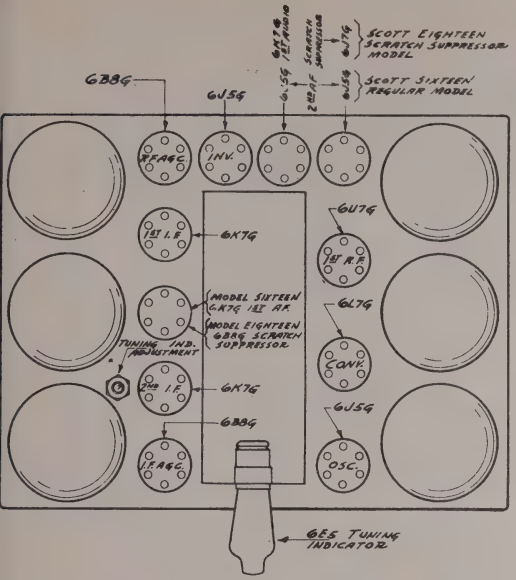

Fig. 1 Showing Tube Locations

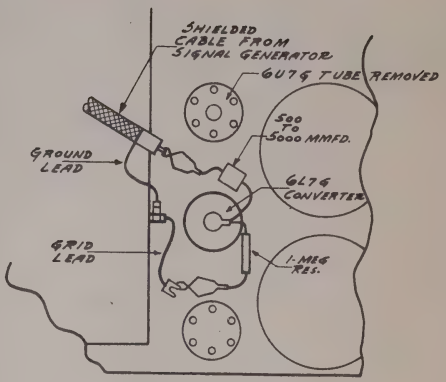

Fig. 2
Signal Generator Connection
For I.F. Alignment

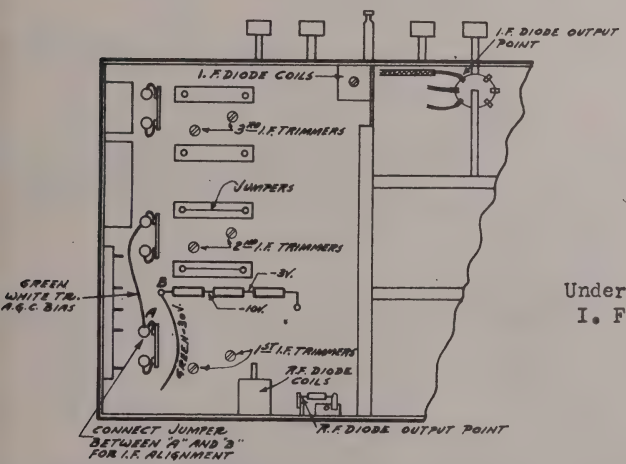

Fig. 3
Under Chassis View Showing
I. F. Adjustments, Etc.,

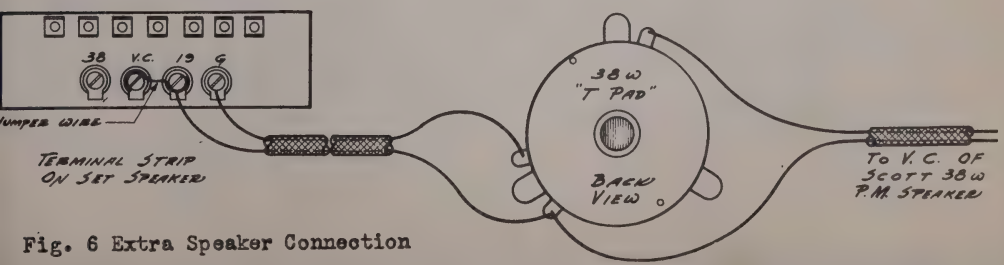

Fig. 6 Extra Speaker Connection

Adjust the I.F. diode trimmers for maximum meter reading, reducing the input, if necessary, to avoid exceeding the above figures.

Alignment of R.F. Sections

Before starting on this portion of the set, it is important to understand how the tuning wand tool works. One end of this device has a core of material such as Polytron while the other end is brass. When the inductance of a coil is high, insertion of the brass end will decrease it to the proper resonant value; whereas, insertion of the other end will increase the effective inductance. This gives a very convenient means of determining whether or not it is necessary to add or remove turns from the coil. In the following instructions only a slight adjustment of trimmers and padders should be necessary where original coils are used. Full instructions, however, are given to cover the case where new coils are to be used.

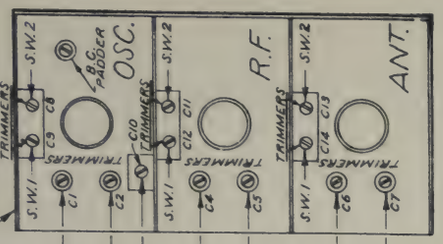

Fig. 2 - Location of Trimmers

Broadcast Band Alignment

First turn the dial pointer completely to the low frequency dial stop and center the pointer between the two heavy marks. Turn the wave band switch to the "Broadcast A" position, set the bass control to minimum, treble control to minimum and connect an output meter across the voice coil. Adjust oscillator trimmer C1, until a 1,400 Kc. signal as set on the dial is tuned in from the generator. Rotate the dial to 600 Kc. and tune in a 600 Kc. signal from the generator by adjusting the padding condenser C3. Check the dial at 950 Kc. and if it tunes high in frequency spread turns on the oscillator secondary. If it is low in frequency push the turns together and then readjust trimmer condenser C1, and padder condenser C3, as before.

With the oscillator circuit correctly spotted, tune in a signal from the generator at 1,400 Kc. and use the output meter as indicated.

Have as weak a signal as possible and adjust trimmers C4 and C6 for maximum output. Turn the dial to 600 Kc. and check the alignment of the R.F. and antenna stages with a tuning wand, spreading turns on the coil where less inductance is needed and pushing turns together if more inductance is required. Readjust the trimmer condenser C4 and C6 for maximum at 1,400 Kc. Turn the dial to 950 Kc. and check the alignment of the R.F. and antenna stages.

Police Band

Set the wave band switch to the Police "B" band position and turn the dial to 3.7 megacycles. Tune in a signal from the generator by adjusting trimmer C2, then turn the dial to 1.8 megacycles and tune in a signal from the generator by adjusting the padder C10. Check the alignment at 2.5 megacycles and if off, either push together or spread turns on the oscillator secondary as described under "Broadcast Band Alignment". Readjust trimmer C2 and padder C10 until correctly aligned. Tune in a signal at 3.7 megacycles and adjust trimmers C5 and C7 to maximum output. Now check the alignment on 1.8 megacycles with a tuning wand and make any necessary corrections by pushing or spreading turns on the coils and readjusting trimmers C5 and C7. Recheck the alignment at 2.5 megacycles.

Foreign S.W. -C- (SW1)

Set the wave band switch to the "C" position and tune in a signal at 9 megacycles by adjusting trimmer condenser C9. Turn the dial to 5 megacycles and if necessary to correct the calibration do so by spreading or pushing turns on the coil and readjusting the trimmer condenser C9. Check the calibration at 6.0 megacycles.

With the oscillator calibrated, tune in a signal at 9 megacycles and adjust trimmer condensers C12 and C14 for maximum output. Check the alignment at 5 and 9 megacycles and make any necessary corrections by pushing or spreading turns on the coils and readjusting trimmers C12 and C14.

Foreign S.W. -D- (SW2)

Set the wave band switch to "D" position and tune in a signal at 20 megacycles by adjusting trimmer C8. Check and if necessary correct the calibration at 12 megacycles by pushing or spreading the turns on the oscillator coil. Check the calibration at 15 megacycles.

With the oscillator correctly aligned tune in a signal at 20 megacycles and adjust trimmers C11 and C13 for maximum output. Check the alignment at 12 and 15 megacycles and make necessary corrections by pushing or spreading turns on the coils. Now, readjust trimmers C11 and C13.

CONNECTING EXTRA SPEAKER

The new type high-fidelity Scott permanent magnet 38-ohm voice coil speaker may be readily connected to a Scott receiver with the optional "T" pad inserted in the voice coil leads where separate control of the extension speaker volume is desired. In case the extension speaker is disconnected, the jumper might be changed to connect terminals "V.C." and "38" together.

ELECTROLYTIC CONDENSERS

The electrolytic condensers are special and in case a replacement is necessary, it must be purchased from the Scott Laboratories.

WAVE CHANGE SWITCH TROUBLE

Poor contact in the wave-change switch can generally be corrected by slightly bending the contacts involved. However, in case a switch section is accidentally damaged beyond repair, this section can be replaced by first removing the dial face, then removing the two screws which support the wave change detent plate and very carefully pulling out the wave change switch shaft. The damaged section can then be unsoldered, removed, and replaced with a new unit, which should be obtained from the Scott Laboratories in Chicago before the change is made in order to insure exact duplication of switch position and connections. Note particularly that the small notch near the center of the switch rotor must be in the same position in each switch section.

HUM TESTS ON RECEIVER

The hum is very low in the Scott Super XII. Under normal conditions the hum cannot be read on an output meter. In case of bad hum, replace the 6V6's, or it may be due to the 6F8 or 6K7. The 6K7 is the worst offender for causing hum.

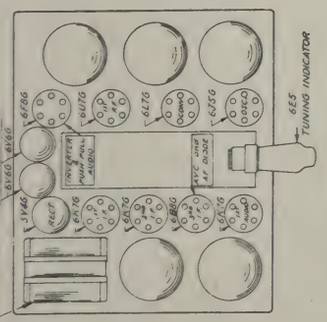

Fig. 1 - Location of Tubes

AUDIO GAIN TEST

With an audio input signal of 0.5 volt at 400 cycles an output reading of 11 volts should be obtained on the output meter which is connected across the voice coil. Make this test with volume full, bass control full, fidelity full and band switch in phono position. If the gain is low it may be due to defective tubes, wrong voltages, shorts or open circuits, either in the set or power amplifier. Both should be checked.

AUDIO FIDELITY TESTS

For correct high fidelity reproduction it is important that the electrical frequency response of the audio system for the phono posts to a 38 or 40 ohm dummy voice coil resistor be approximately 1 1/2 volts at 100 cycles and 4 volts at 6,000 cycles with the bass and fidelity controls on full, after the output has been carefully adjusted, by means of the volume control, to 1 volt at 400 cycles with an input of 0.1 volt at each frequency. Failure of the system to approximate this response (if you are certain that your meters are accurate and that no series meter condenser, which would "cut" low frequencies, is being used) should lead to analysis of the low or high frequency circuit involved to determine and eliminate the trouble.

Alignment of I.F. Section

Connect a good signal generator to the input of the I.F. system. Turn the wave band switch to the broadcast band; have selectivity switch to sharp position (to left); turn tuning dial pointer to Hi-Freq. end of dial.

Connect the negative terminal of a 20,000 ohm per volt DC voltmeter using the 25 volt scale, (or a sensitive microammeter with a 0.5 meg. resistor connected in series with its negative terminal) to the "I.F. Diode Output Point", and connect the positive terminal to the chassis.

Apply an unmodulated 455 Kc. signal of sufficient strength to produce a diode output voltage reading of approximately 10 v. (or 20 microamperes for the microammeter) and very carefully adjust the 1st, 2nd, 3rd, I.F. transformers by removing two buttons from two large round cans. The top adjustment is primary and the adjustment under chassis is secondary.

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MODELS 16,18

E. H. SCOTT RADIO LABS., INC.

REVISED SIXTEEN WITH 2 POSITION SELECTIVITY SWITCH

R.F. 6U7G · CONVERTER 6L7G · 1ST I.F. 6K7G · 2ND I.F. 6K7G · 3RD I.F. AND A.G.C. 6B8G · 1ST A.F. 6K7G · INVERTER 6J5G · 2ND A.F. 6J5G

SHARP — BROAD · TWO POSITION SWITCH 3 GANG · 2000Ω · 1000Ω

B.C. (A) · POLICE (B) · S.W.1 (C) · S.W.2 (D) · SHORTING RING · DOUBLET ANTENNA · GROUND LEAD

OSC. 6J5G

B.C. (A) · POLICE (B) · S.W.1 (C) · S.W.2 (D) · 3 TURNS FROM GROUND END

A.F.A.G.C. 6B8G

TUNING IND. 6E5 · SENSITIVITY SWITCH · MIN. · MAX.

RADIO · PHONO · VOLUME · FIDELITY · BASS

NOTE: 2ND. A.F. PUSH PULL STAGE LOCATED IN AMPLIFIER BASE ON SCOTT EIGHTEEN.

6J5G 2ND A.F.

8 MFD.

6V6G · 6V6G · 5Y4G · 5Y4G · SPEAKER SOCKET BOTTOM VIEW · SET SOCKET BOTTOM VIEW · DUAL PHONO JACK

115 VOLT PRIMARY USE 3 A. FUSE BETWEEN A-B · 115-230 VOLT PRIMARY

FOR 115 VOLTS USE TWO-1 AMPERE FUSES BETWEEN A-B AND C-D · FOR 230 VOLTS USE A ONE AMPERE FUSE BETWEEN B-C ONLY

CABLE · PRONG SIDE OF SPEAKER PLUG · PRONG SIDE OF SET PLUG

GB8G · GJ7G · To 1ST A.F. GK7G

SCOTT EIGHTEEN HAS SCRATCH SUPPRESSOR CONNECTED TO VOLUME CONTROL AS SHOWN

E. H. SCOTT RADIO LABORATORIES INC.

CIRCUIT DIAGRAM OF SCOTT SIXTEEN ALSO SCOTT EIGHTEEN

AUGUST 15, 1932	
DRAWN BY	R.E. STRANG
CHECKED BY	
APPROVED BY	

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HUM TESTS ON RECEIVER

Make certain that there are no soldering irons near the chassis and that the power transformer end of the amplifier is as far away from the chassis as possible. Connect a good output meter, having a resistance of 3000 ohms or more to the 6V6G plates (No. 3 prong) and have a 1 to 2 mfd. condenser in series with one lead to the meter.

With bass full on - treble full - and volume off the hum should not exceed .2 of a volt. To make overall tests, remove the 2nd audio 6J5G tubes. The hum should now drop to less than 0.1 volt. If it does not the amount of hum read on the meter is the hum in the amplifier itself. Leave the tubes out and change the 6V6G tubes in the amplifier until the hum is reduced to a minimum. The phone jack may be defective or there may be filament shorts, check the circuit and connections and get the hum out of the amplifier before proceeding with the rest of the test.

NOTE: It is highly important, in minimizing hum to use the spiral heater type 6K7G and 6J5G tubes in the audio system since, while considerable bass boost is available, tubes are the sole source of hum, there being no hum pickup whatsoever in chokes, transformers, etc.

After a very few of the first receivers were shipped out, a 250 mmfd. mica condenser was added to the grid circuit of each 6V6G tube to eliminate high frequency parasitic oscillation which occurred with some tubes. If these two condensers are not present, they should be added, as shown on the circuit diagram, otherwise oscillation may occur when the 2nd A. F. 6J5G tubes are removed.

After the amplifier is found to be O. K. replace the 2nd audio tubes and remove the inverter and 1st audio, now substitute for the 2nd audio tubes until hum is reduced to a minimum, allowing sufficient time in each case for the tubes to heat up properly. Next try the inverter tube in the same manner and follow with the 1st audio 6K7G. It may be necessary to push the filament wires nearer the base and away from grid wiring on some of the tube sockets, also the dial light circuit may be shorted against the dial frame. All these points should be checked along with the trying of new tubes.

AUDIO GAIN TEST

With an Audio input signal of 0.1 volt at 400 cycles an output reading of between 2 and 3 volts should be obtained on the output meter which is connected across the voice coil. Make this test with Volume full, Bass control 1/2 on, Fidelity full and Band Switch in Phono position. If the gain is low it may be due to defective tubes, wrong voltages, shorts or open circuits, either in the set or power amplifier. Both should be checked.

AUDIO FIDELITY TESTS

For correct high fidelity reproduction it is important that the electrical frequency response of the audio system, from the phono posts to a 38 (or 40) ohm dummy voice coil resistor, approximate 5 volts at 75 cycles and 6 volts at 6250 cycles with the bass and fidelity controls on full, after the output has been carefully adjusted, by means of the volume control, to 1 volt at 400 cycles with an input of 0.1 volt at each frequency. Failure of the system to approximate this response (if you are certain that your meters are accurate and that no series meter condenser, which would "cut" low frequencies, is being used) should lead to analysis of the low of high frequency circuit involved to determine and eliminate the trouble.

HOW TO ADJUST THE AUTOMATIC RECORD SCRATCH SUPPRESSION CIRCUIT ON THE SPECIAL SCOTT EIGHTEEN

This test refers only to the 18 tube model and can be ignored when checking the Sixteen. See Fig. 1 for tube locations in Scott Eighteen.

Connect an output meter across the Voice coil circuit (V.C. to G.) Connect an audio oscillator and a sensitive output meter to the phono-posts, and turn the Wave Switch to position "P" (allway to right). With the Bass Control set to minimum, treble control full on, and Scratch Suppressor switch pushed in, apply 0.25 volt at 3500 cycles to the phono posts. Set the volume control so that 1 volt is obtained on the output meter across the voice coil. Pull out the suppressor switch and the 1 volt reading should just start to drop (say to .9V.) Now push the suppressor switch in (off position) and reduce the audio oscillator input to 0.05 volts, reset the volume control to obtain a 1 volt reading again on the voice coil output meter and now pull out the suppressor switch ("on" position). The 1 volt reading should now drop to a level of 0.2 of a volt or slightly under. This gives a reduction ratio of 5 to 1 and this is the proper ratio to maintain. If this 5 to 1 reduction is not obtained the 6 volt bias should be reduced slightly by shunting it to ground by a suitable resistor. The value of this resistor will lie somewhere between 800 and 5000 ohms. It will have to be determined by substitution of various resistors. If too much control is obtained, it may be due to an abnormal 6J7G.

The 6B8G tube determines the level at which the circuit starts to cut high frequencies and the 6J7G tube determines the amount of this cut.

HOW TO ALIGN AND BAND PASS THE I. F. AMPLIFIER

While this operation is quite difficult in many receivers the Scott Sixteen and Eighteen incorporate a new development which greatly simplifies this adjustment if the following procedure is carefully followed. However, the I. F. adjustments should be changed only as a last resort on positive indication that the I. F. alignment has become impaired. A good signal generator should be connected to the input of the I. F. system at the grid of the 6L7G converter tube using the circuit shown in Fig. 2, in order to maintain normal operating bias. Turn the wave band switch to the Broadcast Band; turn the tuning pointer to the extreme high frequency end of the dial; push in the sensitivity switch; and remove the 6U7G R. F. tube.

Now referring to the underside view of the chassis, Fig. 2, connect a jumper wire between points "A" and "B". Remove the wire jumpers which shunt the terminals of the 2nd I. F. Transformer as shown in Fig. 3, leaving these terminals vacant, and connect two solid wire jumpers across the two terminal strips of the 3rd I. F. transformer. (In case resistors are found connected across any of the terminal strips their positions should be carefully noted on a piece of paper since they must be replaced exactly as found, when the operation is completed.) NOTE: Turn set off when changing jumpers to avoid shock from the plate voltage. Connect the negative terminal of a 20,000 ohm per volt D. C. voltmeter using the 25 volt scale, (or a sensitive microammeter with a 0.5 meg. resistor connected in series with its negative terminal) to the "I. F. Diode Output Point" shown in Fig. 3 and the positive terminal to the chassis.

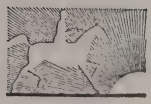
Apply an unmodulated 465 K. C. signal of sufficient strength to produce a diode output voltage reading of approximately 10V (or 20 microamperes for the microammeter) and very carefully adjust the 1st, 2nd, 3rd I. F. and I. F. diode trimmers for maximum meter reading, reducing the input, if necessary, to avoid exceeding the above figures.

PERPETUAL

ROUBLE SHOOTER'S MANUAL

Reg. U.S. Pat. Off.

VOLUME XIV



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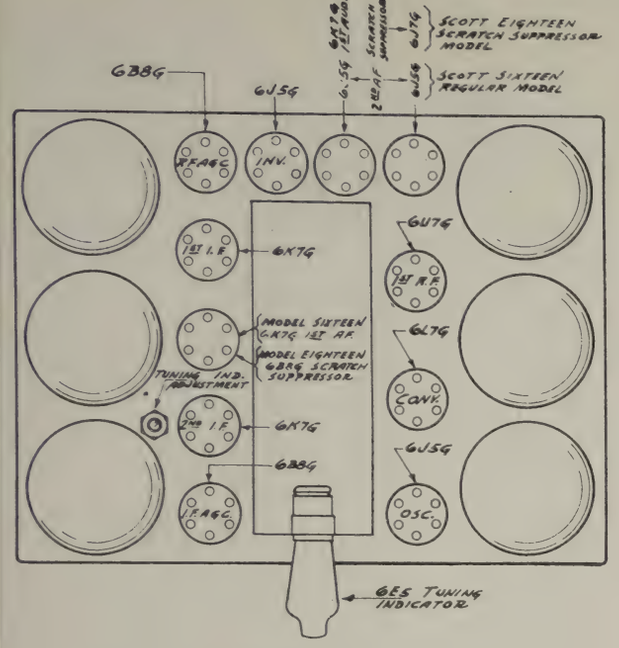

Fig. 1 Showing Tube Locations

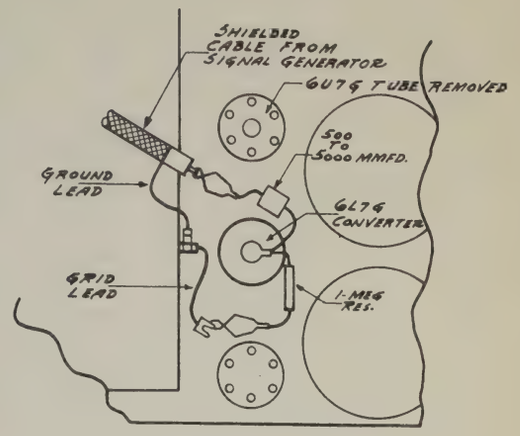

Fig. 2
Signal Generator Connection
For I.F. Alignment

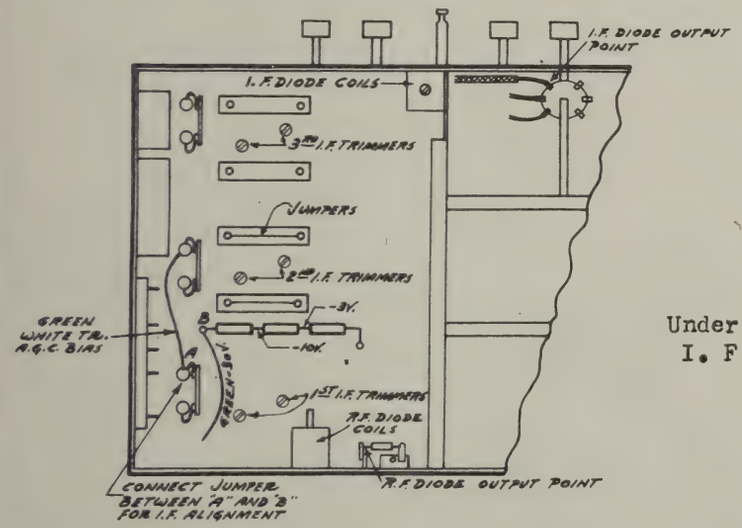

Fig. 3
Under Chassis View Showing
I. F. Adjustments, Etc.,

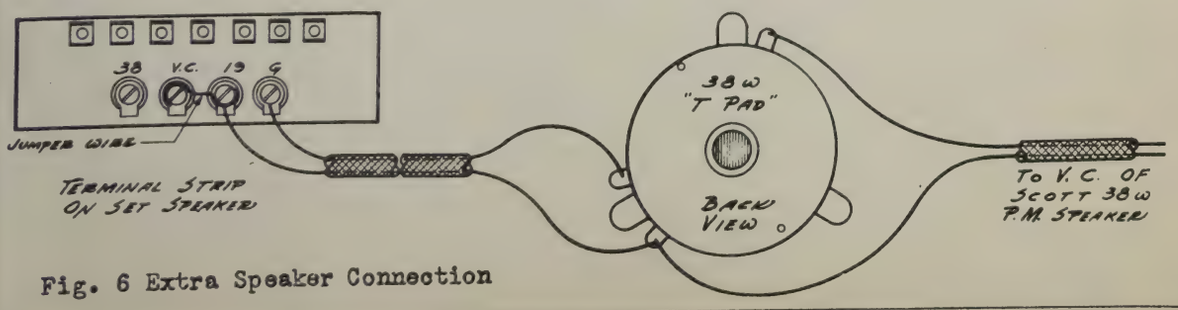

Fig. 6 Extra Speaker Connection

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TROUBLE SHOOTER'S MANUAL

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VOLUME XIV

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by

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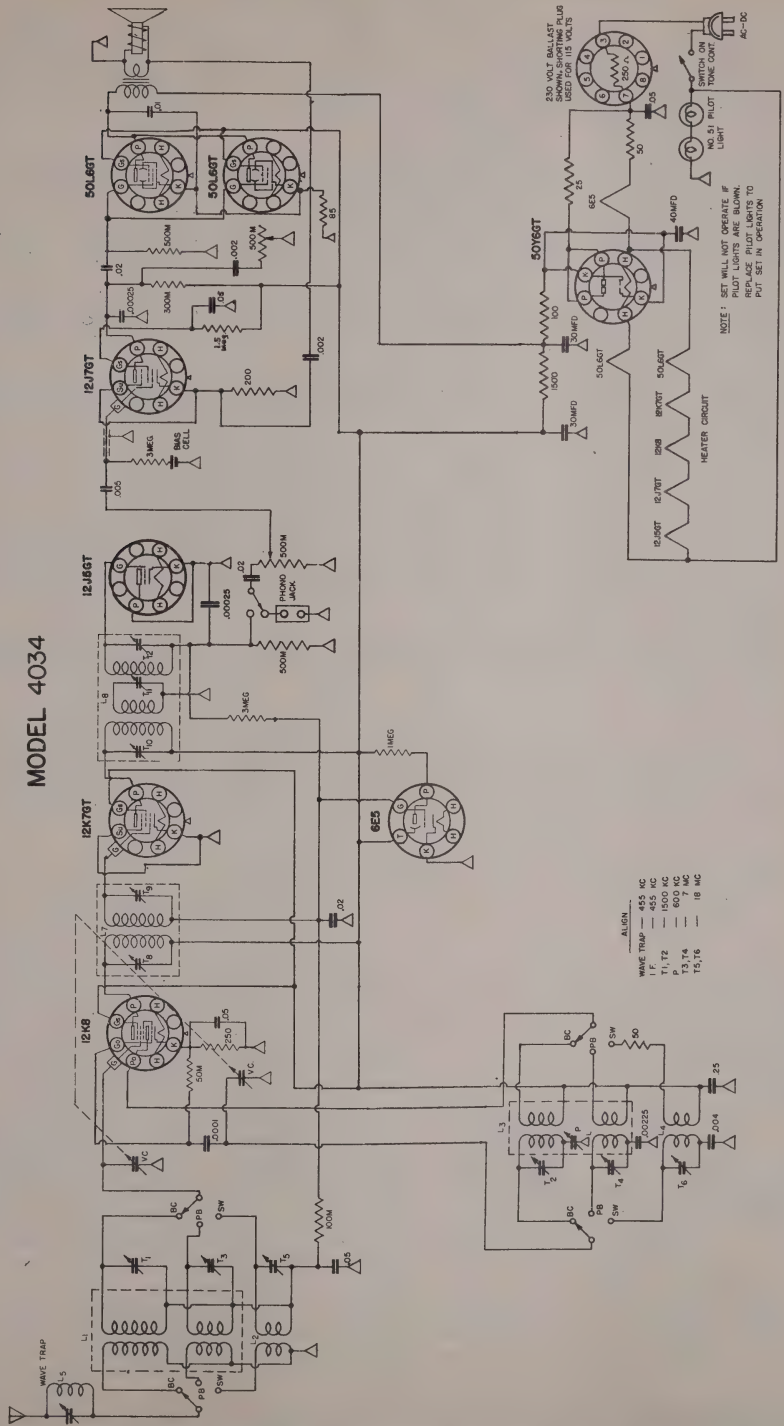
Printed in U. S. A.

AIR KING PRODUCTS CO., INC.

MODEL 4034



MODEL 4136

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FAILURE OF MECHANISM TO CHANGE TO THE NEXT RECORD: An old record may occasionally be found (made before the introduction of automatic phonographs) that does not carry the needle close enough to the turntable spindle to set the changer mechanism in operation. Should one of these old records be used, moving the "REJECT" button will operate the changer mechanism. Need for doing this can be avoided by placing the old record at the top of the stack, so that it will come into position last.

SELECTION OF NEW RECORDS: When buying records inspect them carefully to be sure that they do not have chipped edges and that they are perfectly flat. Records that are warped or "saucer shaped" or that have chipped edges may not operate properly in the phonograph mechanism.

TO AVOID WARPING OF RECORDS, NEVER LEAVE RECORDS RESTING ON THE SHELF PLATES WHEN RECORD PLAYER IS SHUT OFF.

IF NOISE DEVELOPS: Scratching indicates worn records. Poor tone is evidence of a worn needle. Some records will wear longer than others, even if kept equally clean. This is due not only to quality of manufacture and care given the records, but also to the kind of music recorded.

OILING: For oiling, remove the turntable by lifting it straight up with both hands. Remove the cadmium plated screw marked "Oil Hole" in the illustration. Put in a few drops of oil (S. A. E. 20) and replace the screw. The motor should be oiled about once a year with this oil, at which time it is advisable to put a drop of oil on all friction surfaces of the mechanism.

ADJUSTING THE STARTING POSITION OF NEEDLE: Should the pickup arm not come down with the needle the proper distance from the edge of the record, it may be adjusted as follows:

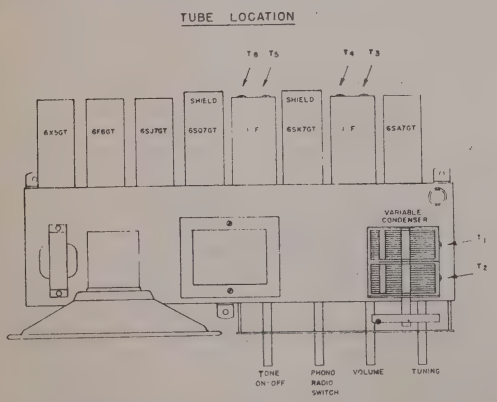
Place a record on the turntable and rotate the turntable by hand. Push the "REJECT" button while continuing to rotate the turntable, until the needle is just about to touch the record as at the start of playing. Loosen the pickup arm adjusting screw about one turn (see illustration). Shift the screw slightly in its slot (which will move the pickup arm and needle) until the needle is at the proper distance from the edge of the record. Then tighten the pickup arm adjusting screw.

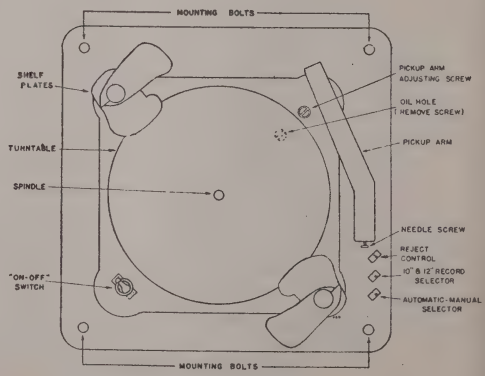
LOADING THE RECORDS FOR AUTOMATIC OPERATION: This mechanism automatically plays in sequence up to twelve 10" records or ten 12" records at one set-up. ALL RECORDS MUST BE THE SAME SIZE FOR EACH SET-UP.

The changer plates should be turned so that the larger bottom shelf plates are toward the center of the turntable. The stack of records should then be placed over the spindle and allowed to rest on the shelf plates.

Move the slide button so that the marking "10" or "12" is exposed, in agreement with the size of the records to be played.

Move the AUTOMATIC-MANUAL button so that "AUTOMATIC" is exposed.





STARTING THE MECHANISM: With the radio turned on and set for record reproduction, snap the turntable switch on. The pickup should be on its rest. Push the "REJECT" button. (The button returns to its normal position automatically.) This will release the bottom record from the stack and the pickup arm will drop to its proper position on the record and start playing. When the end of the record is reached, the mechanism will automatically lift the pickup arm from the played record, will drop the next record into position, and will bring the pickup arm into place for playing this record. The mechanism will continue to repeat the last record until switched off.

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MODEL 4136

AIR KING PRODUCTS CO., INC.

I.F. PEAK 455 KC

SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION
	1104536	Cable—Dial and Spring
	1106331	Cartridge—Crystal
L1	1102812S	Coil—Antenna Loop
L2	1102812A	Coil—Loading
L3	1102812B	Coil—Oscillator
C1		Condenser—05, 400 volts
C2, C7		Condenser—1, 400 volts
C4		Condenser—.0005 mica
C5, C6		Condenser—.0001 mica
C8		Condenser—.002, 400 volts
C9		Condenser—.1, 400 volts,
C10		Condenser—.0025, 400 volts
C11, C12		Condenser—.02, 400 volts
C13		Condenser—.005, 800 volts
C14, C15, C16	1102063	Condenser—20 mfd, 12 mfd, 12 mfd, 350 volt, electrolytic
C17		
C18		
R15	1102515	
R6	1102454	
R1		Condenser—03 moulded mica
R2		Condenser—05 moulded mica
R3		Control—"Off-tone" .5 megohm with switch
R4, R10		Control—Volume, .5 megohm (tap at 90,000)
R5		Resistor—1000 ohms, ¼ watt
R7, R12		Resistor—20,000 ohms, ¼ watt
R8		Resistor—15,000 ohms, 1 watt
R9		Resistor—10 megohms, ¼ watt
R11		Resistor—2.2 megohms, ¼ watt
R13		Resistor—3 megohms, ¼ watt
R14		Resistor—50,000 ohms, ¼ watt
R16		Resistor—.75 megohms, ¼ watt
R17		Resistor—.5 megohms, ¼ watt
		Resistor—400 ohms, 1, watt, wire-wound
		Resistor—1600 ohms, 2 watt, wire-wound
		Resistor—400 ohms, 1 watt, wire-wound

MODEL 4234
MODELS 4232, 4233
4246, 4248
4252, 4254

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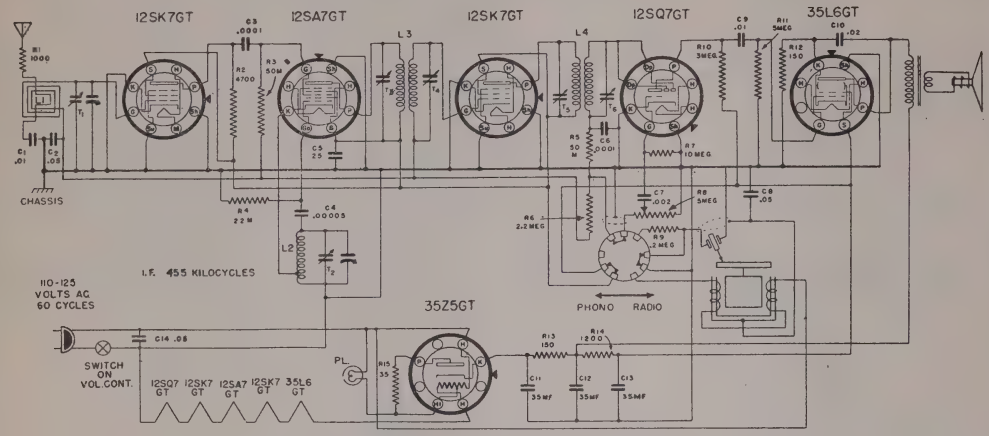
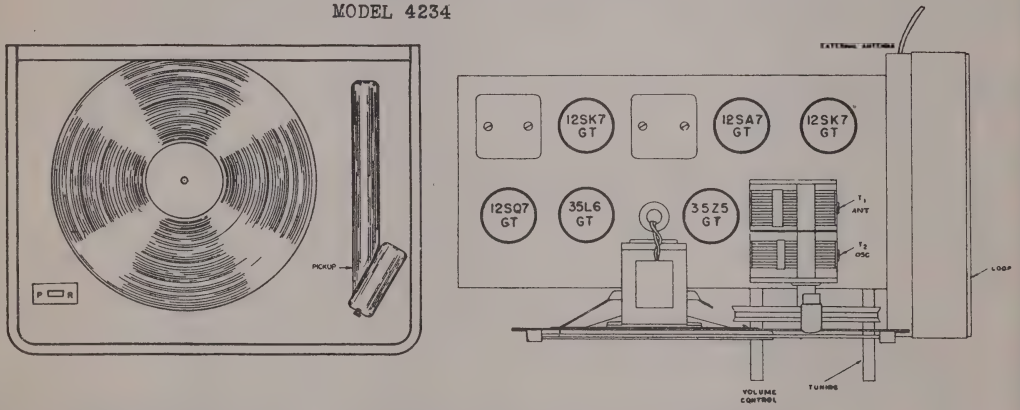


MODEL 4234



ALIGNMENT FOR MODELS 4232, 4233, 4234, 4246, 4248, 4252, 4254

Alignment Frequencies:

I. F.	455 K.C.
R. F.	1500 K.C.

I. F. Alignment

Connect an output meter across the voice coil. Rotate the volume to maximum. Set test oscillator to 455 K.C. and apply signal to lug on stator of gang condenser to which loop is connected through a .05 Mfd. capacitor. Align the second I. F. transformer trimmers, next adjust the first I. F. transformer trimmers. Keep test oscillator output as low as a readable meter reading will permit.

R. F. Alignment

Set the dial pointer and generator at 1500 K.C. Run a wire from the output terminal of the generator, having it come near the receiver. However, no metallic connection is made between the signal generator and the receiver.

Peak the oscillator trimmer for maximum output and then the antenna trimmer.

If the variable condenser plates have become bent or damaged, it may be necessary to adjust them for tracking, at 600 K.C. The oscillator plates are adjusted first, then the antenna plates are adjusted for maximum output at 600 K.C.

This radio is a compact, table model phono-radio superheterodyne receiver using six tubes and operates from an A.C. source of power. This receiver tunes the broadcast band of frequencies, covering the range of 540-1720 kilocycles.

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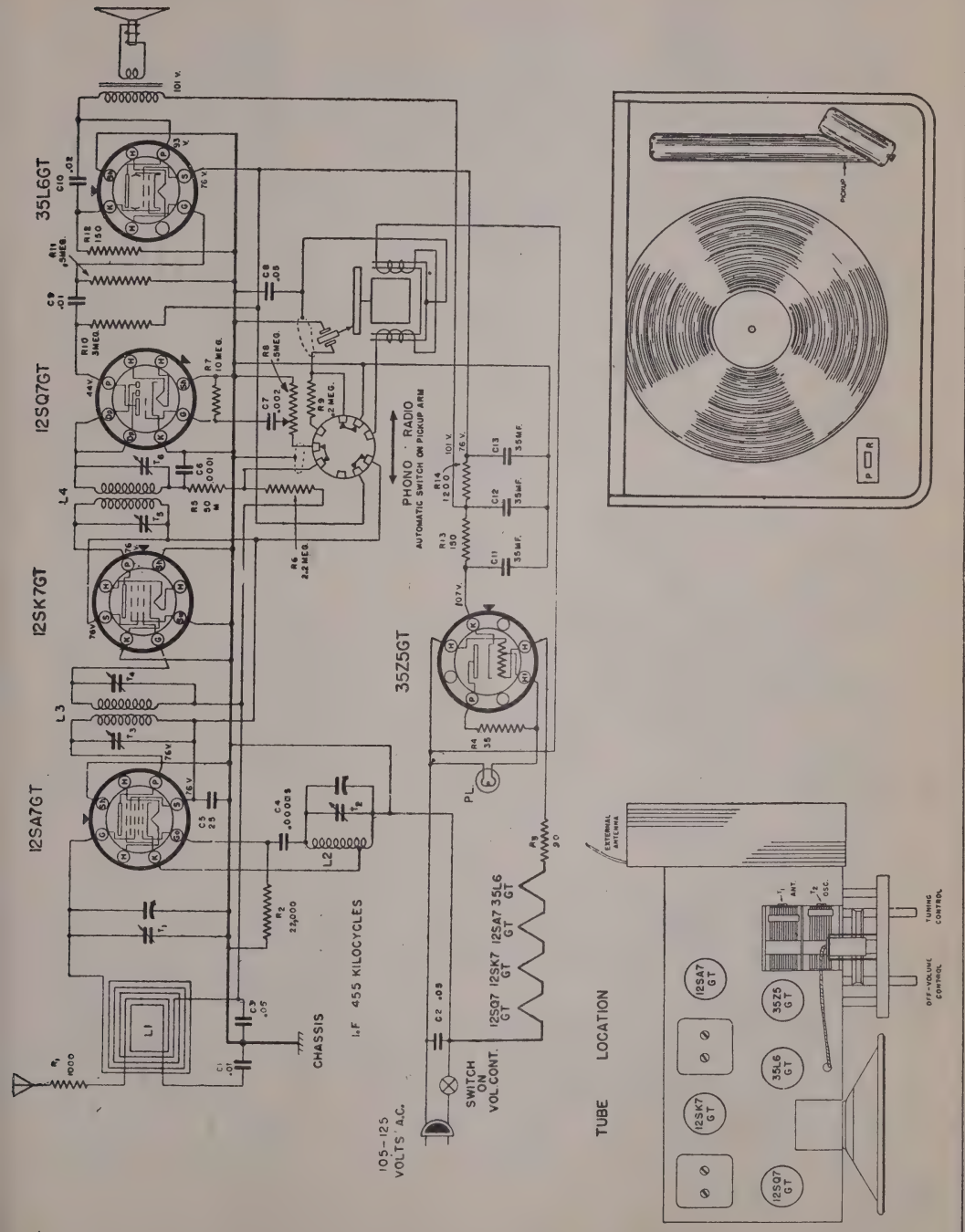
MODELS 4232, 4233
4246, 4248
4252, 4254



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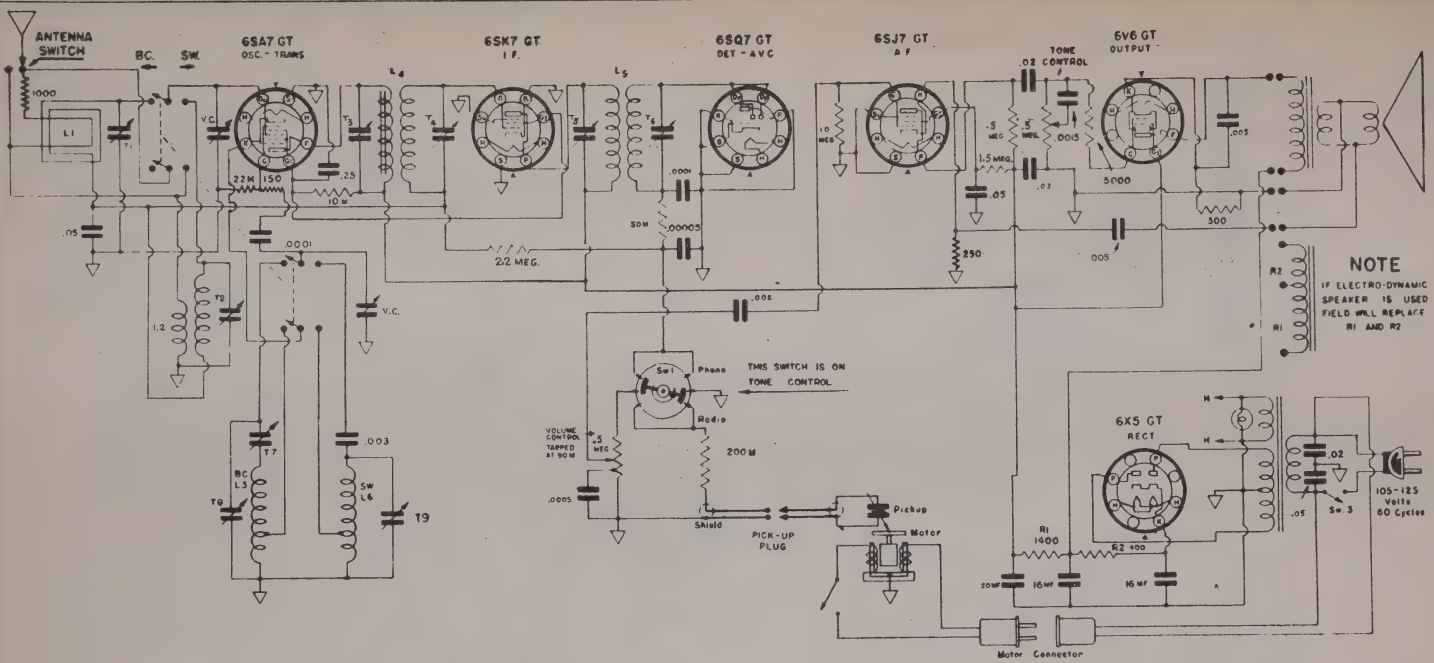
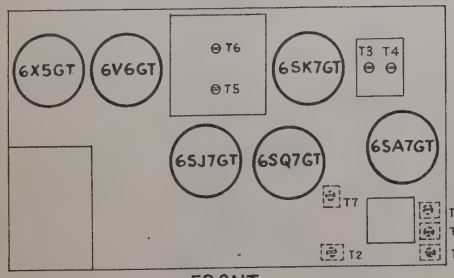




Alignment Frequencies:

I. F.	455 K.C.
B. C.	1500 K.C. and 600 K.C.
S. W.	16 M.C.

I. F. Alignment

Connect an output meter across the voice coil. Rotate the volume control to maximum and rotate the tone control to the "brilliant" position. Set test oscillator to 455 K. C. and apply signal to the control grid of the 6SA7GT converter tube (control grid pin No. 8) through a .05 MFD. capacitor. Align the second I. F. transformer trimmers, next adjust the first I. F. transformer trimmers. Keep test oscillator output as low as a readable meter reading will permit. Repeat this procedure for greater accuracy.

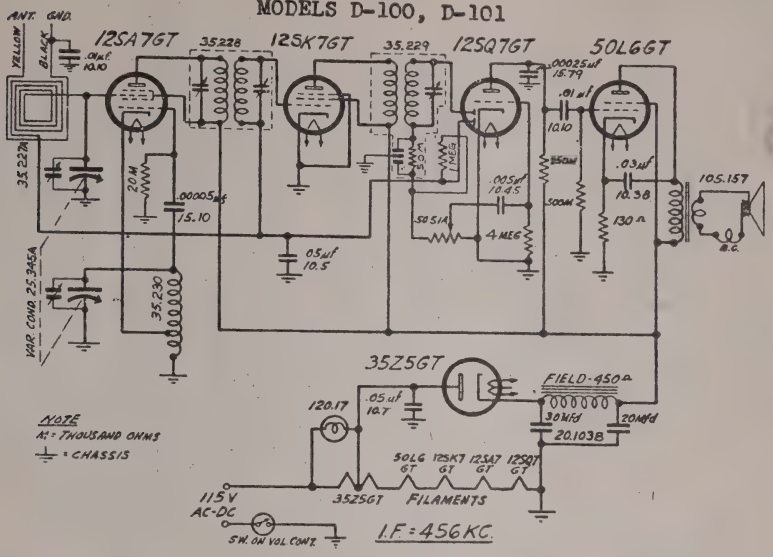
R. F. Alignment

Run a wire from the output terminal of the generator, having it come near the receiver. However, no metallic connection is made between the signal generator and the receiver. Set the dial pointer and generator at 1500 K. C. for high frequency alignment on the Broadcast Band. Peak oscillator trimmer T8 and then antenna trimmer T1 for maximum output meter reading. Set the dial pointer and generator at 600 K. C. and "rock in" oscillator padder T7. Next reset dial pointer and generator at 1500 K. C. and readjust T8. For short-wave alignment set dial pointer and generator at 16 megacycles and adjust oscillator trimmer T9 and then antenna trimmer T2 for maximum reading of output meter.

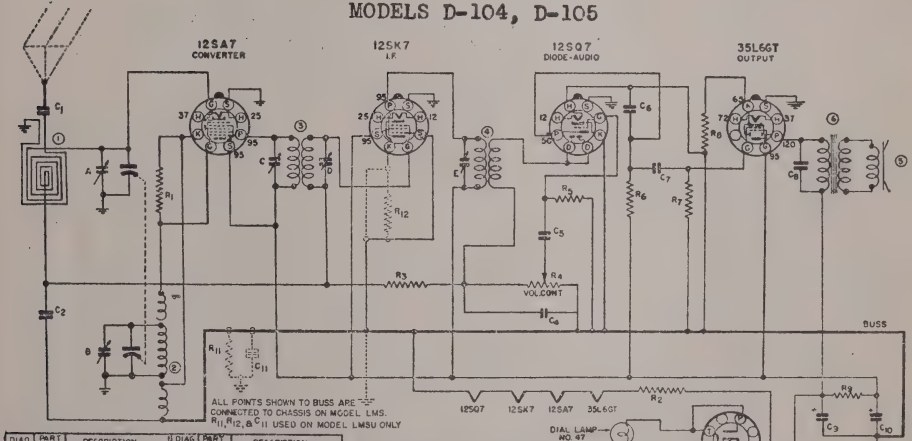
MODELS D-100, D-101
MODELS D-104, D-105

ALLIED RADIO CORP.

MODELS D-100, D-101

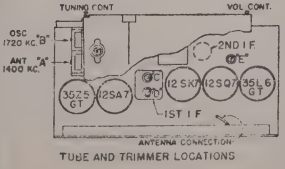


MODELS D-104, D-105


12SA7 CONVERTER
12SK7 I.F.
12SQ7 DIODE-AUDIO
35L6GT OUTPUT
VOL.CONT.
BUSS
ALL POINTS SHOWN TO BUSS ARE CONNECTED TO CHASSIS ON MODEL LMS. R11, R12, & C11 USED ON MODEL LMSU ONLY
DIAL LAMP NO. 47
SWITCH ON VOL CONT
35Z5GT RECTIFIER
I.F. 456 KC.

DIAG NO	PART NO	DESCRIPTION	DIAG NO	PART NO	DESCRIPTION
R1	N-1427	20,000 OHM .5W. 20%	1	N-4523	ANTENNA COIL LOOP
R2	N-1618	80 OHM .5W. 10%	2	N-3298	OSCILLATOR COIL
R3	N-1232	1 MEGOHM .5W. 20%	3	N-3876	1 ST. I.F. TRANSFORMER
R4	N-3377	.5 MEGOHM VOL. CONT.	4	N-3754	2 ND. I.F. TRANSFORMER
R5	N-1419	6 MEGOHM .5W. 20%	5	N-4316	4" SPEAKER
R6	N-1428	250,000 OHM .5W. 20%	6	N-3899	OUTPUT TRANSFORMER
R7	N-1264	500,000 OHM .5W. 20%			
R8	N-3756	200 OHM .5W. 10%			
R9	N-3341	1,000 OHM .5W. 20%			
R10	N-1742	25 OHM .5W. 20%			
R11	N-1779	150,000 OHM .5W. 20%		N-4310	2 GANG CONDENSER
R12	N-1482	250 OHM .5W. 20%			
C1	N-1344	.01 MFD. 400V			
C2	N-1345	.05 MFD. 200V			
C3	N-1346	.05 MFD. 400V			
C4	N-1374	100 MMFD.			
C5	N-2712	.004 MFD. 400V.			
C6	N-1447	.0005 MFD. 400V.			
C7	N-1344	.01 MFD. 400V			
C8	N-1376	.02 MFD. 400V			
C9	N-3302	35 MFD. 150V ELECT.			
C10		30 MFD. 150V.			
C11	N-3081	.22 MFD. 200V.			

NOTE VOLTAGES SHOWN ARE FROM TERMINAL TO BUSS ---------- HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING



TUBE AND TRIMMER LOCATIONS

5 TUBE AC-DC

SUPERHETERODYNE SINGLE BAND

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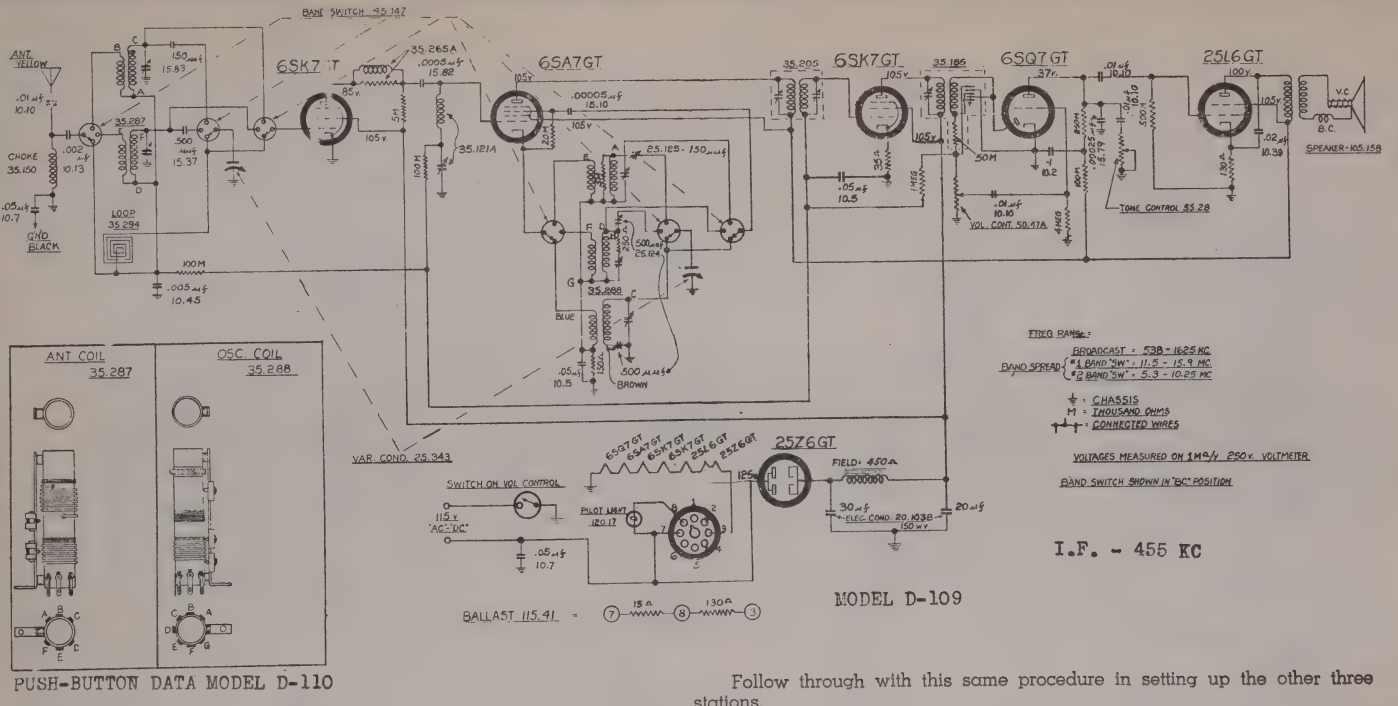


PUSH-BUTTON DATA MODEL D-110

Remove the call letters of your four selected stations from the list supplied with your receiver and slip them into the end of the push-buttons. Arrange the call letters in the buttons in any order you desire. The buttons are interchangeable and, therefore, may be used with any stations you choose to use.

Follow the procedure outlined below in order to adjust the push-buttons properly:

1. Remove all four push-buttons by pulling forward, and with a small screw-driver loosen set screw in the push-button stems, about two turns counter clockwise. Replace push-buttons to their original positions.

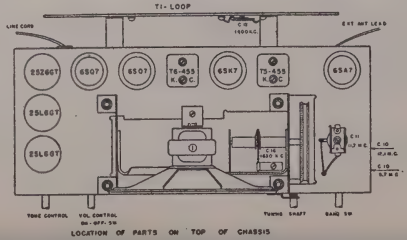
2. By means of the tuning knob, tune in as accurately as possible your first desired station.

3. Push the push-button for that station down as far as it can go, making sure that your desired station is still tuned in properly. It may be necessary to re-tune your station.

4. Release push-button and remove from stem. Tighten set screw firmly. Replace push-button.

Follow through with this same procedure in setting up the other three stations.

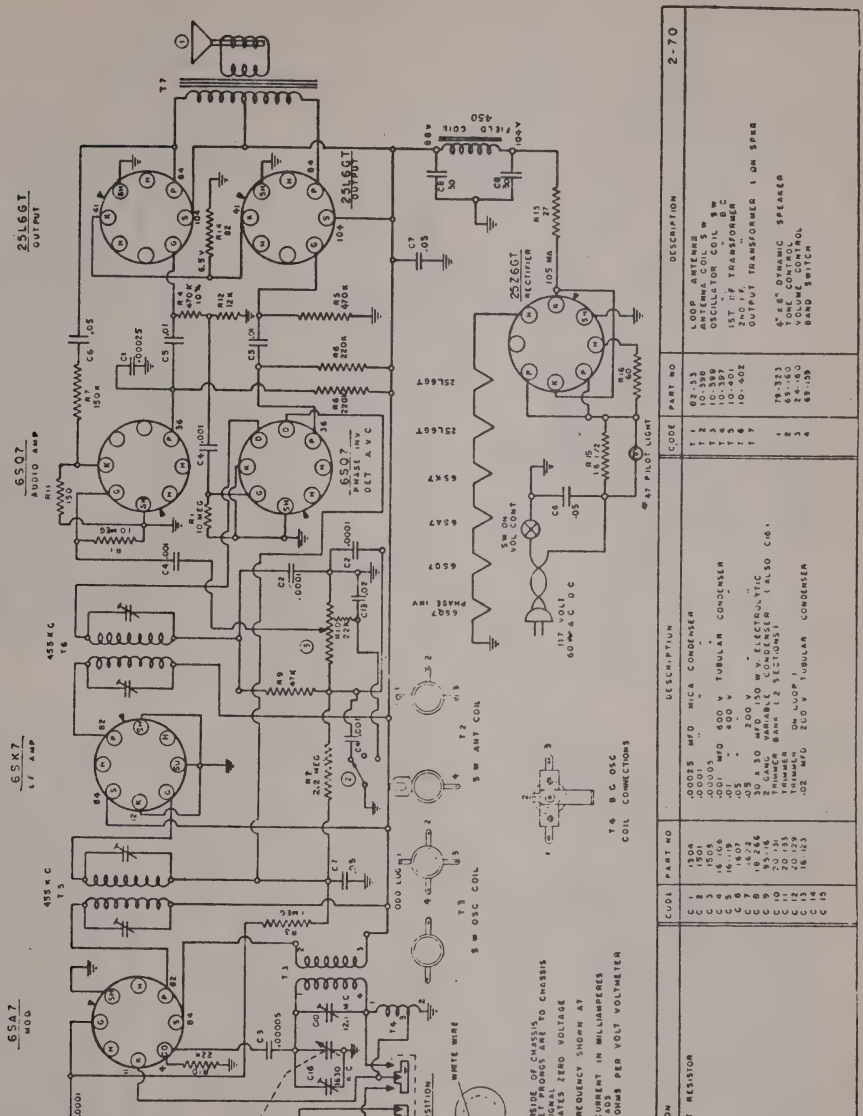
If a long, thin screw-driver is available, it will be possible to adjust the automatic push-button system without removing push-buttons, by simply inserting screw-driver through hole in push-button and following the above procedure.



LOCATION OF PARTS ON TOP OF CHASSIS

ALLIED RADIO CORP.

MODEL D-110


6SA7 MOD
6SK7 I.F. AMP
6SQ7 AUDIO AMP
25L6GT OUTPUT
25Z6GT RECTIFIER
6SQ7 2ND DET. AVC
6SQ7 PHASE INV
455 K.C.
ANT LOOP
EXT ANT
WHITE WIRE
BLK & WHITE WIRE
117 VOLT 60 ~ A.C. O.C.
SW ON VOL CONT
SW ANT COIL
SW OSC COIL
T4 B.C. OSC COIL CONNECTIONS
SW SHOWN IN B.C. POSITION
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGES READINGS INDICATED AT SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MEASURED WITH 1000 OHMS PER VOLT VOLTMETER
WHERE NO VOLTAGE IS SHOWN, IT INDICATES ZERO VOLTAGE
ALL OHMAGE VALUES ARE READING
ALL CONDENSERS MUST BE MADE AT THE FREQUENCY SHOWN AT
EACH TRIMMER CONDENSER
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES
CAUTION: VOLTAGES ARE MEASURED WITH 1000 OHMS PER VOLT VOLTMETER
VOLTAGES ARE MEASURED WITH 1000 OHMS PER VOLT VOLTMETER

CODE	PART NO	DESCRIPTION
R1	60-193	10 MEGOHM 1/4 WATT RESISTOR
R2	60-178	2.2 " " "
R3	60-187	470K " " "
R4	60-407	470A OHM " " "
R5	60-178	2.2 " " "
R6	60-410	220A " " "
R7	60-402	150A " " "
R8		
R9	60-177	470K " " "
R10	60-177	470K " " "
R11	60-184	150 " " "
R12	60-190	22K " " "
R13	60-411	27 " " "
R14	60-486	85 " 1/2 WATT
R15	60-534	16 1/2 " "
R16	60-483	60 " "

CODE	PART NO	DESCRIPTION
C 1	1504	.00025 MFD MICA CONDENSER
C 2	1501	.0001 " " "
C 3	1503	.00005 " " "
C 4	16-1004	.001 " 600 V TUBULAR CONDENSER
C 5	16-119	.01 " 400 V " "
C 6	1507	.05 " 200 V " "
C 7	1507	.05 " " " "
C 8	18-266	30 A 30 MFD 150 W.V. ELECTROLYTIC
C 9	95-16	7 GANG VARIABLE CONDENSER (ALSO C10)
C 10	20-133	(SEE BANK 12 SECTIONS)
C 11	20-129	TRIMMER
C 12	16-123	TRIMMER
C 13		ON LOOP
C 14		.02 MFD 600 V TUBULAR CONDENSER
C 15		

CODE	PART NO	DESCRIPTION
T 1	82-53	LOOP ANTENNA
T 2	10-398	ANTENNA COILS
T 3	10-399	OSCILLATOR COIL
T 4	10-397	
T 5	10-401	1ST I.F. TRANSFORMER
T 6	10-402	2ND I.F. "
T 7		OUTPUT TRANSFORMER
		1 OH SPKR
	79-353	6" P.M. DYNAMIC SPEAKER
	65-183	TONE CONTROL
	24-140	VOLUME CONTROL
	69-39	BAND SWITCH

CODE	PART NO	DESCRIPTION
		2-70

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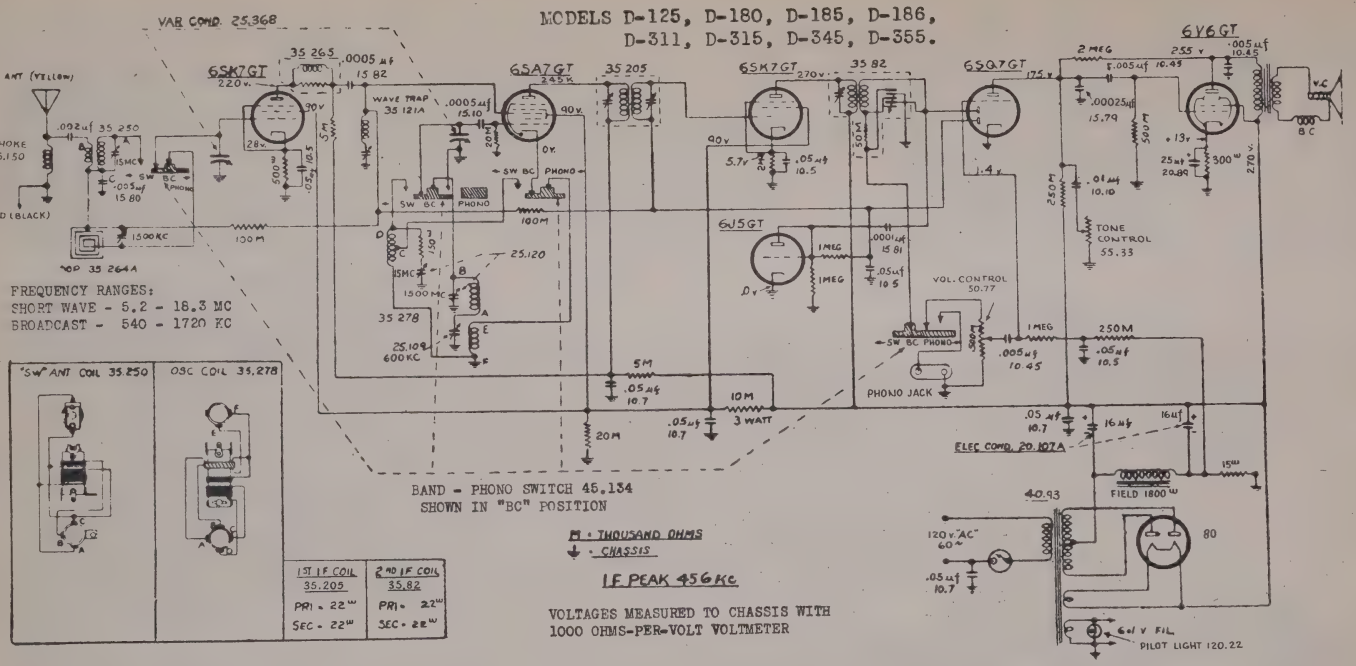


MODELS D-127, D-149, D-189, D-190

INSTRUCTIONS FOR SETTING BUTTONS

Setting up the stations to be tuned in automatically by the Station Selector buttons has been made extremely easy. Follow these instructions carefully:

1. Turn the set on and allow it to operate at least fifteen minutes before attempting to set up button.
2. Make a list of the frequencies of six nearby stations to which you wish to set up the buttons. Be sure to select the most powerful nearby stations, since weak signals will not give as satisfactory results.
3. Push up button to be adjusted. There will then be exposed a screwdriver slot recessed in the plunger button. This screw when rotated counter-clockwise by means of a small screwdriver, unlocks the tuner setting for that particular button. The plunger for the button to be set up is then held in a fully depressed position (by the screwdriver) while the desired station is tuned by means of the Vernier Dial Tuning Control. The plunger is then released and the lockup screw is rotated in a clockwise direction, with the screwdriver in order to lock the station permanently in tune.

Repeat the above for each of the other five buttons.

It is advisable to set the lowest frequency station on the left-hand button and the rest in ascending order.

MODELS D-127, D-149, D-189, D-190

ALLIED RADIO CORP. MODELS D-127, D-149, D-189 D-190, B-17113, B-17114

INSTRUCTIONS FOR SETTING BUTTONS

Setting up the stations to be tuned in automatically by the Station Selector buttons has been made extremely easy. Follow these instructions carefully:

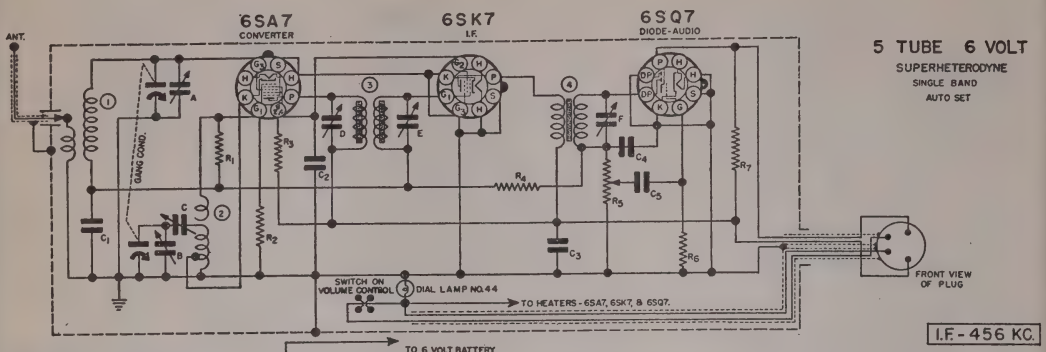
1. Turn the set on and allow it to operate at least fifteen minutes before attempting to set up button.
2. Make a list of the frequencies of six nearby stations to which you wish to set up the buttons. Be sure to select the most powerful nearby stations, since weak signals will not give as satisfactory results.
3. Push up button to be adjusted. There will then be exposed a screw-driver slot recessed in the plunger button. This screw when rotated counter-clockwise by means of a small screwdriver, unlocks the tuner setting for that particular button. The plunger for the button to be set up is then held in a fully depressed position (by the screwdriver) while the desired station is tuned by means of the Vernier Dial Tuning Control. The plunger is then released and the lockup screw is rotated in a clockwise direction, with the screwdriver in order to lock the station permanently in tune.

Repeat the above for each of the other five buttons.

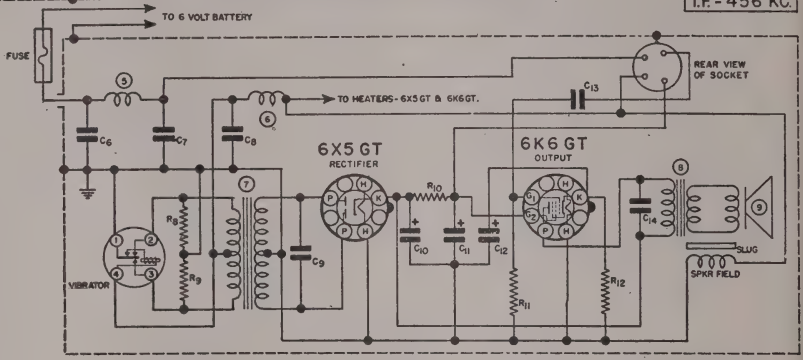
It is advisable to set the lowest frequency station on the left-hand button and the rest in ascending order.

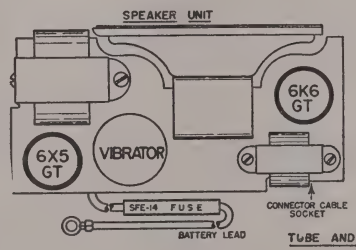
MODELS D-130, B-17140

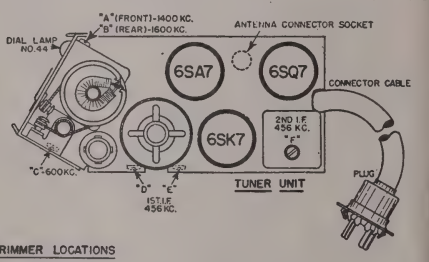
ALLIED RADIO CORP.



DIAG NO.	PART NO.	DESCRIPTION
R1	N-4231	10 MEGOHM .5WATT 20%
R2	N-4025	22,000 OHM .5WATT 20%
R3	N-4229	10,000 OHM 1 WATT 10%
R4	N-1262	1 MEGOHM .5WATT 20%
R5	N-4125	0.5 MEGOHM VOLUME CONTROL
R6	N-4061	4.7 MEGOHM .5WATT 20%
R7	N-4230	330,000 OHM .5WATT 20%
R8	N-1481	75 OHM .5WATT 20%
R9	N-1481	75 OHM .5WATT 20%
R10	N-4227	820 OHM 1 WATT 10%
R11	N-4027	470,000 OHM .5WATT 20%
R12	N-4228	680 OHM .5WATT 10%
C1	N-2594	.05 MFD. 200 VOLT
C2	N-1351	.1 MFD. 200 VOLT
C3	N-1623	.1 MFD. 400 VOLT
C4		100 MMFD. (IN 2ND I.F. CAN)
C5	N-1347	.006 MFD. 600 VOLT
C6	N-2807	.0002 MFD. SPARK PLATE
C7	N-2816	.5 MFD. 100 VOLT
C8	N-2816	.5 MFD. 100 VOLT
C9	N-4276	.006 MFD. 1200 VOLT
C10	N-4178	16 MFD 350 W.V. / 14 MFD 350 W.V. ELECTROLYTIC / 20MFD 25 W.V.
C11		
C12		
C13	N-3094	.01 MFD. 400 VOLT
C14	N-2817	.015 MFD. 600 VOLT
1	N-4181	ANTENNA COIL
2	N-4172	OSCILLATOR COIL
3	N-4170	1ST I.F. TRANSFORMER
4	N-4171	2ND I.F. TRANSFORMER
5	N-4183	MOTOR NOISE CHOKE
6	N-4184	HASH CHOKE
7	N-4161	VIBRATOR TRANSFORMER
8	N-4176	OUTPUT TRANSFORMER
9	N-4175	5" DYNAMIC SPEAKER
	N-4160	VIBRATOR
	N-4163	GANG CONDENSER
	N-2798	BATTERY LEAD
	N-4358	BATTERY LEAD EXTENSION







TUBE AND TRIMMER LOCATIONS

INSTALLATION

GRILLE MOUNTING

Remove the cloth on the sponge rubber pad and press the pad on the front of the speaker case. Figure 1 shows a rear view of a typical grille installation and Figure 2 shows a side view along with arrangements of the clamps and strap lugs. Hold the speaker unit in place behind the grille of the car and determine the hole positions for the strap lugs. These positions will vary with different cars. In cars having no ash tray or other ornamentation above the center of the grille, one strap will be sufficient. In other cars it is necessary to use two straps in order to make the screw heads symmetrical about the ash tray or decoration. Be careful that the straps will not cover the plug from the tuner unit. Also, before drilling the holes for mounting the speaker unit, hold the tuner unit in place to determine if any of the bolts holding the speaker unit in place will interfere with the mounting of the tuner unit. Attach the strap lugs to the straps (Fig. 2B and 2C) and fasten the straps to top and bottom of grille as shown in Figure 2A.

Hold the speaker unit in place and make a slight bend in the upper straps and the lower straps so there is about 1" clearance between the lower and upper straps. Use these bends to locate the clamps in the proper positions. Fasten the clamps to the upper and lower straps as shown in Figure 2D. Slip the two portions of the clamps together and turn the screw to take all the slack out of the straps.

Next, drill the two holes in the lower flange of the dash for the tuner mounting, mount the tuner unit and securely bolt into place.

Plug the cable from the tuner unit into the speaker unit, taking care that the plug is all the way in so the flange on the plug is resting on the case. After the antenna has been installed according to directions furnished with it, plug into the socket in the tuner unit. (see section on antenna). Connect the battery cable as described in the section on battery connections.

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MODELS D-130, B-17140

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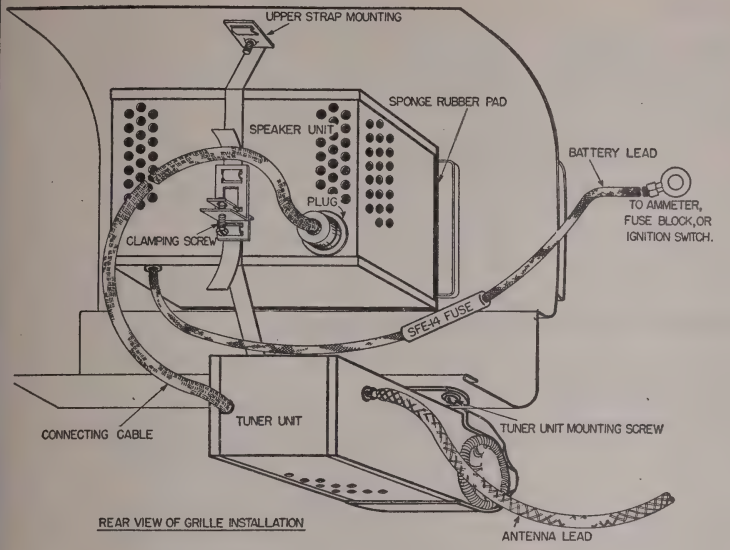
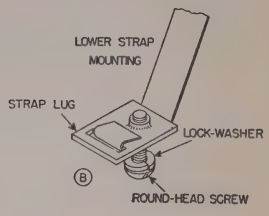




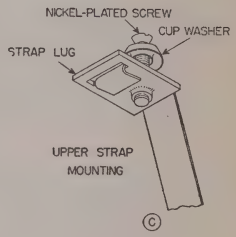
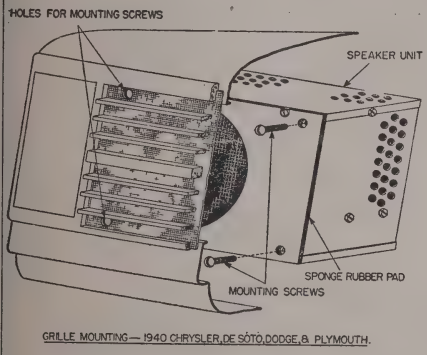


Figure 1



GRILLE MOUNTING — 1940 CHRYSLER, DE SOTO, DODGE, & PLYMOUTH.

FIGURE 3.

FIRE WALL MOUNTING

For cars not having a grille, special accessories which include a baffle housing, the necessary mounting hardware, and an extended battery lead can be obtained from your dealer.

ANTENNA

This receiver is designed for use with whip type antennas of the cowl or hinge mounting types. Either is suitable and both will work equally well. The cowl type is recommended for permanent installations and requires a minimum of attention once installed.

Mechanical details of installation will depend on the individual peculiarities of the antenna as manufactured, but in general, the lead-in should be shielded at all points between the antenna where it enters the car and the receiver case itself.

At the antenna end of the lead-in the shielding should be well grounded to the body of the car and no unshielded part of the antenna wire is permitted inside the car.

Most of the whip type aerials are adjustable in length, in general, the signal pick-up being greater as the length is increased.

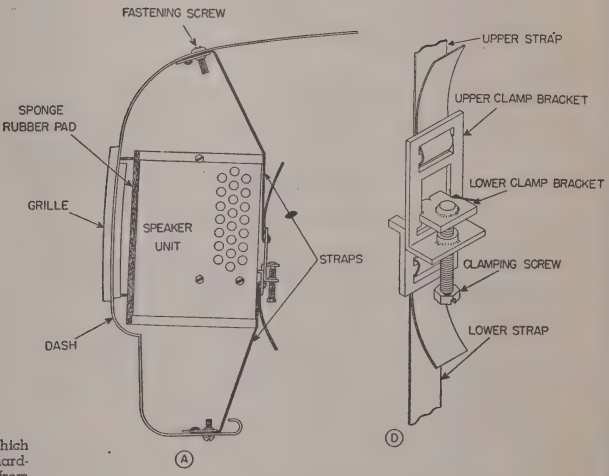


Figure 2

SPECIAL GRILLE MOUNTINGS

On 1940 Chrysler, Dodge, DeSoto and Plymouth, it is not necessary to mount the speaker unit with straps as special provision has been made to take care of these cars. (see Figure 3). Take a sharp pointed tool and from the rear of the grille, pierce the grille at the four small holes arranged around the speaker opening. Hold the speaker unit in place and with the four small screws furnished, fasten the unit in place from the front of the grille. Use the rubber pad on the front of the speaker unit. On some cars with ash trays or other devices on the lower ledge of the dash panel near the center of the grille, it is possible to move them to one side or the other to place the tuner unit in a more convenient position. It is advisable to have the tuner unit within easy reach of the driver.

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MODELS D-130, B-17140

ALLIED RADIO CORP.

BATTERY CONNECTION

The battery lead extending from the rear of the speaker case should be connected to one of the two terminal posts of the ammeter, the fuse block, or to the ignition switch depending upon the make of car. The most accessible point for connection can readily be determined by inspection. This receiver will operate on any polarity of the battery without any adjustment of the receiver.

GROUND

This connection is automatically made when the receiver units are fastened in position. Rotate the left hand knob toward you and the dial will become illuminated. This knob is the combined volume control and "ON-OFF" switch. If dial fails to light check the battery connection, look for a burned-out fuse, and make certain the cable from the tuner unit is plugged into the speaker unit.

TUNING PROCEDURE

A range of 535 to 1600 kilocycles is covered by turning the right hand knob or tuning control. The knob on the left hand side of the case is the combined volume control and "on-off" switch. To tune in a station, turn this knob towards you and the dial will become illuminated. Allow the set to warm up for about a minute, turn the right hand knob until the station you desire is heard with maximum volume and clarity, then adjust to the required volume with the volume control. Never adjust the volume by detuning.

ALIGNMENT DATA AND SERVICING

NOTE: Lack of sensitivity and poor quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, defective by-pass condenser, or defective antenna or ground. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1600 KC. and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the antenna and oscillator should be aligned.

I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6SA7) through a .05 or .1 mfd condenser. The ground on the test oscillator should be connected to the chassis ground. Align all three trimmers to peak or maximum reading on the output meter.

ANT. AND OSC. ALIGNMENT. Connect the antenna to the generator through a 65 MMF dummy* and set the dial and generator at 1600 KC (gang at minimum capacity). Align the BC oscillator trimmer for maximum output. Set the test oscillator at 1400 KC and tune in the signal with the dial and adjust the antenna trimmer for maximum output.
Next set the test oscillator at 600 KC and tune in the signal with the dial. Adjust the 600 KC padder for maximum output while slowly rocking the gang condenser at the 600 KC position on the dial. If this padder is badly out of adjustment it is necessary to repeat the 1600 and 1400 KC adjustments.
*If the antenna is aligned using a whip antenna shielded lead use a 30 MMF dummy antenna.

INSTALLATION AND SERVICE HINTS

MOTOR NOISE ELIMINATION

Interference from motor noise may be encountered due to the peculiarities of certain automobiles. This type of interference can be recognized by the presence of a regular popping sound when the motor is running, especially on the weaker stations.

The following list of suggestions will be helpful in eliminating or reducing motor noise interference. It may not be necessary to follow any of these suggestions. They are to be followed only if motor noise is present after complete installation. The suggestions are listed in the correct sequence and only in rare instances will it be necessary to do all of the things listed. (See Fig. 4).

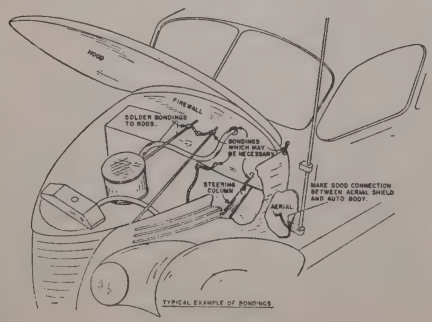

Figure 4

1. Ground the antenna lead-in shield at one or more points to the cowl or any other metal surface in contact with the lead-in.

2. Move the battery lead around to a point of least noise pick-up and fasten in place with tying cord or tape. Keep this lead as far away from the tuner unit as possible.

3. Bond together the throttle rod, choke rod and any metal tubing with a piece of copper braid and ground to the fire wall. This should be done on the engine side.

4. Bond steering post to firewall.

5. Bond hood, side panel and other protective covering for engine if it is not making a positive contact to the body.

In extreme cases, a distributor resistor and generator condenser will reduce noise interference to a minimum. These parts are available at your dealer.

From the standpoint of motor noise, the whip type antenna recommended has been found to be the most satisfactory. It is advisable to use this type antenna even if the car is equipped with a built-in antenna.

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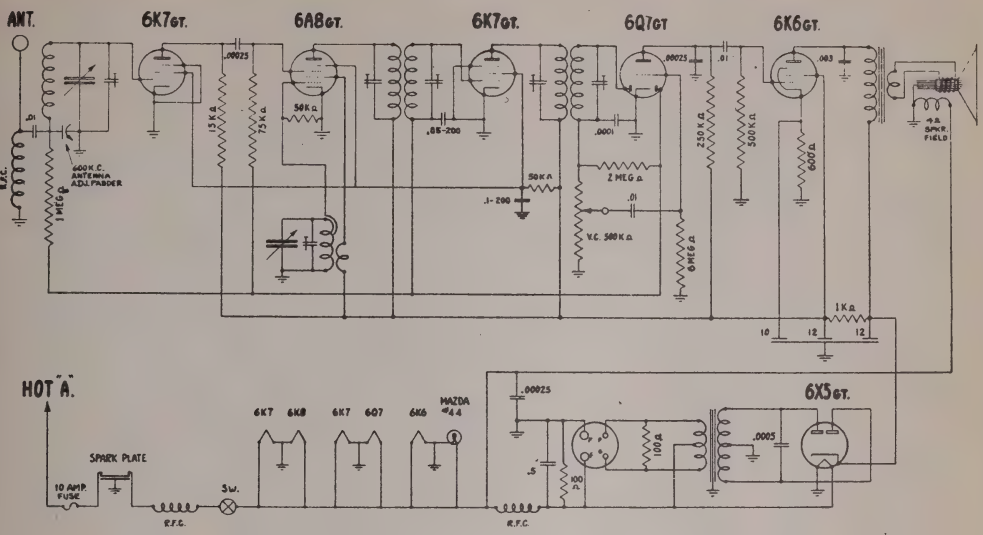
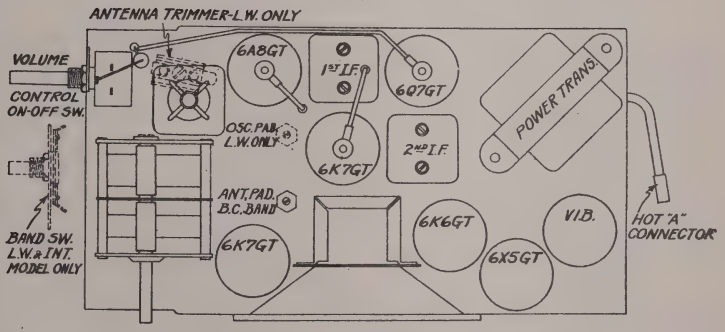


I.F. PEAK 456 KC



This radio is designed to operate on 6 volts D.C. **only.** A special model is built to operate on 12 volts D.C and it will carry a tag plainly marked so. The tuning range covers the Standard Broadcast Band from 538 to 1550 kilocycles

BATTERY CONNECTION

A single, heavy insulated wire lead extends from a hole in the rear of the set. This lead has a fuse receptacle containing a 10 ampere fuse, in the center of its length, and a connecting lug on the end. The lug is connected to the terminal post on the car's ammeter so that a discharge is shown on the meter when the radio is in operation.

The fuse receptacle may be disconnected at any time to change the fuse, or to remove the radio. On the 12 volt model the fuse should be of a 5 ampere rating instead of 10.

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ANTENNA CONNECTION

The shielded antenna lead supplied with the radio is plugged into the receptacle provided in the underside of the radio. The other end is connected to the lead from the antenna and taped so the connection cannot touch the cable shield or any metal part of the car. If the automobile has a built-in antenna, the lead should be found behind the dash, extending from the right or left-hand corner post. It is important that this lead be cut and connected to the shielded set lead as close to the corner post as possible, to eliminate antenna pickup of motor noise.

On cars where it is necessary to install an antenna, a "fish-pole" type, an "over-the-roof" type, or a "under-the-running board" type, may be used. Two antennas, one mounted under each running board, are recommended for the best reception, as the noise on the radio will increase as the size of the antenna decreases.

The lead from the antenna should be shielded, direct, and as short as is practical. It should not be twisted around any part of the car, and should not lead thru the motor compartment. All connections should be clean, tight, **soldered,** and insulated with tape. The antenna must **never** touch any part of the car.

Instructions for mounting any particular type of antenna are packed with the antenna

ANTENNA MATCHING ADJUSTMENT

As the sizes and types of antennas vary considerably, it is necessary to adjust the radio to "match" the antenna used. To do this, tune in a station, accurately, at roughly 600 kilocycles, reduce the volume of the set, pry out the plug on the underside of the set, insert a screw driver, and turn for maximum output. Replace the plug when this has been accomplished, and the radio is ready to operate efficiently on any station.

MOTOR NOISE ELIMINATION

To eliminate motor noise, a condenser and a suppressor are supplied with the radio. The condenser is mounted on the generator with its lead connected to the terminal of the generator output on the generator side rather than on the battery side. The heavy insulated lead in the center of the distributor cap is pulled out, the suppressor inserted in its place, and the heavy lead inserted in the end of the suppressor.

This, with the antenna installed properly will eliminate motor noise in most cars. In some of the older cars it may be necessary to install a condenser similar to the generator condenser, bolted to the dash or a good ground, with the lead connected to the ammeter with the set battery lead. When a built-in roof antenna is used, a condenser should be connected to the dome light lead where it passes through the right or left hand post to the roof. The condenser should be bolted to grounded metal.

PUSH BUTTON ADJUSTMENT

Six push button station selectors are incorporated in this receiver, and each may be set to select any frequency or station within the range of the set.

To adjust each button, follow these instructions.

1. With the set in operation, tune in any station the push button is to be set for, with the right hand tuning knob.

2. Keep a firm grip on the tuning knob so the station will not be detuned, and turn the push button about one turn to the left to loosen the mechanism. Press the button all the way in and turn it to the right until it is tight.

Repeat these operations with the other five buttons, setting each for a different station. Insert the correct call letter tab into the space provided in the panel just above the push buttons.

TECHNICAL INSTRUCTIONS

A good output meter should be used in all alignment adjustments. This meter should be of the high resistance A.C. type, with a low range scale of 2.5 or 3 volts. The leads are connected across the voice coil terminals of the speaker.

I. F. ALIGNMENT

Set the variable condenser at minimum capacity, (dial pointer at 1550 K.C.). Connect the two leads from a good, modulated signal generator, the ground lead to the radio chassis and the other lead through a .1 mfd. condenser, to the grid cap of the 6A8GT with the tube's grid lead still in place.

Connect the leads from a fully charged 6 volt storage battery to the receiver chassis and battery lead, the polarity being reversible.

With the set in operation and the volume control full on, set the signal generator to 456 K.C. and increase its output until the signal is heard in the set's speaker. Starting with the second I. F., adjust the I. F. trimmers for maximum output, decreasing the signal generator output as the receiver output increases.

The generator output in all the alignment adjustments should be adjusted so the meter will read approximately .4 volts continually.

R. F. ALIGNMENT

With the variable condenser still full open, set the generator to 1550 K.C. Connect the generator lead to the antenna lead through a .0001 mfd. condenser as dummy antenna. Adjust the oscillator trimmer for maximum output. Set the receiver dial and the generator to 1400 K.C. so the signal comes through, and adjust the antenna trimmer for maximum output.

Set the receiver dial and generator to 600 K.C. and adjust the oscillator padder for maximum output by rocking the variable condenser (with the tuning knob) as the padder is adjusted.

Return the dial and generator setting to 1400 K.C. and check for alignment.

MODEL D-132

ALLIED RADIO CORP.

Power Consumption - - - - 8.1 Amperes at 6.3 Volts
Power Output - - - - - - - - 6 Watts Undistorted
8 Watts Maximum
Sensitivity - - - - - 1 Microvolt at .5 Watt Output
(L-D Switch in Distance Position)
Selectivity - - - 38 KC Broad at 1000 Times Signal
Tuning Frequency Range - - - - 540 to 1580 KC
Intermediate Frequency - - - - - - - - 456 KC
Speaker - - - - - - - - - - 6" Electro-Dynamic

Fig. 5—Location of Tubes and Vibrator

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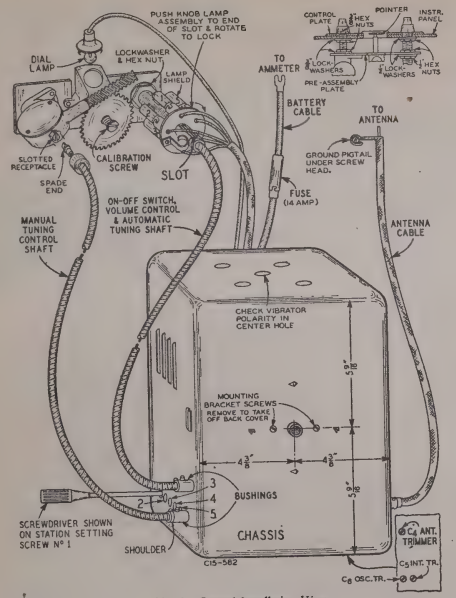


Fig. 3—General Installation View

ANTENNA CABLE

Keep the antenna cable as far away from car wiring as possible and ground the pigtail of the antenna cable shield at the antenna end, otherwise ignition noise may be picked up. The length of the pigtail from the grounding point to the end of the antenna cable should be kept as short as possible, preferably not over one inch.

For the "fishpole" and over-the-roof type antenna, the lead must be shielded the entire distance from the radio to the point where the lead goes through the car body to the outside.

When the antenna cable is connected to an antenna lead coming down the pillar post, the shielded cable should be pushed several inches up into the pillar post.

Final Installation Items

Before Mounting Chassis

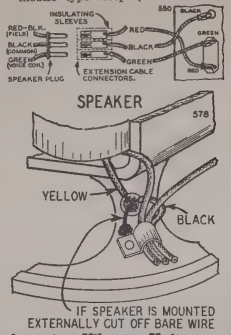
Before mounting the chassis to the fire wall, it is advisable in most cases to complete the wiring connections. The stations should be set for Automatic Tuning at this time if this procedure cannot be followed after the chassis is mounted.

Battery Cable and Fuse

The battery connection is made at the ammeter. The end of the battery cable with the connecting lug is secured to one of the posts at the back of the ammeter in the instrument panel. The other end of the cable with the fuse receptacle connects to the battery cable from the radio after the fuse has been inserted. A 14 ampere fuse is used.

Dial Lamp Cable

Insert the dial lamp assembly in the hole at the top of the lamp housing as indicated in Fig. 3. The dial lamp used in this unit is a 6-8 volt automobile type lamp (Bulb No. 51).



Inserting Vibrator Unit

IMPORTANT—The vibrator unit can be inserted in two ways. The proper method of insertion will depend on which terminal of the car battery is grounded. If the POSITIVE (+) terminal of the car battery is grounded, line up the + mark on the top of the vibrator with the arrow on the chassis base. If the NEGATIVE (—) terminal of the car battery is grounded, line up the — mark on the top of the vibrator with the arrow on the chassis base.

On one side of the chassis case is a hole (See Fig. 3) through which may be seen the vibrator. If a red stripe is seen on the side of the vibrator, the vibrator is inserted for cars on which the positive terminal of the battery is grounded. If no paint mark is visible, the vibrator is inserted for cars with the negative terminal of the battery grounded.

Adjusting Antenna Trimmer

After the antenna is connected, tune in a weak signal at approximately 1000 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna trimmer (C4) up or down until maximum output is obtained. See Fig. 3 for location of this trimmer.

Bolting Chassis in Place

Put the chassis in place on the fire wall extending the mounting bolt through the drilled hole in the fire wall. If the chassis must be spaced away from the fire wall, first assemble the wood spacer on the mounting bolt.

See article "Locating the Chassis and Drilling Mounting Hole" for additional data on mounting chassis.

On the mounting bolt, assemble the washers and nuts. Then tighten the mounting bolt nut securely so that the spurs on the chassis case bite into the fire wall insulation and the washers bear firmly against the fire wall.

After the chassis is in place, secure the flexible shafts and electrical cables in position at the nearest convenient point.

Calibration

(*For later type control with no stop on pointer shaft.*)

Tune to a station of known frequency (about 850 KC). Turn the knurled calibration screw at the back end of the pointer disc shaft one complete turn (360°) in a clockwise direction (from back of instrument panel). Then continue to turn the screw in a clockwise direction until the pointer is at the frequency of the station being received.

Mounting Speaker in Back of Instrument Panel Grille

Some automobiles have a grille in the instrument panel, in back of which a speaker may be mounted. The speaker may be taken out of the case should it be desired to mount it in back of such a grille.

Remove the grille plate and speaker from the case (see article "Replacing Tubes and Vibrator"). Pull out the speaker plug. Replace the grille, putting the round cardboard gasket under the grille. Cut off the bare ground wire on the speaker as shown in Fig. 4.

At one side of the speaker grille is a rectangular cover. Unscrew the screw at each end and remove this cover. Three clips, each a different color, will be seen. Using the 24 inch, 3 wire cable supplied with the radio, match the color of each wire with a clip and insert the solid pin tips in the clips—See Fig. 4. Pass the cable through the same hole in the cover provided for the other wires. Push each of the connectors at the other end of the cable over the proper prong of the speaker plug, matching the color as shown in Fig. 4. Be sure the insulating sleeves cover the connectors completely. Tape over the speaker plug and connectors. Replace the cover.

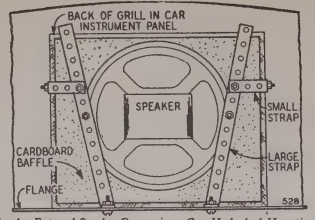


Fig. 4—External Speaker Connections, One Method of Mounting, and Cutting Off Bare Ground Wire When Speaker is Mounted Externally.

Two perforated straps are provided which may be used as mounting brackets to secure the speaker in back of the grille. The method of mounting will vary in different cars. If the spring clamps on the back of the speaker frame interfere with the mounting, they may be cut off.

In the mounting shown in Fig. 4, the long and short straps have each been cut in two pieces and attached as indicated. The speaker should be supported at two points on the rim 180 degrees apart.

Secure the straps under any nearby screw head or nut which is convenient. Frequently it will be advisable, as shown in Fig. 4, to bend the straps under the flange at the bottom of the instrument panel and then drill two holes in the flange through which to extend the mounting bolts.

A piece of cardboard is provided for use as a baffle. This is cut for a 5¼ inch speaker which may be purchased if it is required. The outline of the hole necessary for a 6 inch speaker (speaker in radio) is shown on the cardboard. Cut the cardboard to size so that it covers all of the grille opening that is not covered by the speaker.

Several pieces of felt are also provided to be used around the rim of the speaker in those cars in which the grille is curved or bent.

Replacing Tubes and Vibrator

To replace the tubes or vibrator, remove the screw on the grille plate. Take off grille plate and pull the speaker out of the case. The speaker is held in place by 2 spring clamps. The tubes and vibrator are now accessible for replacement

Local-Distance Switch

This switch is located on the cover of the chassis case.

LOCAL—While driving in the city or close to broadcasting stations, it is best to have the switch in the "local" (L) position for least noise.

DISTANCE—When driving in the country or when listening to distant stations, best results are obtained with the switch in the "distance" (D) position. In this position, the sensitivity is at a maximum.

Procedure for Setting the Stations

There are 6 positions of the Automatic Station Mechanism. Five of these are Automatic Station positions and one is the Manual Tuning position. A sixth station may be tuned in with the Manual Tuning Knob. If the position of this knob is not disturbed, the sixth station will be automatically tuned in when the Automatic Station Mechanism is in the Manual Tuning position.

The different positions are reached by pushing the Automatic Station Knob firmly and gently all the way in and releasing this knob so that it snaps all the way back. Pushing in the knob once in this manner will advance the mechanism to the next position, twice will move it to the second position, etc.

When the radio is in the Manual Tuning position, the dial is illuminated. When it is in any of the 5 station setting positions, one of the numbers on the Automatic Station Knob is illuminated.

Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

Any station setting position may be used for any station you can receive although it is better to put the stations on your list in frequency order.

First get the mechanism in the Manual Tuning position. If the dial is illuminated, it is already in this position. If one of the numbers on the Automatic Station Knob is illuminated, depress this knob one or more times until every number is dark.

Select the first station from the list you have made and carefully tune in this station by rotating the Manual Tuning Knob. Determine what program is being broadcast.

Then advance the mechanism to position No. 1 by depressing the Automatic Station Knob once. As shown in Fig. 3, there are 5 small holes in the chassis case through which the station setting screws are reached.

Insert a small bladed screwdriver in the opening for setting screw No. 1 and turn this screw in or out until the desired station (the one previously tuned in) is heard. Turning the screw in (clockwise) will tune in stations with lower kilocycle numbers while turning the screw out (counter-clockwise) will tune in stations with higher kilocycle numbers.

There is a card supplied with the radio on which is a frequency scale. Using the screwdriver as a guide, this scale will show the approximate frequency (kilocycle number) at which the setting screw is set.

Be sure not to tune in some other station broadcasting the same program. Turn the screw slowly back and forth until this station is carefully tuned in to the clearest and loudest point. The final motion of the setting screw should be to the right (clockwise). The station is now set for position No. 1.

Next advance the mechanism to position No. 2 by depressing the Automatic Station Knob once more. Tune in the second station on your list by adjusting setting screw No. 2 as explained above.

If you have difficulty in knowing when this station is tuned in, push the Automatic Tuning Knob 4 times to reach the Manual Tuning position. Then tune in this station with the Manual Tuning Knob, noting the program that is being broadcast. Push in the Automatic Station Knob twice to get the mechanism back into position No. 2 and again tune in this station by carefully adjusting setting screw No. 2 until the station is clearest and loudest.

Proceed in like manner to set any remaining stations on your list.

Suppression of Motor Noise

The following procedure has been found to be effective in reducing motor noise to a satisfactory level in most cars. Follow the steps in the order given. Additional procedure, which may be required in exceptional cases of motor noise, is not covered here and will be found by referring to current literature on this subject.

GENERATOR CONDENSER—A generator condenser is required in all cases. Connect the condenser lead to the battery terminal of the generator. The case and mounting strap connect the other side of the condenser to ground. This unit must, therefore, be well grounded at its mounting.

CAUTION—In cars with automatic regulators, it is important not to connect the condenser across the field terminal. Most manufacturers at the present time have a recommendation for the proper post at which to connect the condenser.

DISTRIBUTOR SUPPRESSOR—A distributor suppressor will be required in most cases. Remove the high tension lead to the distributor. Insert a distributor suppressor and connect the wire to the other end of the suppressor (See Fig. 7). If this is not practical, cut the high tension lead *close to the distributor* and use a wood screw end type distributor suppressor in this line.

Withdraw Antenna Cable Plug

Turn on the radio and start the motor.

If motor noise is heard, proceed as follows:

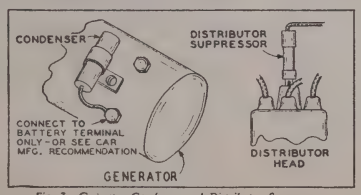


Fig. 7—Generator Condenser and Distributor Suppressor

BONDING CABLES—Try grounding to the fire wall all cables and tubing which pass through it such as oil lines, gas lines, etc. By means of a file, contact can be established between any of the lines and the fire wall in order to determine whether such a ground will reduce the noise. To bond the cables to the fire wall, clean the point of contact, wrap a length of braided shielding around the cable, and solder the connection. Then solder the end of the shielding to the fire wall or ground it under a screw head if one is convenient.

Sufficient play should be left in the bonding shielding so that movement of the cables or tubing will not loosen this shielding from the fire wall.

BONDING STEERING COLUMN, ETC.—It is possible for the steering column, foot pedals, and brake lever to carry interference to the back of the fire wall at which point it may affect the radio. See if each of these items is well grounded to the frame of the car. By means of a file or a braided shielding jumper, contact can be established between any of these items and the frame in order to determine whether or not such a ground will reduce the noise. A piece of one inch braided shielding should be used if such a ground is necessary and this shielding may be grounded under a screw head, nut, or may be soldered in position.

Then Reinsert Antenna Cable Plug

If motor noise is heard when the antenna cable is reconnected, proceed as follows until the noise is satisfactorily reduced:

DOME LIGHT LEAD—Noise due to radiation from the dome light lead is generally experienced only when a roof antenna is being used. Disconnect the dome light lead connection at the back of the instrument panel and ground this wire. If this is found to reduce the noise noticeably, interference is being radiated by the dome light lead. Reconnect the dome light lead and then connect a .5 mfd. bypass condenser between the point at which this lead leaves the pillar post and ground.

BYPASS CONDENSERS—Try a .5 mfd. bypass condenser from the ammeter to ground and see if interference is reduced. Install this condenser permanently if there is an improvement.

In like manner, try a .5 mfd. condenser from car fuse to ground, switch to ground, tail light and stop light connections to ground, windshield wiper and various other 6 volt connections to ground, noting what effect these condensers have on the noise pick-up.

Try a .5 mfd. condenser from the "Hot" side of the coil primary to ground.

The electric gauges used for oil, water, and gas are often a source of interference and bypass condensers should be tried.

HIGH AND LOW TENSION LEADS—In some cases, the high and low tension leads between the coil and distributor are run close together. In some cars, they are in the same conduit. If this is the case, remove the low tension lead from this conduit. In any event, keep the high and low tension leads as far apart from each other as possible. If separating the two leads is not sufficient, shield and ground the shield of the low tension lead.

GROUNDING MOTOR AND OTHER PARTS—The motor must, in every case, be well grounded to the frame of the car. If it is not, use a very heavy braided lead for this purpose, similar to a storage battery ground lead. In like manner, it may be necessary to check the grounding of the metal fire wall, instrument panel, transmission, radiator, hood, and muffler to the frame of the automobile. To obtain a good electrical connection, scrape off the paint, if necessary, at the point where ground contact is made.

PEENING ROTOR ARM—In extreme cases of motor noise, it is advisable to peen the distributor rotor arm, that is, increase the length of the arm by using a small machinist's hammer. This will lessen the gap between the rotor arm and the stationary contacts thus reducing the spark. Be sure, after peening the arm, that it does not strike the stationary contacts.

SPARK PLUG SUPPRESSORS—If motor noise persists, spark plug suppressors must be installed. One suppressor is put on each plug. These are not regularly supplied with the radio and must be purchased extra. Ninety-five percent of all cars will not require spark plug suppressors.

Care should be taken that a good mechanical and electrical connection is made between the spark plugs, suppressors, and plug wires.

WHEEL OR BRAKE STATIC—Noise from this source is generally experienced only when an under car antenna is being used. To determine if noise is being caused from this source, set the car in motion; then with the motor shut off and the clutch disengaged, apply the brakes. If the noise stops, the source of the static is in the wheels. The use of a front or rear wheel static eliminator will generally end the trouble.

Service Data (For Professional Service Men)

ALIGNMENT PROCEDURE

Remove Grille, Speaker, Trimmer Caps and Rear Cover From Chassis Case—(See Figs. 3 and 5).

Volume Control—Maximum All Adjustments.

Local-Distance Switch—"Distance" Position.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antenna—.05 mf., See Note A.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	IRON CORE SETTING	ADJUST TRIMMERS TO MAXIMUM (See Figs. 3 and 5)
I.F.	Control Grid (prong No. 8) 6SA7 1st Det. Tube			1st I.F. (C11) & (C12)
456 KC		.05 mf.		2nd I.F. (C15) & (C16)
OSCILLATOR	Antenna Cable		Extreme Position	
1560 KC	See Note A	See Note A	out of Coil	Oscillator (C6)
1000 KC ADJUSTMENT				
1000 KC	Antenna Cable	See Note A	Tune to Max. Output with Tuning Knob	Int. (C5) Ant. (C4)

Reassemble Radio—Install in Car—Connect Car Antenna to Radio.

Car Antenna Readjustment—Tune in weak signal near 1000 KC—Readjust Antenna Trimmer C4 for maximum output.

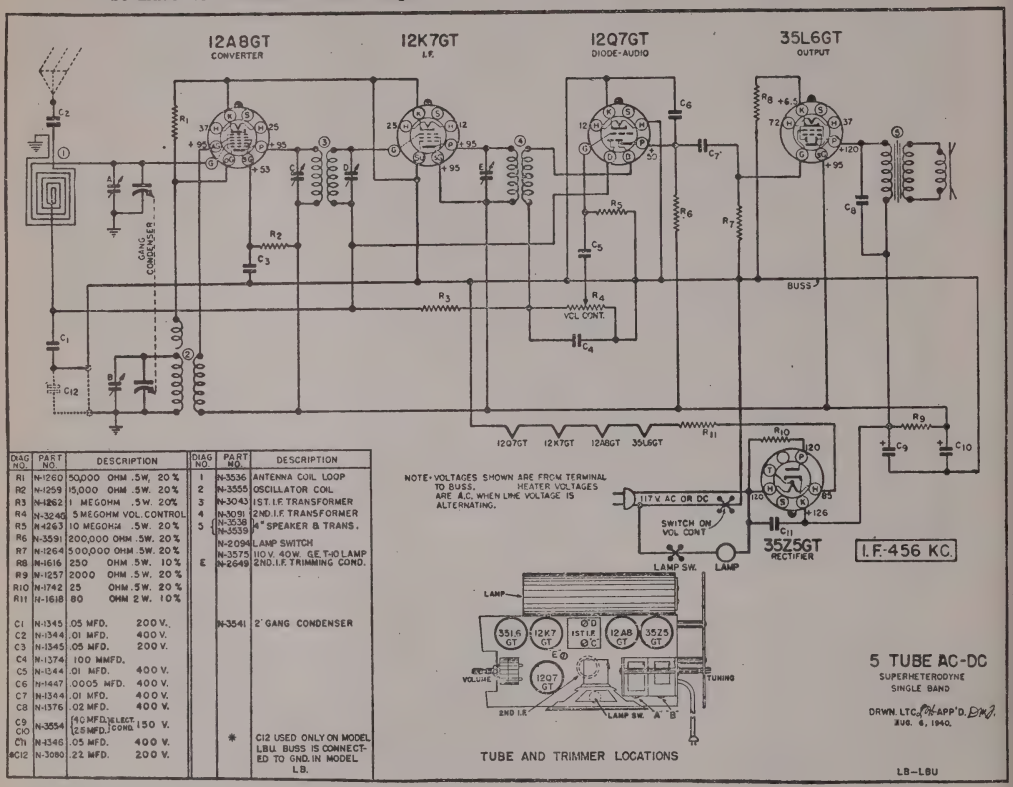
NOTE A—Insert the antenna cable plug in the antenna socket on the chassis. The total capacity of the antenna cable and dummy antenna should be 60 mmf. If the cable, for example, has a capacity of 30 mmf., use a 30 mmf. condenser for a dummy antenna. Connect the other end of the antenna cable through the dummy antenna capacity to the output of the signal generator.

CALIBRATION—To calibrate the radio, tune in a station of known frequency. At the back of the pointer disc shaft is the calibration screw. Turn this screw with the fingers until the pointer on the dial scale is at the frequency of the station being received.

MODELS D-121, D-122,
Lullaby

ALLIED RADIO CORP.

Voltages shown on the circuit diagram are from socket terminals to chassis base. In measuring voltages use a voltmeter having a resistance of at least 1000 ohms per volt. Allowances should be made for variations in line voltage.



DIAG NO.	PART NO.	DESCRIPTION
R1	N-1260	50,000 OHM .5W. 20%
R2	N-1259	15,000 OHM .5W. 20%
R3	N-1262	1 MEGOHM .5W. 20%
R4	N-3240	5 MEGOHM VOL. CONTROL
R5	N-1263	10 MEGOHM .5W. 20%
R6	N-3591	200,000 OHM .5W. 20%
R7	N-1264	500,000 OHM .5W. 20%
R8	N-1616	250 OHM 5W. 10%
R9	N-1257	2000 OHM .5W. 20%
R10	N-1742	25 OHM .5W. 20%
R11	N-1618	80 OHM 2W. 10%
C1	N-1345	.05 MFD. 200V.
C2	N-1344	.01 MFD. 400V.
C3	N-1345	.05 MFD. 200V.
C4	N-1374	100 MMFD.
C5	N-1344	.01 MFD. 400V.
C6	N-1447	.0005 MFD. 400V.
C7	N-1344	.01 MFD. 400V.
C8	N-1376	.02 MFD. 400V.
C9, C10	N-3554	(40 MFD. ELECT. 25 MFD. COND. 150 V.
C11	N-1346	.05 MFD. 400V.
C12	N-3080	.22 MFD. 200V.

DIAG NO.	PART NO.	DESCRIPTION
1	N-3536	ANTENNA COIL LOOP
2	N-3555	OSCILLATOR COIL
3	N-3043	1ST. I.F. TRANSFORMER
4	N-3091	2ND. I.F. TRANSFORMER
5	N-3538	4" SPEAKER & TRANS.
	N-3539	
	N-2094	LAMP SWITCH
	N-3575	110 V. 40 W. G.E. T-10 LAMP
E	N-2649	2ND. I.F. TRIMMING COND.
	N-3541	2 GANG CONDENSER
*		C12 USED ONLY ON MODEL LBU. BUSS IS CONNECTED TO GND. IN MODEL LB.

5 TUBE AC-DC
SUPERHETERODYNE
SINGLE BAND

DRWN. LTC. APP'D. EMJ.
AUG. 6, 1940.

LB—LBU

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. Remove the chassis from the cabinet and set on a bench taking care that no iron or other metal is near the loop. Do not make this setup on a metal bench. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12A8GT) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the test oscillator to the antenna of the set through a 200 mmfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 K.C. and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

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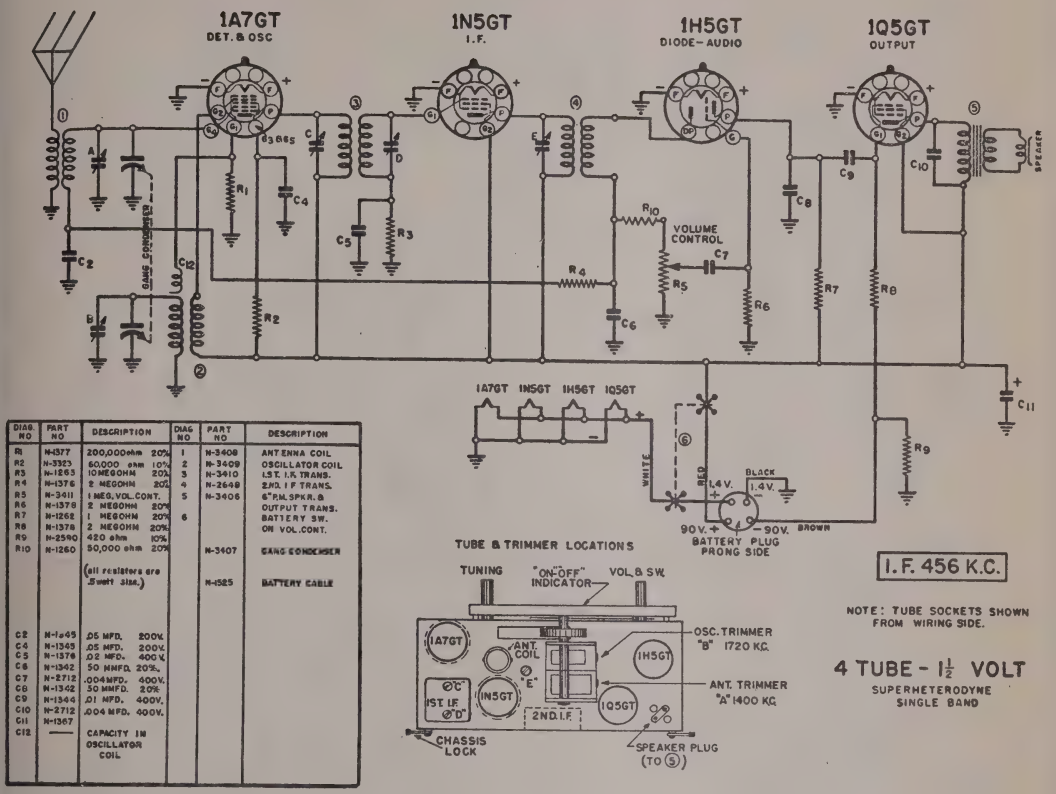
ALLIED RADIO CORP.



DIAG. NO	PART NO	DESCRIPTION	DIAG NO	PART NO	DESCRIPTION
R1	N-1577	200,000ohm 20%	1	N-3408	ANTENNA COIL
R2	N-3323	60,000 ohm 10%	2	N-3409	OSCILLATOR COIL
R3	N-1263	10 MEGOHM 20%	3	N-3410	1ST I.F. TRANS.
R4	N-1376	2 MEGOHM 20%	4	N-2648	2ND. I F TRANS.
R5	N-3411	1 MEG. VOL. CONT.	5	N-3406	6"P.M. SPKR. & OUTPUT TRANS.
R6	N-1378	2 MEGOHM 20%			
R7	N-1268	1 MEGOHM 20%	6		BATTERY SW. ON VOL. CONT.
R8	N-1378	2 MEGOHM 20%			
R9	N-2590	420 ohm 10%			
R10	N-1260	50,000 ohm 20%		N-3407	GANG CONDENSER
		(all resistors are ½watt size.)		N-1525	BATTERY CABLE
C2	N-1405	.05 MFD. 200V.			
C4	N-1345	.05 MFD. 200V.			
C5	N-1378	.02 MFD. 400 V.			
C6	N-1342	50 MMFD. 20%.			
C7	N-2712	.004 MFD. 400V.			
C8	N-1342	50 MMFD. 20%			
C9	N-1344	.01 MFD. 400V.			
C10	N-2712	.004 MFD. 400V.			
C11	N-1367				
C12	——	CAPACITY IN OSCILLATOR COIL			

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1A7GT) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the antenna to the generator through a 200 MMF dummy and set the dial and generator at 1720 KC (gang at minimum capacity). Align the BC oscillator trimmer for maximum output. Set the test oscillator at 1400 KC and tune in the signal with the dial and adjust the antenna trimmer for maximum output.

Next set the test oscillator at 600 KC and check the sensitivity to determine if the gang or the coils have been damaged.

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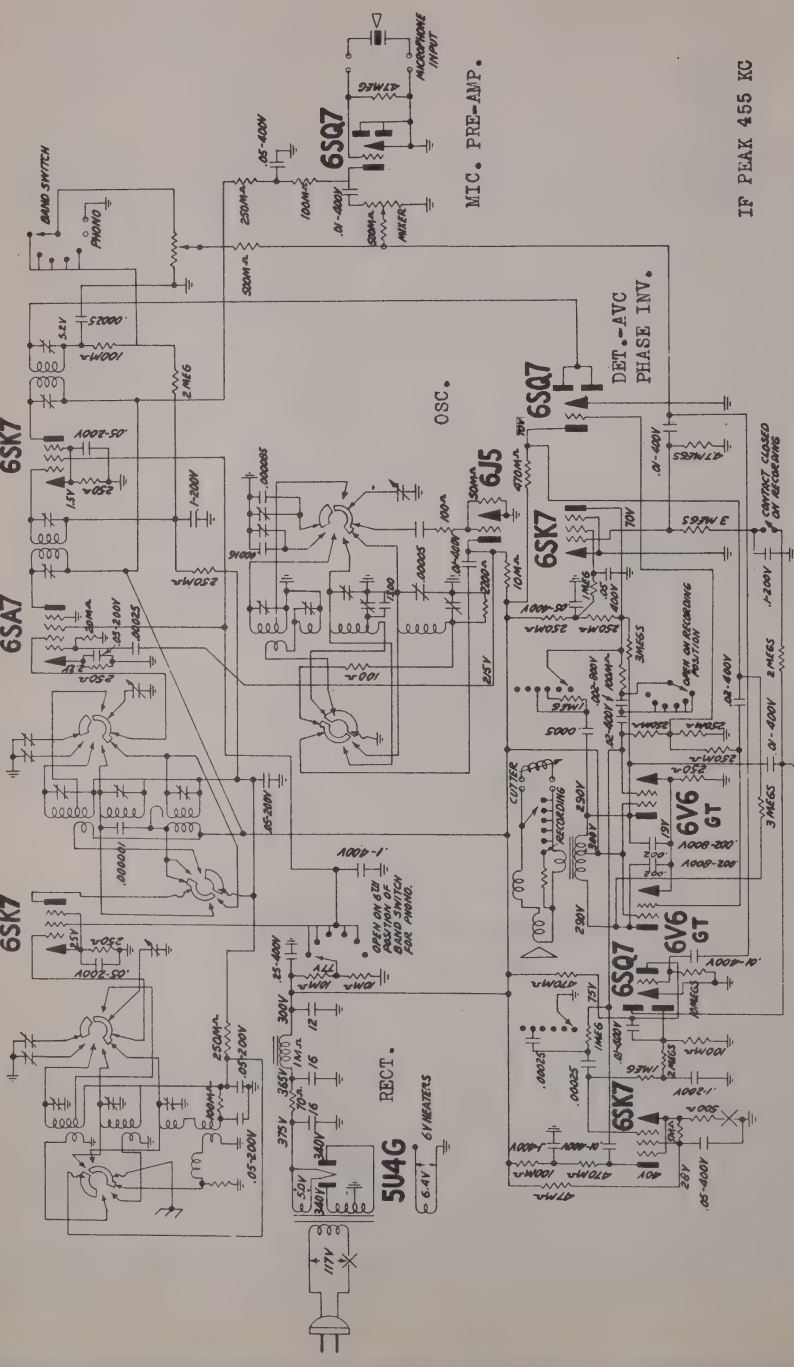
MODELS D-150, D-195, D-196

ALLIED RADIO CORP.



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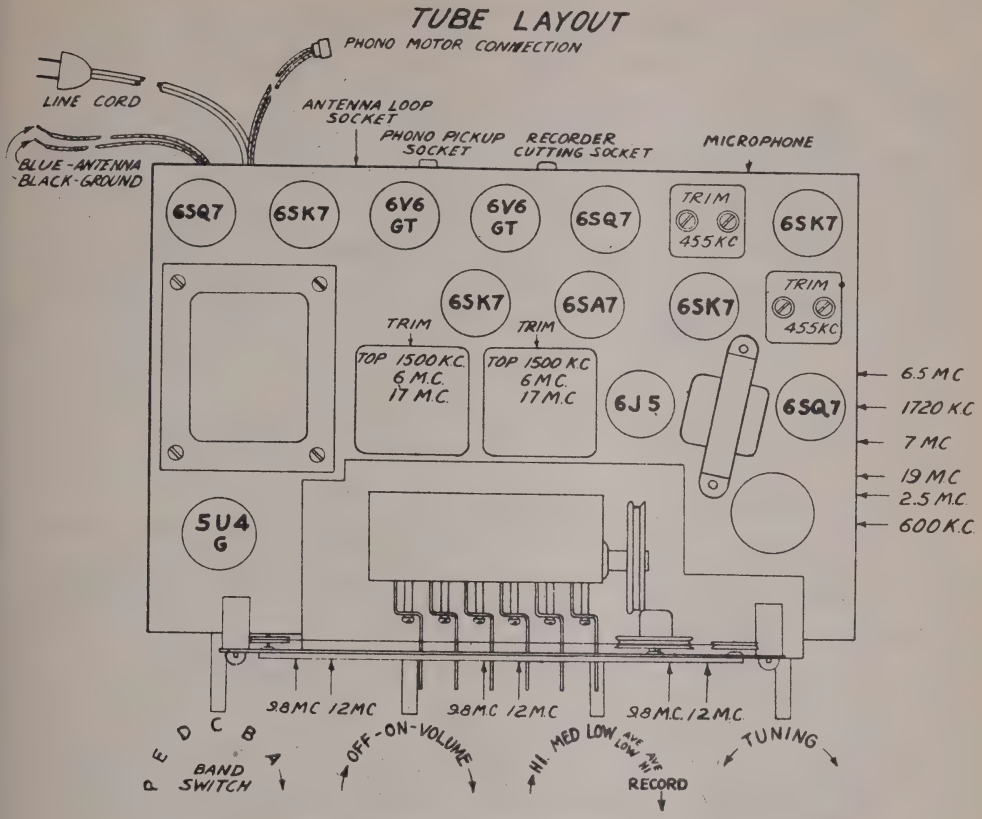

SETTING UP OF PUSH BUTTONS

1. Turn the set on and allow it to operate for at least fifteen minutes before setting the push buttons.

2. Remove the push buttons by pulling them away from the set. If they are difficult to remove, they may be pried off by inserting a nail file in the call station slot and pulling toward you.

3. Select six strong stations, preferably local or nearby stations. Remove the call letter tabs of the chosen six stations from the complete list of station tabs supplied with this receiver.

4. Using a screw driver, loosen the screw left exposed by removing the push button (See figure 2).

5. Push the loosened adjustment screw lightly with a screw driver (do not turn), and tune in one of the desired stations with the Station Selector Knob until it is heard with the best tone. This will correspond to maximum bass and minimum treble of "hiss".

6. Hold the station exactly in tune with the Station Selector Knob and tighten the adjustment screw while pushing it lightly.

7. Replace the push button.

8. Insert the proper station tab in the push button slot.

9. Follow this procedure for each push button until all buttons are adjusted.

10. "Push Button Stations" will be tuned accurately by pushing the push button all the way to its stop.

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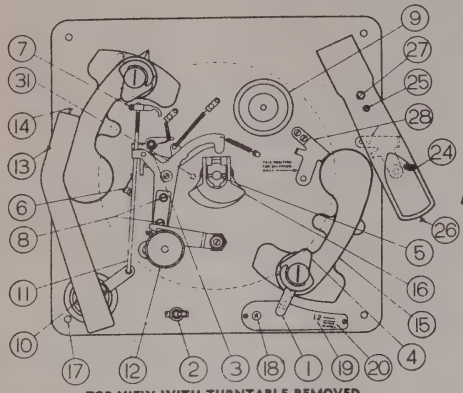
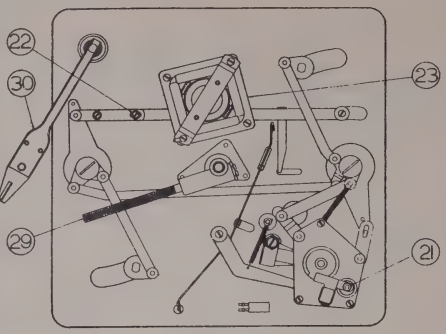
MODELS D-150, D-195, D-196

ALLIED RADIO CORP.

RECORD CHANGER-RECORDER



TOP VIEW WITH TURNTABLE REMOVED



BOTTOM VIEW UNDER BASE PLATE

(1.) Lever for setting to play 10-inch or 12-inch records. Manual playing or Remove records. Mechanism as shown is set for playing 10-inch records.

(2.) "On" and "Off" switch for operating the record playing mechanism. Not used on some models.

(3.) Trip mechanism designed to handle automatically records with either spiral run-in or oscillating grooves.

(4.) Record Support Fingers.

(5.) Turntable Shaft.

(6.) Trip Rod Tension Spring.

(7.) Adjustment for run-in or spiral grooved records.

(8.) Adjusting lock screws for controlling position of power take-off wheel(12).

(9.) Rubber-tired Drive Wheel. By means of a spring, this wheel contacts the steel pulley on the motor and the inside flange of the turntable; driving the table in clockwise rotation.

(10) Adjusting screws for locking tone arm in position so that needle will rest properly on edge of record.

(11) Trip Rod.

(12) Rubber-tired power take-off wheel. It is through the trip mechanism this wheel contacts the inside flange of the turntable during the change cycle from one record to the next, but does not operate during the playing of a record.

(13) Pickup Arm.

(14) Needle Set Screw.

(15) Record Support Arm.

(16) Master Trip Cam.

(17) Mounting Holes. Rubber washers or springs should be used when bolting changer in cabinet to absorb possible vibration.

(18) Reject Button. By pressing this button, changing mechanism operates immediately regardless of needle position on the record. Also by pressing this button, the first record will drop on turntable.

(19) Position for Lever (1) when playing 12-inch records.

(20) Position for Lever (1) for Manual playing, Removing records or Cutting records.

(21) Adjusting screw for setting vertical movement for tone arm. If properly set, no further adjustment will be necessary.

(22) Adjustable Tie Bar used for positioning record support arms. The adjustment of this bar properly made should require no further attention.

(23) Rim Drive Electric Motor. Be sure Voltage and Cycles are correct for your Power Line.

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ALLIED RADIO CORP.

MODELS D-150, D-195, D-196
RECORD CHANGER-RECORDER DATA - continued

(24) Cutter Arm. At all times except when actually recording, cutter arm is placed on cutting arm support rest (28).

(25) Adjusting Screw by which the tension on the cutter head equalizing spring may be varied for different types of records.

(26) Cutting Stylus clamp screw.

(27) Adjusting Screw and Lock Nut for proper spacing between cutter arm and record.

(28) Cutter Arm Support Rest. Holds cutter arm out of the way when automatic record changer is in use and also removes all strain on cutter-head equalizing spring. Mounted in inside position for shipping purposes. Before attempting to use mechanism it is necessary to move rest to the outside position shown.

(29) Lead Screw.

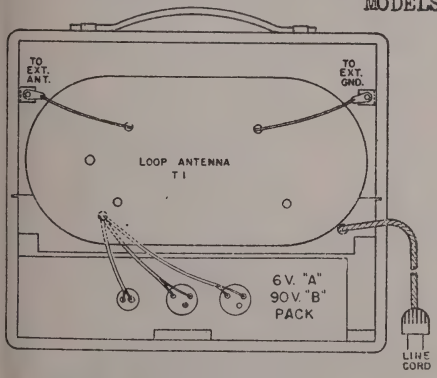
(30) Follower Arm and Spring Cam. This arm and cam mesh with lead screw(29) to provide lateral motion of cutter arm during recording.

(31) Retractable Pin in turntable for driving home recording disc.

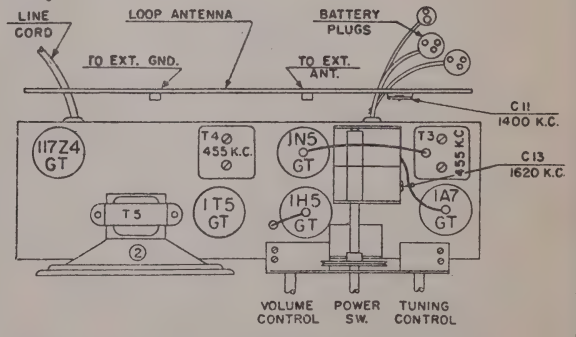
CUTTING HEAD AND ARM ADJUSTMENTS MODELS D-150, D-195, D-196

There is a possibility, that these adjustments may have been altered after leaving our factory; if so, the following information should be sufficient to make proper readjustments. With record blank on turntable, cutting stylus in cutting head and cutting arm lowered on the record, the cutting stylus clamp screw(26) should be centered in the slot through which it protrudes. This condition should occur when the underside of the nose of cutter arm is approximately 1/4 inch above record surface. If this height of the arm differs appreciably, adjustments may be made by adjusting screw and lock nut(27). A cut of at least ten turns should now be made on the record blank. Remove record and hold so light is reflected from surface just cut, then relative width of cut can be observed. When properly adjusted, grooves are just about as wide as space between grooves. For readjustments; turn adjusting screw(25) to right to increase depth and width of cut and to left to decrease the depth or width. Turn screw in quarter or half-turns only as this adjustment is very critical. When cutting head is properly adjusted and arm is raised to approximately 45 degrees, cutting stylus screw should just rest on bottom of slot and cutting head almost flat.

MODELS D-160, D-161



LOCATION OF PARTS IN CABINET



LOCATION OF PARTS ON TOP OF CHASSIS

INSTALLATION

If the receiver is purchased complete with battery, it is ready for operation. If it is purchased without battery, it is necessary (for battery operation) to install one Ray-O-Vac No. AB694-3 or General Dry Battery No. 60A-4FL4, or an equivalent, combination 90v. and 6v. battery pack. (See figure below for installation). It is not necessary to install battery to operate receiver on a 117 volt A.C. or D.C. supply.

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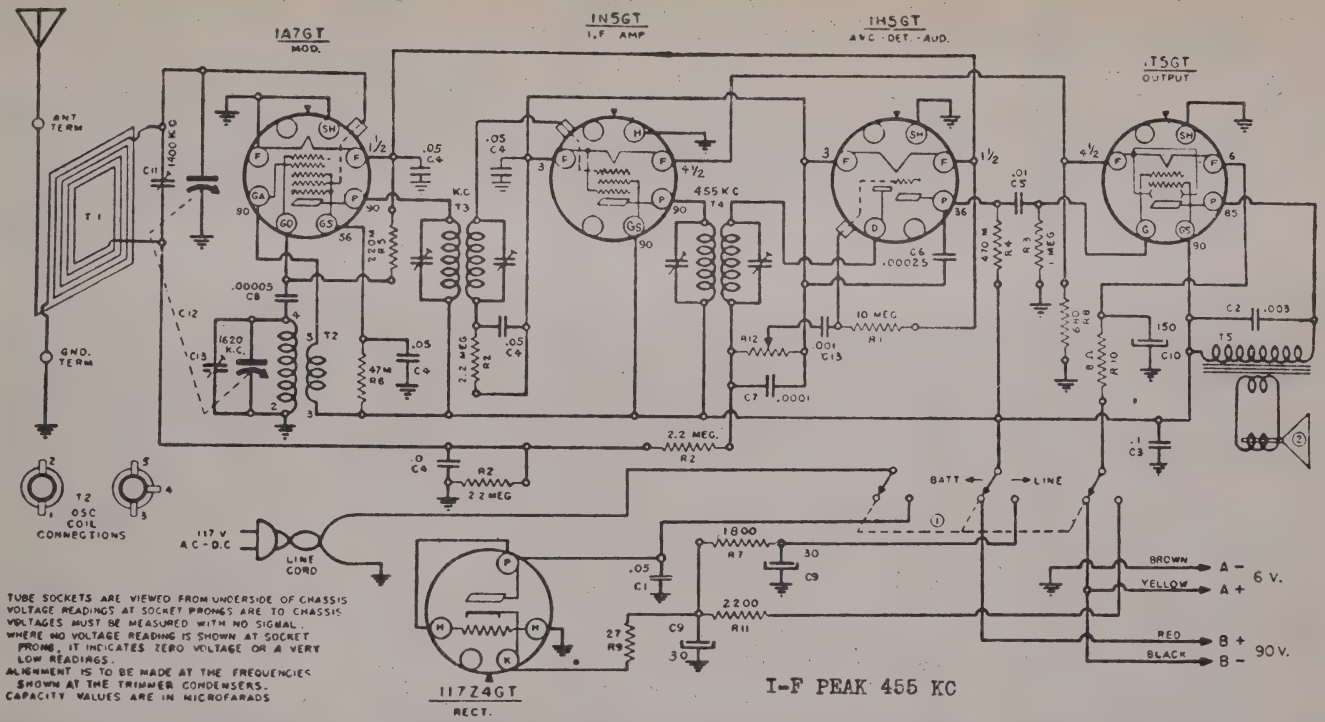
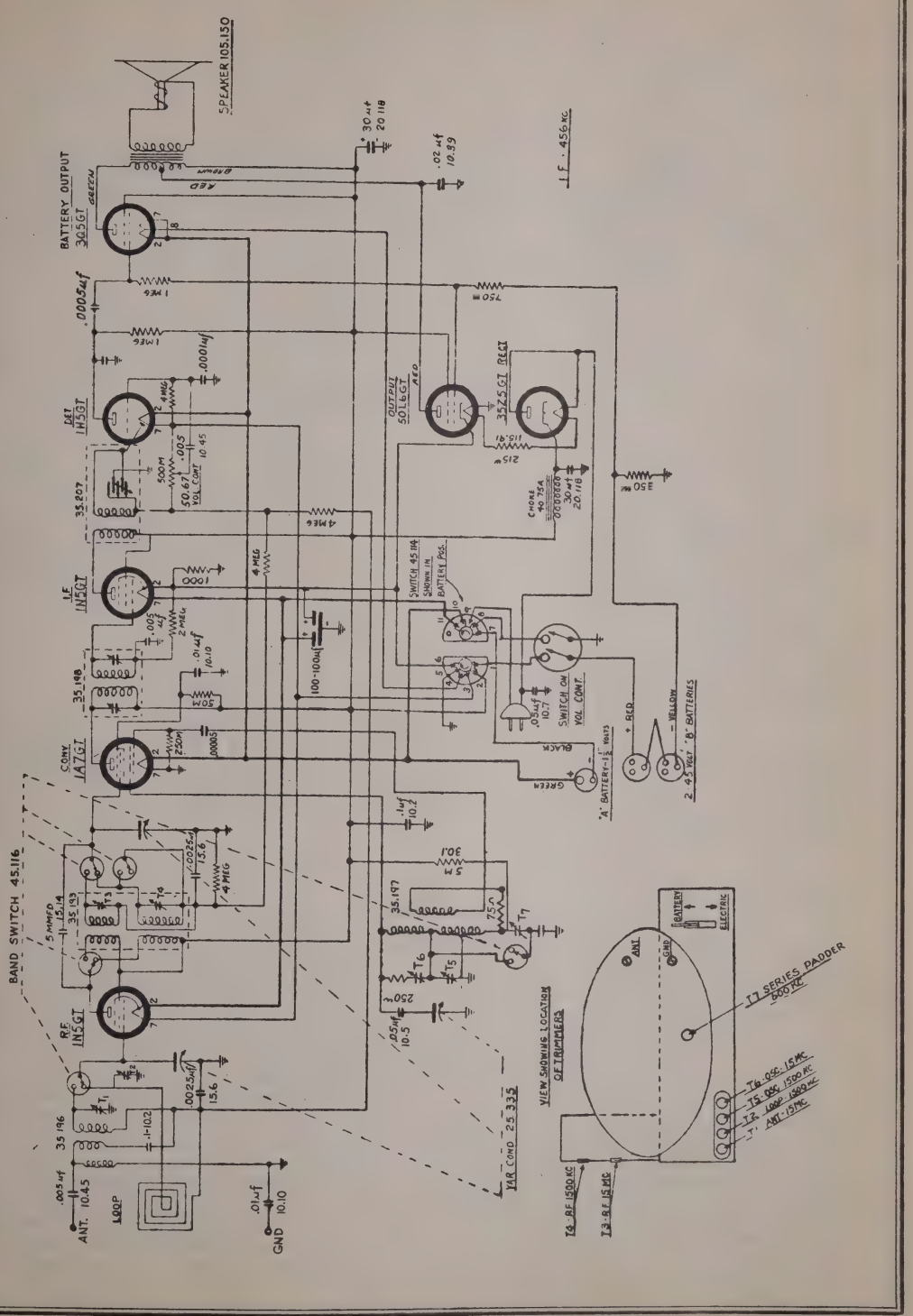


CODE	PART NO	DESCRIPTION
C1	1607	.05 MFD 400 V. TUBULAR COND.
C2	16-139	.003 " " " "
C3	16-115	1 " 200 V " "
C4	1622	.05 " " " "
C5	16-121	.01 " " " "
C6	1504	.00025 MFD MICA CONDENSER
C7	1501	.0001 " " "
C8	1503	.00003 " " "
C9	18-266	30-30 " 150 W V ELECTROLYTIC
C10	18-271	150 " 25 W V
C11	20-129	TRIMMER ON LOOP
C12	19 172	2 GANG VARIABLE COND. ALSO C13
C13	16-124	.001 MFD. 400 V. TUBULAR COND.

CODE	PART NO.	DESCRIPTION
R1	60-193	10 MEGOHM 1/4 W RESISTOR
R2	60-179	2.2 " " "
R3	60-195	1 " " "
R4	60-178	470 M OHM "
R5	60-180	220 M "
R6	60-177	47 M "
R7	60 257	1800 "
R8	60 379	680 " "
R9	60-651	27 " "
R10	60-128	8 " 1/2 W "
R11	60-652	2200 " 8 W "
R12	24 150	1 MEGOHM VOLUME CONTROL

CODE	PART NO	DESCRIPTION 2-54
T1	82-25	LOOP ANTENNA
T2	10-340	OSCILLATOR COIL
T3	10-379	1 ST. I.F. TRANSFORMER
T4	10-343	2 ND " "
T5	------	OUTPUT TRANSFORMER
1	69-151	POWER SWITCH
2	79-314-A	5" P M SPEAKER

ALLIED RADIO CORP. MODELS D-165, B-17109



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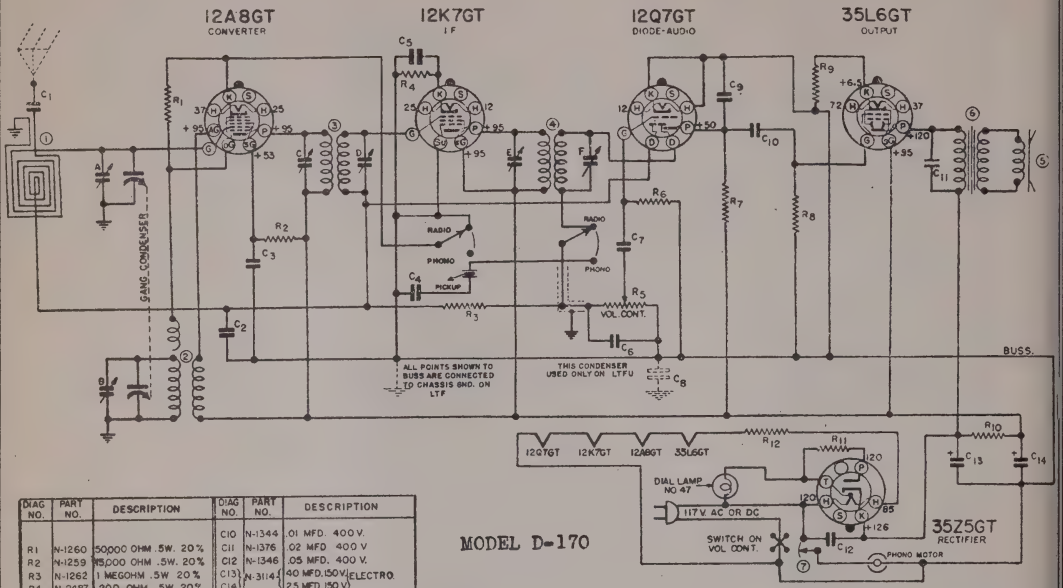
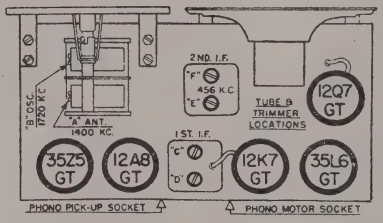
MODEL D-170
MODEL D-174

ALLIED RADIO CORP.



DIAG NO.	PART NO.	DESCRIPTION
R1	N-1260	50000 OHM .5W. 20%
R2	N-1259	15,000 OHM .5W. 20%
R3	N-1262	1 MEGOHM .5W 20%
R4	N-2487	200 OHM .5W. 20%
R5	N-3045	0.5 MEGOHM VOL. CON.
R6	N-1263	10 MEGOHM .5W. 20%
R7	N-1377	200,000 OHM .5W. 20%
R8	N-1264	500,000 OHM 5W. 20%
R9	N-1616	250 OHM .5W. 10%
R10	N-1257	2,000 OHM .5W. 20%
R11	N-1742	25 OHM .5W. 20%
R12	N-1618	80 OHM 2W. 10%
C1	N-1344	.01 MFD. 400 V.
C2	N-1345	.05 MFD. 200 V.
C3	N-1345	.05 MFD. 200 V.
C4	N-2642	.09 MFD. 200 V.
C5	N-1351	.1 MFD. 200 V.
C6	N-1374	.0001 MFD. MICA
C7	N-1344	.01 MFD. 400 V.
C8	N-3080	.22 MFD. 200 V.
C9	N-1447	.0005 MFD. 400 V.
C10	N-1344	.01 MFD. 400 V.
C11	N-1376	.02 MFD. 400 V.
C12	N-1346	.05 MFD. 400 V.
C13	N-3114	40 MFD. 150 V. ELECTRO.
C14	N-3114	25 MFD. 150 V.
1	N-3041	LOOP ANTENNA COIL
2	N-1452	OSCILLATOR COIL
3	N-3043	1ST. I.F. TRANSFORMER
4	N-3044	2ND. I.F. TRANSFORMER
5	N-2624	5" P.M. SPEAKER
6	N-3568	OUTPUT TRANSFORMER
7	N-4136	PHONO MOTOR SWITCH
	N-3046	2 GANG CONDENSER
	N-3550	RADIO-PHONO SWITCH
	N-4188	CRYSTAL PICK-UP
	N-3143	PHONO MOTOR & TURNTABLE

MODEL D-170



NOTE-VOLTAGES SHOWN ARE FROM TERMINAL TO BUSS. HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING.

SERVICE

MODELS D-170 and D-174

As the phonograph motor is the only moving part it is the only part of your phono-attachment that will require any attention. The motor requires oiling once every year.

Remove the turntable and detach the motor by removing the 3 screws. Apply 2 or 3 drops of Number 10 S.A.E. Oil in each of the felt wicks around the bearings.

ALIGNMENT PROCEDURE

I. F. ALIGNMENT. With the gang condenser set at minimum, adjust test oscillator to 456 KC, and connect the oscillator output lead to the first detector tube (12A8GT) through an .05 or .1 mfd. condenser. The test oscillator ground lead should be connected to the chassis base. Proceed by adjusting the four I.F. trimmers for maximum signal, or swing on output meter, if available.

BROADCAST ALIGNMENT. Connect the test oscillator to the antenna of the set through a 200 mmfd. (.0002) condenser. With the gang condenser set at minimum capacity, set the test oscillator at 1720 KC, and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next — set the test oscillator at 1400 KC, and tune in the signal of the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

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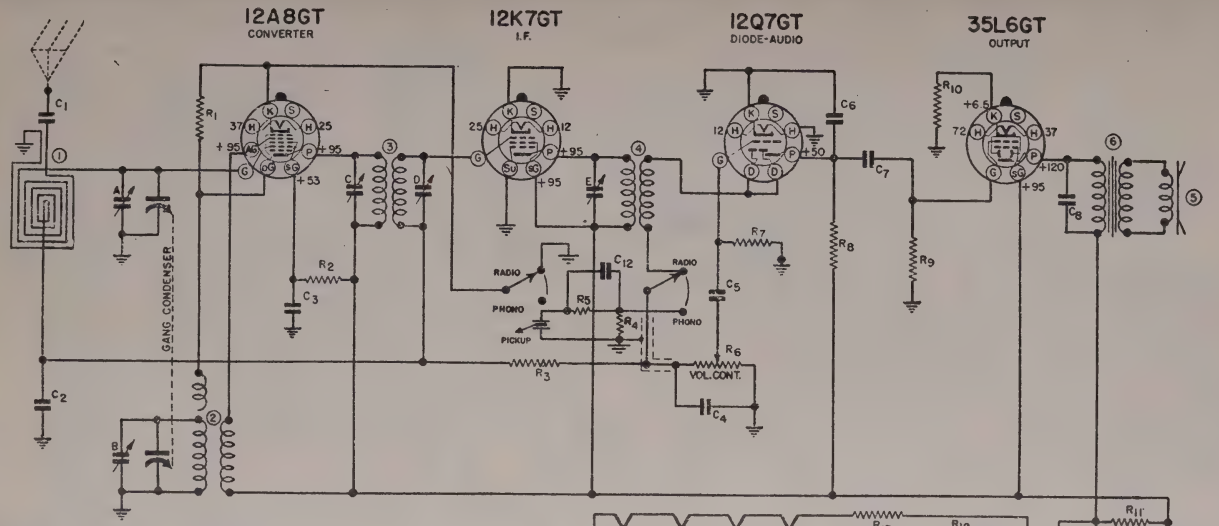
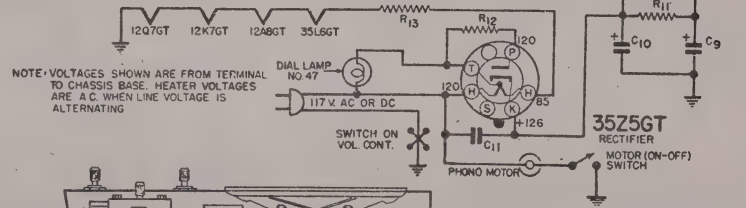
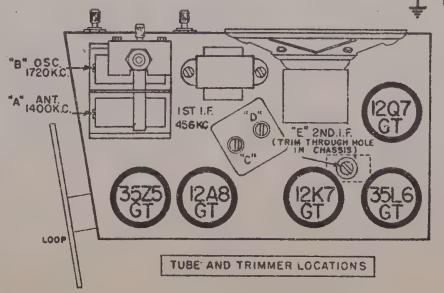




NOTE: VOLTAGES SHOWN ARE FROM TERMINAL TO CHASSIS BASE. HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING

I.F. 456 KC.



TUBE AND TRIMMER LOCATIONS

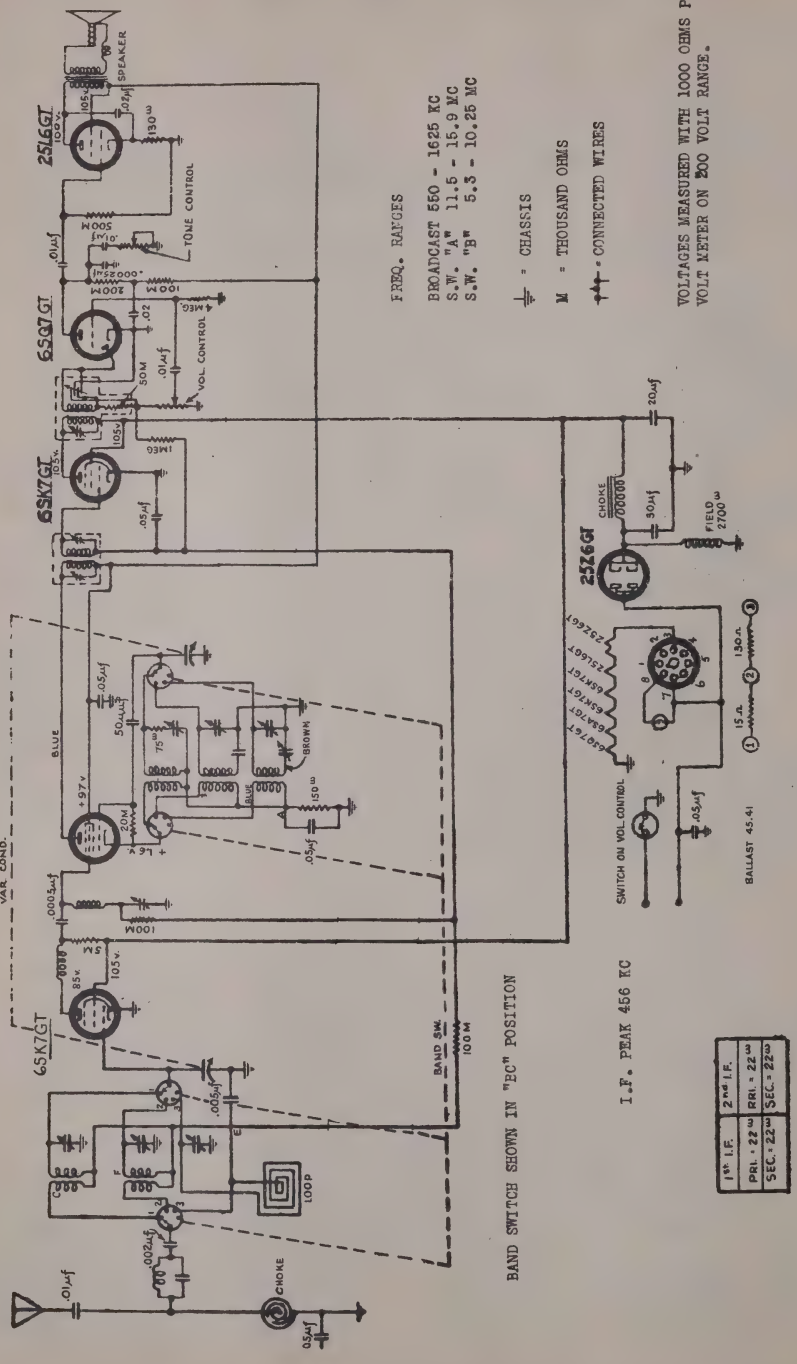
DIAG NO.	PART NO.	DESCRIPTION	DIAG NO.	PART NO.	DESCRIPTION
R1	N-1260	50,000 OHM .5W. 20%	C9	N-2915	35 MFD. 150 V. ELECTRO. 20 MFD. 150 V.
R2	N-1627	20,000 OHM .5W. 20%	C10		
R3	N-1262	1 MEGOHM .5W. 20%	C11	N-1346	.05 MFD. 400 V.
R4	N-1653	300000 OHM .5W. 20%	C12	N-1447	.0005 MFD. 400 V.
R5	N-1696	400,000 OHM .5W. 20%			
R6	N-2876	.5 MEGOHM VOL.CONT.			
R7	N-1263	10 MEGOHM .5W. 20%	1	N-2745	ANTENNA COIL LOOP
R8	N-1377	200,000 OHM .5W. 20%	2	N-1452	OSCILLATOR COIL
R9	N-1264	500,000 OHM .5W. 20%	3	N-2938	1ST I.F. TRANSFORMER
R10	N-1616	250 OHM .5W. 10%	4	N-2890	2ND I.F. TRANSFORMER
R11	N-1617	2500 OHM .5W. 20%	5	N-2914	4" PM. SPEAKER
R12	N-1614	50 OHM .5W. 20%	6	N-2952	OUTPUT TRANSFORMER
R13	N-1618	80 OHM 2 W. 10%	E	N-2649	2ND I.F. TRIMMING COND.
				N-2875	2 GANG CONDENSER
				N-2094	MOTOR ON-OFF SWITCH
C1	N-1344	.01 MFD. 400 V.		N-2877	RADIO-PHONO SWITCH
C2	N-1345	.05 MFD. 200 V.		N-2921	PHONO MOTOR & TURNTABLE
C3	N-1345	.05 MFD. 200 V.		N-2832	CRYSTAL PICK-UP
C4	N-1374	.0001 MFD. MICA			
C5	N-1344	.01 MFD. 400 V.			
C6	N-1447	.0005 MFD. 400 V.			
C7	N-1344	.01 MFD. 400 V.			
C8	N-1376	.02 MFD. 400 V.			

5 TUBE AC-DC

SUPERHETERODYNE
SINGLE BAND
PHONO. COMBINATION

MODEL D-175

ALLIED RADIO CORP.



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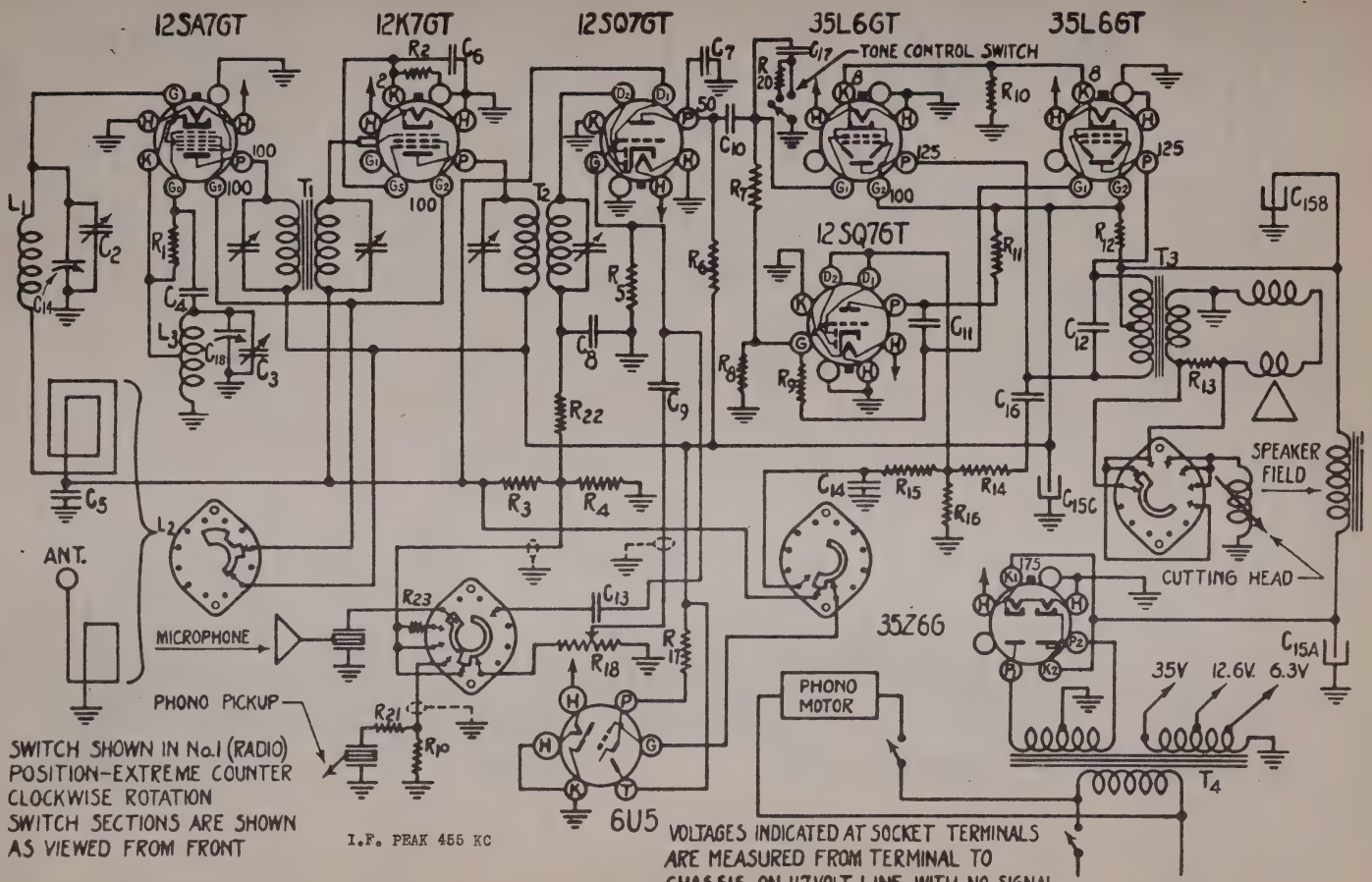

12SA7GT
12K7GT
12SQ7GT
35L6GT
35L6GT
12SQ7GT
35Z6G
6U5
TONE CONTROL SWITCH
SPEAKER FIELD
CUTTING HEAD
PHONO PICKUP
MICROPHONE
ANT.
PHONO MOTOR
35V
12.6V.
6.3V
SWITCH SHOWN IN No.1 (RADIO) POSITION-EXTREME COUNTER CLOCKWISE ROTATION
SWITCH SECTIONS ARE SHOWN AS VIEWED FROM FRONT
I.F. PEAK 455 KC
VOLTAGES INDICATED AT SOCKET TERMINALS ARE MEASURED FROM TERMINAL TO CHASSIS ON 117VOLT LINE WITH NO SIGNAL

MODEL D-176

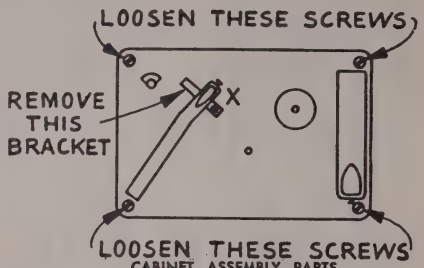
ALLIED RADIO CORP.

INSTALLATION

The recorder is rigidly mounted for shipping purposes. To prepare the unit for operation, loosen the four corner screws on the recorder and allow the unit to float on its rubber mountings. Remove the small bracket (X) which holds the tone arm in place.

Place the turntable disc on the spindle and press the motor drive wheel under so that it allows the disc to settle on its bearing.

See illustration.



Schematic Location	Part Number	Description
		CHASSIS PARTS
	4417	Button, Snap (Dial Mounting)
	8931	Cable, Tuning Tube
	2163	Cable, drive
	3227	Cap, Grid
R18	8910	Control, Volume and Switch
	1732	Cord, Line
	6424	Clamp, Linecord
	4314	Clamp, Tapped—For Tuning Tube
	4315	Clamp, Plain—For Tuning Tube
L3	8422	Coil, Oscillator
L1	8423	Coil, Tracking
C1a,b	8911	Condenser, Variable (with Pulley)
C2,3	8504	Condenser, Dual Trimmer
C15a,b,c	8425	Condenser, Electrolytic (20-250)—(20-150)—(20-150)
C4		Condenser, 100 Mmf. Mica
C5,14		Condenser, 1 Mfd. 200 v.
C6		Condenser, .05 Mfd. 200 v.
C7		Condenser, 250 Mmf. Mica
C8		Condenser, 100 Mmf. Mica
C9		Condenser, .002 Mfd. 600 v.
C10,16		Condenser, .01 Mfd. 400 v.
C11		Condenser, .05 Mfd. 400 v.
C12,13		Condenser, .001 Mfd. 600 v.
C17		Condenser, .005 Mfd. 600 v.
	7209	Grommet, Tuner Assembly Mtg.
	9121	Dial Chart
	8941	Microphone Socket Assembly
	6244	Pulley, Idler
	5026	Pointer
	6158	Pilot Lite
	1207	Retainer, "C" Washer (Holds Tuning Shaft)
R1		Resistor, 20M, 1/3 Watt
R2		Resistor, 200 Ohm, 1/3 Watt
R3,4,14,16		Resistor, 1 Meg. 1/3 Watt
R5		Resistor, 10 Meg. 1/3 Watt
R6,7,8,9,11		Resistor, 200M. 1/3 Watt
R10		Resistor, 120 Ohm, 1/2 Watt
R12		Resistor, 1000 Ohm, 1 Watt
R13		Resistor, 35 Ohm, 1/2 Watt
R15		Resistor, 2 Meg. 1/3 Watt
R17		Resistor, 1 Meg (in Tuning Tube Socket)
R19,20,21,22		Resistor, 50M, 1/3 Watt
R23		Resistor, 4 Meg. 1/3 Watt
	8440	Socket, Dual Dial Lamp
	8648	Spring, Drive Cable
	8427	Shaft, Drive
	8428	Switch, Tone Control
	8932	Switch, Master Control
	8919	Speaker, 6½" Dynamic
T4	8918	Transformer, Power, 60 cycle
T4	8933	Transformer, Power, 50 cycle
T3	89191	Transformer, Output
T1	8434	Transformer, 1st IF
T2	8435	Transformer, 2nd IF

CABINET ASSEMBLY PARTS

	Back for Cabinet
	Book, Instruction
8462	Bushing, Rubber (Recorder Unit Mtg.)
9205	Carton, Shipping
9210	Cabinet
9206	Escutcheon
2750	Knob, Motor Switch
8487	Knob, Tuning
8488	Knob, Tone
8489	Knob, Volume
8925	Knob, Master Control Switch
8491	Loop Antenna Assembly
9208	Plate, Instruction
8477	Plate, Motor-on-off
8287	Plug, 1 Prong (for Cutter Leads)
3288	Plug, 1 Prong (for Phono Pickup Leads)
8493	Plug, 2 Prong (for Motor Leads)
8454	Switch, Motor
2997	Washer, Rubber (for Recorder Mtg.)

RECORDER UNIT PARTS

6943	Hex Nut for Pivot Post
6947	Motor Mounting Screw
6948	Adjusting Screw (Follower Arm)
9413	Turntable Shaft Locking Screw
9417	Recorder Arm Rest
9418	Follower Arm Complete
9424	Pickup Cartridge
9426	Pickup Arm Complete
9428	Cutter Head Tension Spring
9484	Magnetic Cutter Head with Leads
9434	Recorder Arm Complete
9438	Pivot Post Return Spring
9450	10" One-piece Turntable
9456	Turntable Drive Disc Stud Clip
9458	Lead Screw and Pinion Assembly
9463	Turntable Drive Disc Tension Spring
9464	Turntable Shaft
9466	Turntable Drive Disc
9467	Turntable Drive Disc Mounting Bracket Assembly

The following parts are for models with ONE-PIECE TURNTABLE ONLY

9469	Retractable Pin Spring
9470	Retractable Pin
9472	Rotor Shaft Pulley
9474	Rotor Shaft Pulley Set-Screw
9481	Motor 60 Cycle
9482	Motor 50 Cycle

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MODEL D-176

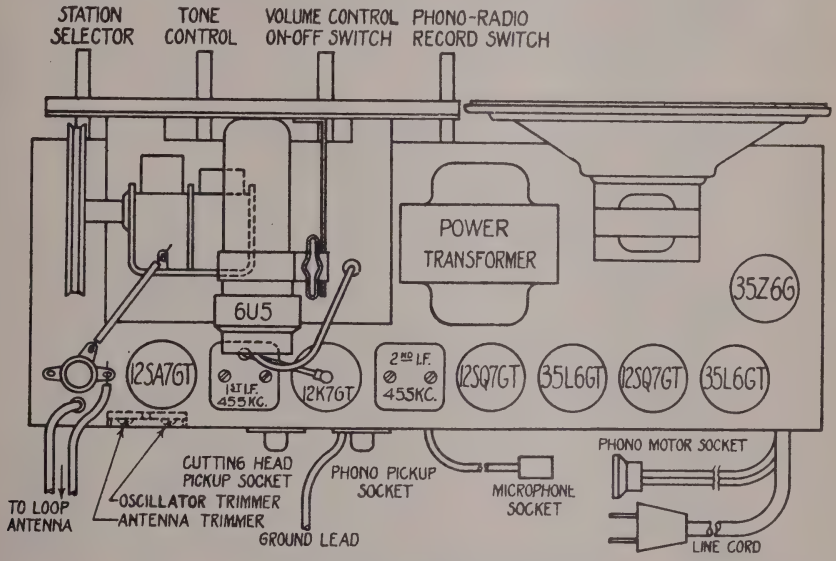
ALLIED RADIO CORP.

ALIGNMENT PROCEDURE

Output meter connection . . . . . Across speaker voice coil
Connection of generator ground lead . . . . . To Chassis
Connection of generator output lead . . . . . See chart below
Dummy antenna value to be used in series with generator . . . . See chart
Position of volume control . . . . . Full on (Clockwise)

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)
Open (Min. capacity)	455 kc.	.1 mfd.	Ant. section of variable	T2, T1.
Min. capacity	1720 kc.	50 mmf.	Ant. Terminal	Oscillator Trimmer
Tune in signal from generator	1400 kc.	50 mmf.	Ant. Terminal	Antenna Trimmer

ALL ALIGNMENT OPERATIONS MUST BE DONE WITH THE MASTER CONTROL SWITCH IN THE NO. 1 (RADIO) POSITION.



RECORDING ARM ADJUSTMENTS

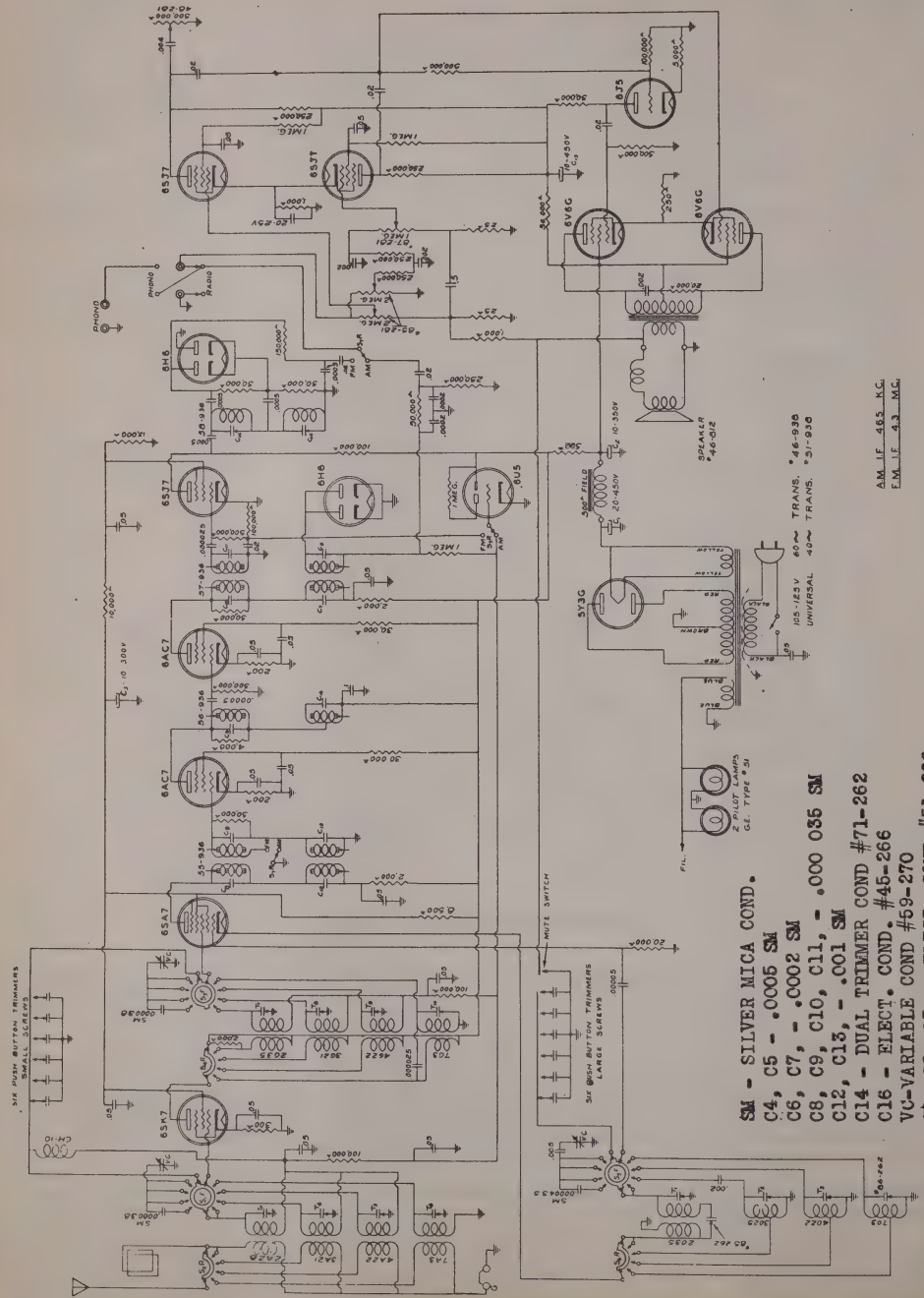
The recorder arm and recording head are adjusted at the factory for best operation. The following paragraph tells how to correct these adjustments should they, for any reason, become changed from their factory setting.

The bottom of the recording arm should be exactly 1/4 inch from the surface of the record. This should be measured beside the needle retaining screw on the end of the arm. The screw for making this adjustment can be found when the arm is raised, on a small platform near the hinge. Turning the adjusting screw to the left raises the arm, turning to the right lowers it. In making an adjustment turn the screw only a small fraction of a turn at a time.

Make a cut of at least ten or fifteen turns to see whether or not the needle is exerting the correct pressure on the record. This is correct when the groove cut by the needle is of approximately the same width as the space between grooves. On top of the cutting arms is a flat head screw. Turning this screw to the right increases the depth of cut, to the left decreases it. This adjustment is quite critical and the screw should be turned not more than 1/4 turn at a time.

MODEL D-182, D-197

ALLIED RADIO CORP.


SM - SILVER MICA COND.
C4, C5 - .0005 SM
C6, C7, - .0002 SM
C8, C9, C10, C11, - .000 085 SM
C12, C13, - .001 SM
C14 - DUAL TRIMMER COND #71-262
C16 - ELECT. COND. #45-266
VC-VARIABLE COND #59-270
C1, C2, C3, - ELECT. COND #51-266
S2R, ETC. -SECTION TWO REAR - BAND SWITCH #67-914A
TRIMMER CONDS. #87-262- T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11
AM IF 455 K.C.
FM IF 4.3 M.C.
SPEAKER #46-612
105-125 V 60~ TRANS. #46-939
UNIVERSAL 40~ TRANS. #31-936
2 PILOT LAMPS G.E. TYPE #51
MUTE SWITCH
SIX PUSH BUTTON TRIMMERS LARGE SCREWS
SIX PUSH BUTTON TRIMMERS SMALL SCREWS
PHONO
RADIO
6S7T
6S3T
6V6G
6H6
6U5
6AC7
6SA7
5Y3G

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ALLIED RADIO CORP.

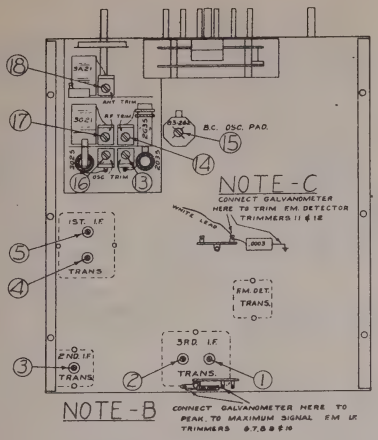
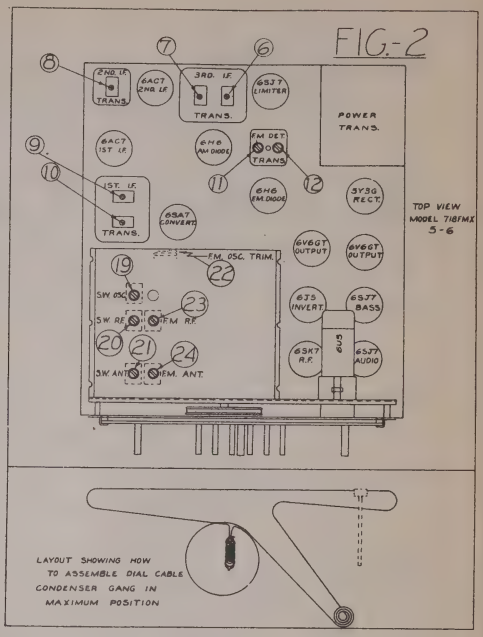


FIG.-1

BOTTOM VIEW OF CHASSIS



SOCKET VOLTAGE READINGS

* Socket Terminal Number

Voltage taken from ground with voltage at 117 Volts AC. Drop across speaker field 65 V. Use at least a 1000 Ohm per Volt Meter. High voltage reading off rectifier 300 V. DC.

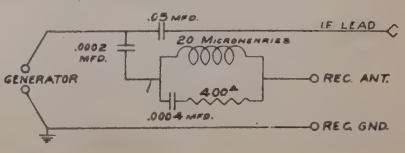
TUBE	FUNCTION	CATH.		SG.		PLATE			
6SK7	R.F.	5	*5	100	6	230	8		
6SA7	Converter			100	4	220	3		
6AC7	1st. I.F.	3	5	155	6	225	8		
6AC7	2nd I.F.	3	5	155	6	210	8		
6SJ7	Limiter			65	6	65	8		
6H6	FM Des-Det.								
6H6	AM Det.								

TUBE	FUNCTION	CATH.		SG.		PLATE			
6SJ7	A.F.	1	5	20	6	25	8		
6SJ7	Bass Boost	1	5	20	6	25	8		
6U5	Tuning Eye					230			
6J5	Inverter	6	8			80	3		
6V6GT	Output	14	8	235	4	225	3		
6V6GT	Output	14	8	235	4	225	3		
5Y3G	Rectifier								

ALIGNMENT PROCEDURE

EQUIPMENT REQUIRED:

1. SIGNAL GENERATOR to accurately cover the alignment frequencies as shown below.
2. GALVANOMETER 75 microamperes center "0" (Such as Simpson Type 25) USE SERIES RESISTOR OF 100,000 Ohms in positive lead. Leads from meter to set to be as short as possible.
3. OUTPUT METER (0 to 3 V. AC if used in voice coil circuit).
4. DUMMY ANTENNA. Although the values as shown in below table for antenna load may be satisfactory we urgently recommend the circuit as shown at the right to properly take care of the various frequencies to accomplish the correct alignment.



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MODEL D-182, D-197

ALLIED RADIO CORP.

START ALIGNMENT WITH:
Treble and Bass controls turned toward left, Volume Control full ON to right and Band Switch in Broadcast position. After checking for pointer travel to last line above 550, set dial to point where there is no interference with generator signal and proceed with AM-IF alignment.

DUMMY ANTENNA	SIG. GEN. CONNECTION TO	GEN. FREQ.	BAND SW. POSITION	DIAL SETTING	ORDER OF TRIMMER ADJUSTMENTS	TRIMMER FUNCTION	SEE NOTE
.05 Mfd.	Grid of 6SA7	465 KC	BC	Off Station	See Fig. 1 ① ② ③ ④ ⑤	AM I.F. peak to max. output	A
"	Grid of 6SA7 - remove tuned circuit	4.3 MC Unmod.	FM	"	See Fig. 2 ⑥ ⑦ ⑧ ⑨ ⑩	FM I.F. See Fig.1 Galvanometer Position	B
"	"	4.4 MC	FM	"	Turn ⑪ down tight - Then adjust ⑫	FM Detector See Fig. 2	C
"	"	4.3 MC	FM	"	After ⑫, adjust ⑪ for zero deflection	FM Detector See Fig. 2	D
400 Ohm Resistor	"A" Ant. post	1400 KC	BC	1400 KC	See Fig. 1 ⑬ then ⑭	BC Osc. and RF	E
"	"	600 KC	BC	600 KC	⑮ Rock Dial	BC Osc. Pad.	E
"	"	5 MC	Police	5 MC	⑯ ⑰ ⑱	Osc. - RF - Ant. Check image at 4.1	E
"	"	16 MC	S.W.	16 MC	⑲ ⑳ ㉑	Osc. - RF - Ant. Check image at 15.1	E
"	"	48 MC 8th Har. of 6 MC	FM	48 MC	㉒ ㉓ ㉔	FM Osc.- RF - Ant	E

NOTE A: When a re-alignment is made of either the AM I.F. or FM I.F. it should not be necessary to turn the adjustments very far in either direction. The AM I.F. adjustments are reached through holes in the base from underside of chassis. Should the screws be turned too far in, they might fall out of position which would require that the coil be re-assembled. At the other extreme, if the screws are forced too far out, there is danger of breaking the iron cores.

NOTE B: Connect Galvanometer from tap of limiter grid load circuit to ground. See Fig. 1. Adjust for max. current. Normal gain should give deflection (with meter as specified) of 22 with 2,000 to 3,000 microvolt input. Now shift generator frequency each side of 4.3; that is, to 4.2 and 4.4. The drop-in meter deflection should be approximately proportional to change in frequency. If not, recheck alignment.

NOTE C: With Galvanometer connected to FM Detector output (See Fig. 1) and Trimmer 11 turned all the way in temporarily, adjust Trimmer 12 for max. deflection at 4.4 MC. Normal gain should give deflection of 9 with 2,000 to 3,000 microvolts input.

NOTE D: After trimmer 12 is adjusted to 4.4, adjust Trimmer 11 to zero deflection at 4.3. Then shift generator to 4.2 MC. Meter should then show deflection approximately same as at 4.4 at reverse polarity. If the I.F. circuits are ever readjusted, always recheck detector afterwards.

NOTE E: Peak for greatest deflection of output meter.

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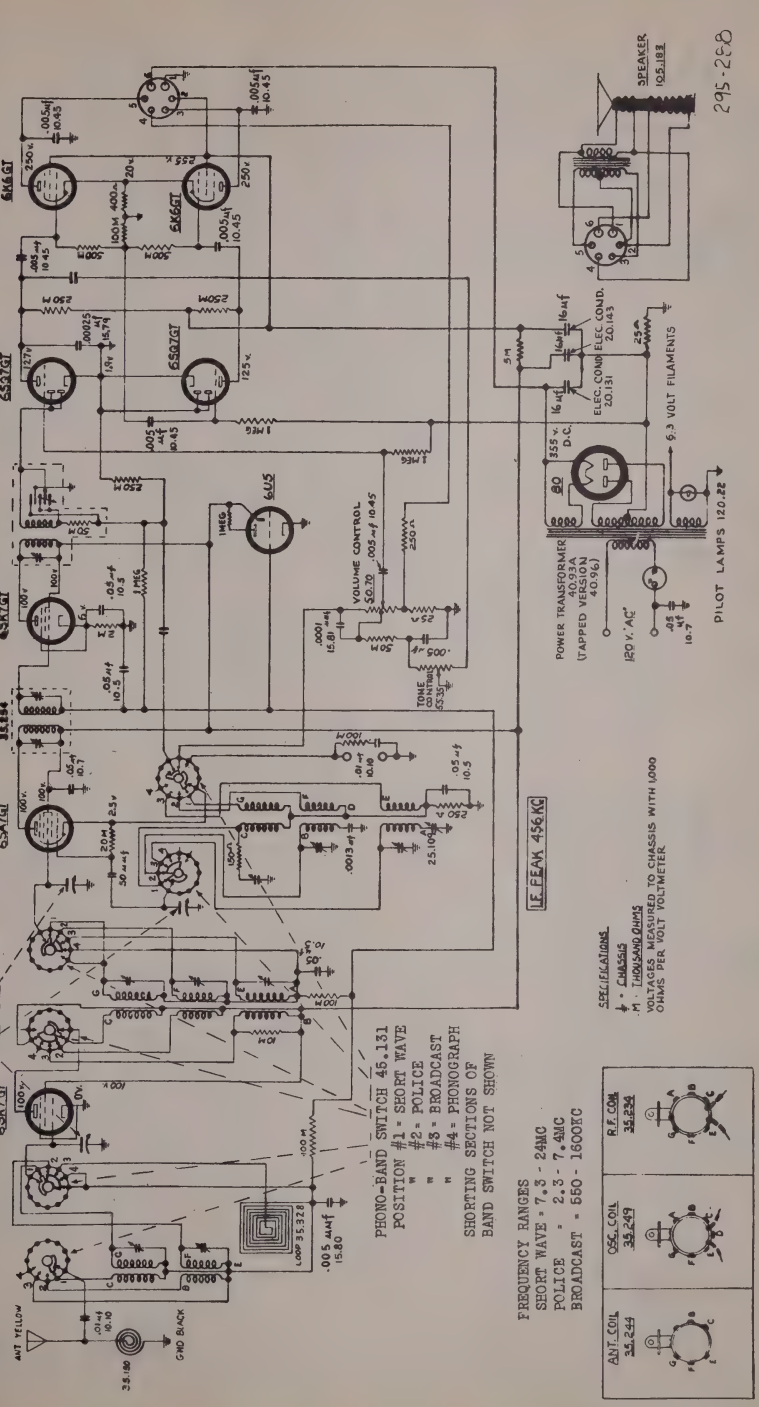
MODEL D-312

ALLIED RADIO CORP.



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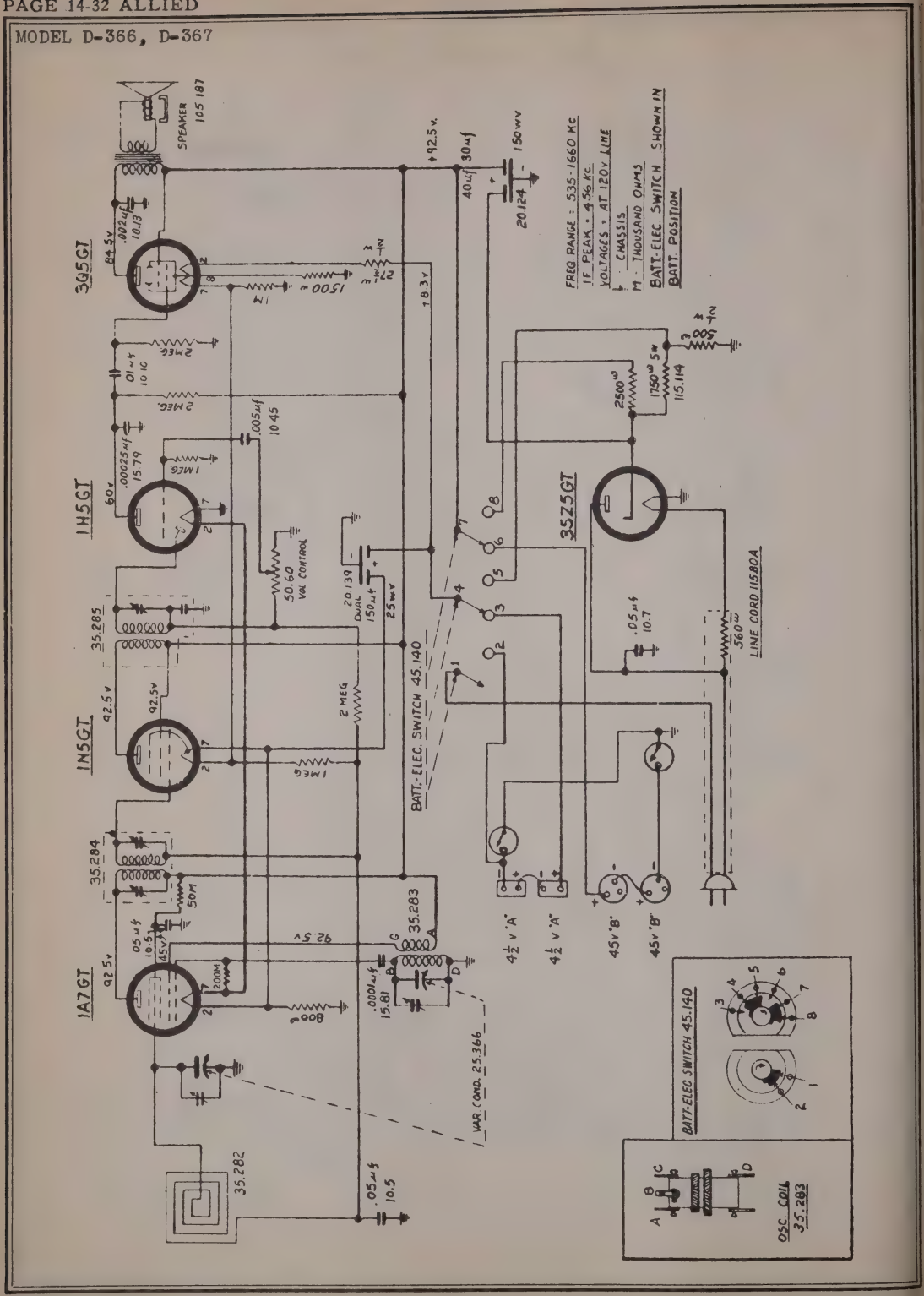
MODEL D-366, D-367



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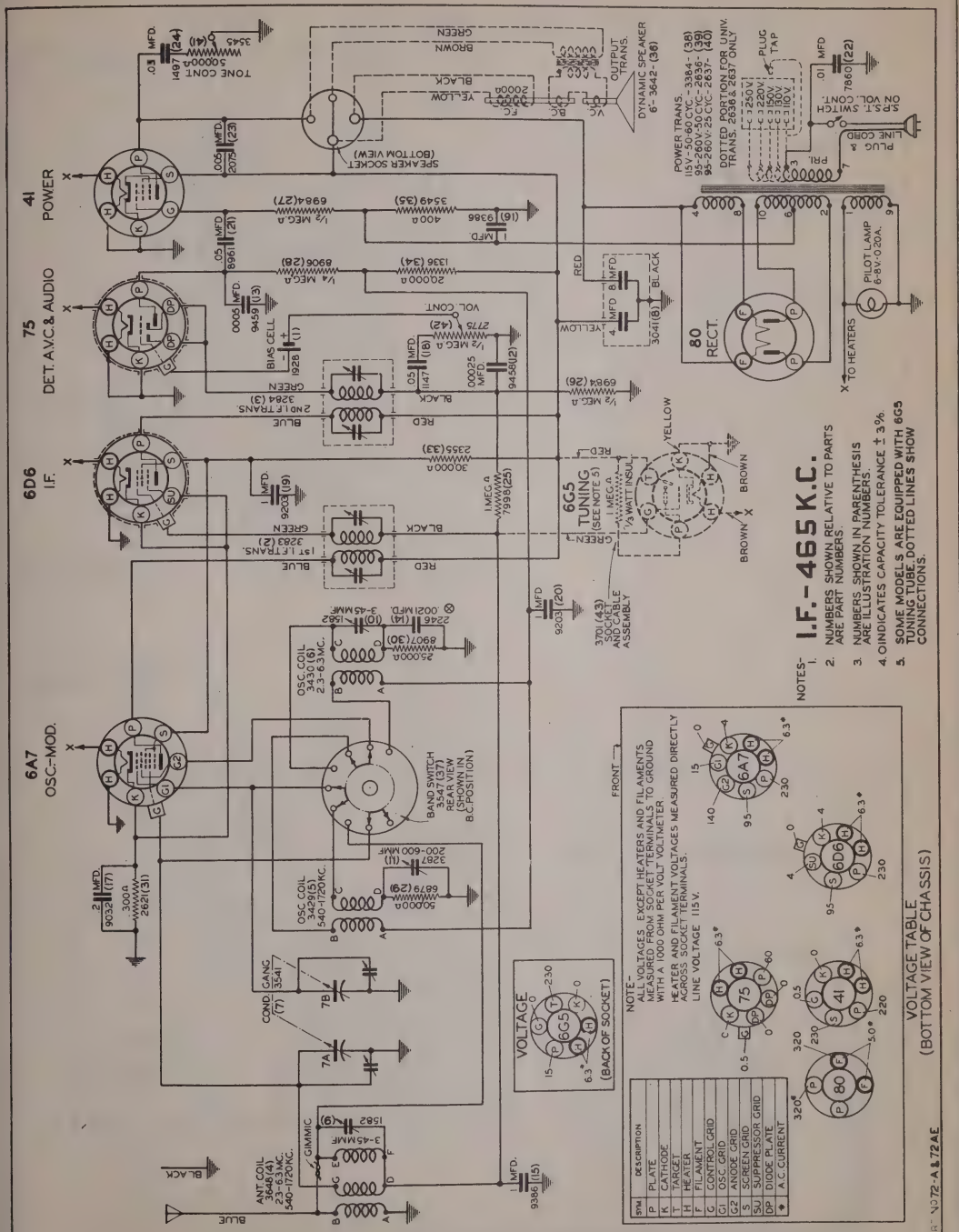
ALLIED RADIO CORP.

MODELS B10562, B10563, B10570


I.F.-465 K.C.
NOTES-
1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
3. ΔINDICATES CAPACITY TOLERANCE ± 3%.
4. SOME MODELS ARE EQUIPPED WITH 6G5 TUNING TUBE. DOTTED LINES SHOW CONNECTIONS.
NOTE- ALL VOLTAGES EXCEPT HEATERS AND FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. ALL VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS. LINE VOLTAGE 115 V.
VOLTAGE TABLE (BOTTOM VIEW OF CHASSIS)
SYM DESCRIPTION
P PLATE
K CATHODE
T TARGET
H HEATER
F FILAMENT
C CONTROL GRID
G1 OSC GRID
G2 ANODE GRID
S SCREEN GRID
SU SUPPRESSOR GRID
DP DIODE PLATE
A A.C. CURRENT
6A7 OSC.-MOD.
6D6 I.F.
75 DET. A.V.C. & AUDIO
41 POWER
80 RECT.
6G5 TUNING
SPEAKER SOCKET (BOTTOM VIEW)
DYNAMIC SPEAKER 6-3642-(36)
OUTPUT TRANS.
POWER TRANS. 115V-50-60 CYC.-3384-(38) 115V-25 CYC.-3385-(39) 95-260V.25 CYC.-2637-(40)
DOTTED PORTION FOR UNIV. TRANS. 2636 & 2637 ONLY
PLUG TAP
S.P.S.T. SWITCH ON VOL. CONT.
LINE CORD PLUG
PILOT LAMP 6-8V-0.20A.
TO HEATERS
BAND SWITCH 3547(37) REAR VIEW (SHOWN IN B.C. POSITION)
OSC. COIL 3430(6) 2.3-6.3 MC.
OSC. COIL 3429(5) 540-1720 KC.
ANT. COIL 3648(4) 2.3-6.3 MC. 540-1720 KC.
COND. GANG 3541
GIMMIC
BIAS CELL 928
VOL. CONT. 2775 (42)
2ND I.F. TRANS. 3284(3)
1ST I.F. TRANS. 3283(2)
370L(43) OSC. COIL AND CABLE ASSEMBLY
TONE CONT 5000Ω (41)
FRONT
(BACK OF SOCKET)

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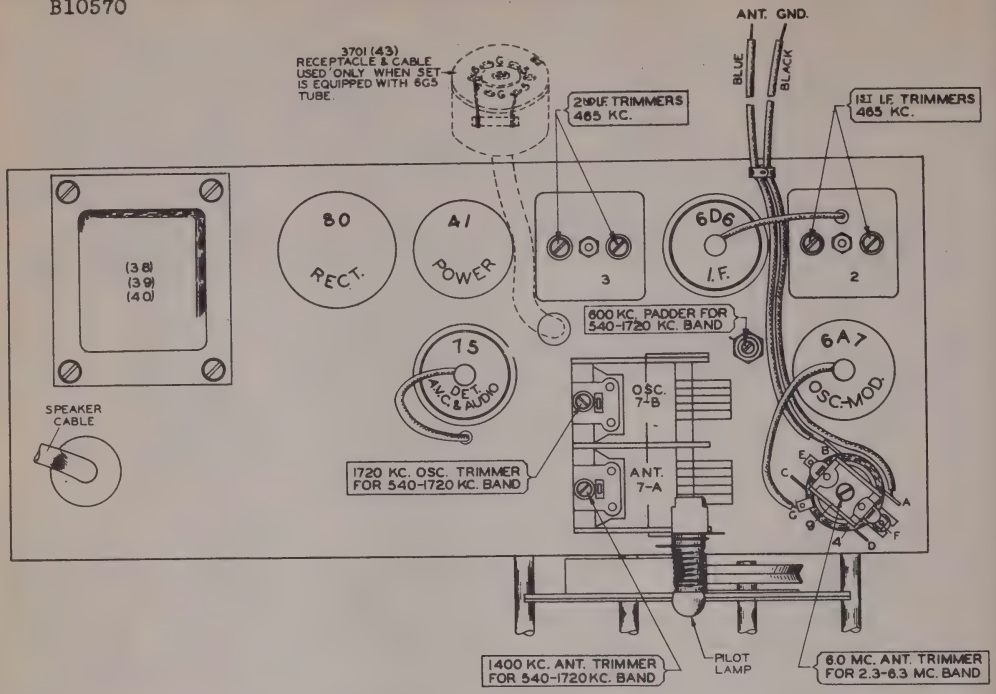
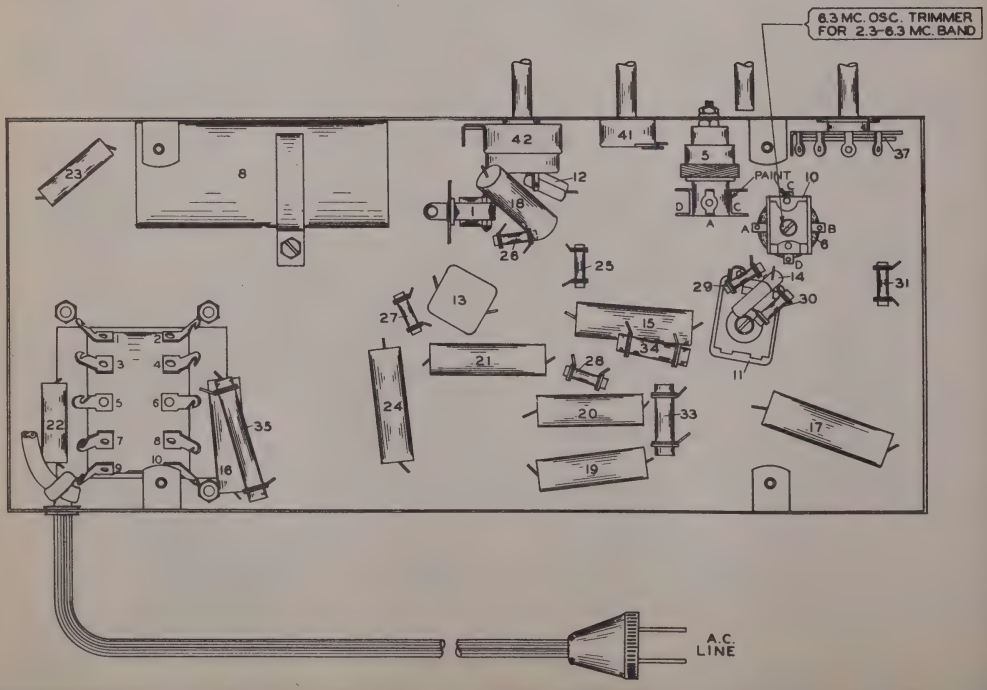
MODELS B10562, B10563, B10570

ALLIED RADIO CORP.


ANT. GND.
BLUE
BLACK
3701 (43) RECEPTACLE & CABLE USED ONLY WHEN SET IS EQUIPPED WITH 6G5 TUBE.
2ND I.F. TRIMMERS 465 KC.
1ST I.F. TRIMMERS 465 KC.
80 RECT.
41 POWER
6D6 I.F.
(38) (39) (40)
600 KC. PADDER FOR 540-1720 KC. BAND
6A7 OSC.-MOD.
75 DET. A.V.C. & AUDIO
OSC. 7-B
ANT. 7-A
SPEAKER CABLE
1720 KC. OSC. TRIMMER FOR 540-1720 KC. BAND
1400 KC. ANT. TRIMMER FOR 540-1720 KC. BAND
PILOT LAMP
6.0 MC. ANT. TRIMMER FOR 2.3-6.3 MC. BAND



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AC OPERATED SUPERHETERODYNE RECEIVER

Some of these models are equipped with a 6G5 Cathode ray visual tuning indicator tube. The parts and connections shown in dotted lines on the circuit and parts layout diagrams are used only when the 6G5 tube is incorporated in the receiver.

ALIGNMENT PROCEDURE:

Lack of sensitivity, selectivity or poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS AND PADDING CONDENSER WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

ALIGNING I.F. STAGE AT 465 KILOCYCLES:

(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A7 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.

(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.

(c) Peak each of the second I.F. transformer trimmers.

(d) Peak each of the first I.F. transformer trimmers.

To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

ALIGNING 1720-540 KILOCYCLE BAND:

(a) Remove test oscillator lead from grid of the 6A7 tube and attach it to the receiver antenna lead through a .00025 Mfd. series condenser.

(b) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.

(c) Set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.

(d) Bring in 1720 KC test oscillatoi signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser.

Looking at the front of the receiver the rear section of the gang condenser is the oscillator section.

(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.

(f) Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.

(g) Tune receiver dial and set test oscillator frequency to approximately 600 kilocycles.

(h) While rocking the tuning condenser back and forth adjust 600 KC oscillator padder condenser which is accessible through the hole in the top of the chassis adjacent to the gang condenser for maximum 600 kilocycle signal response.

ALIGNING 2.3-6.3 MEGACYCLE BAND:

(a) Replace .00025 Mfd. Test oscillator antenna lead series condenser with a 400 ohm resistor.

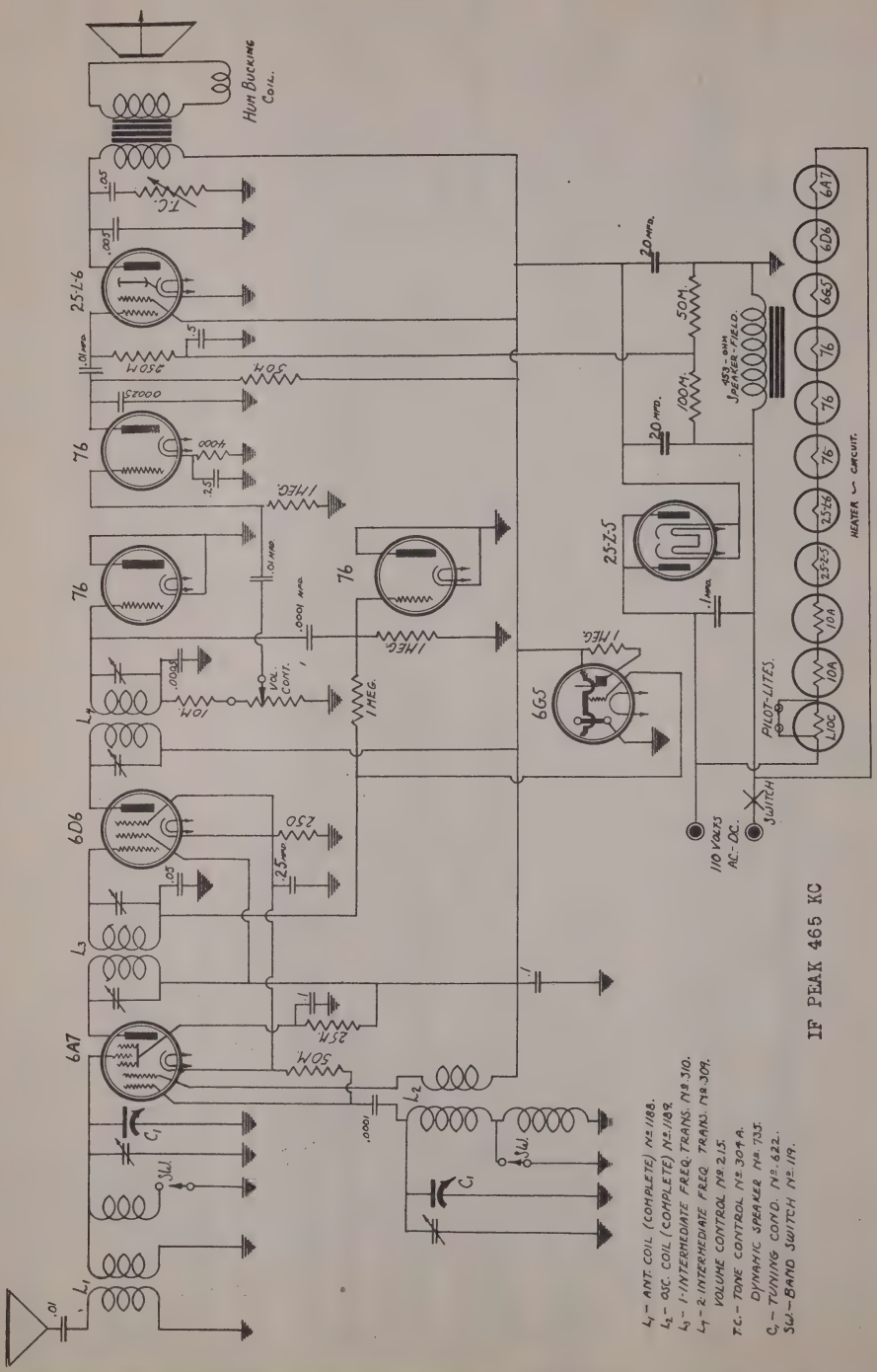
(b) Adjust band selector switch for 2.3-6.3 megacycles band operation, tune receiver dial and set test oscillator frequency to EXACTLY 6.3 megacycles.

(c) Bring in 6.3 megacycle test oscillator signal to maximum output by adjusting 6.3 M.C. oscillator trimmer.

(d) Tune receiver dial and test oscillator frequency to EXACTLY 6 megacycles, and adjust 6 M.C. antenna trimmer for maximum sensitivity.

MODEL B-10620, B-10621

ALLIED RADIO CORP.



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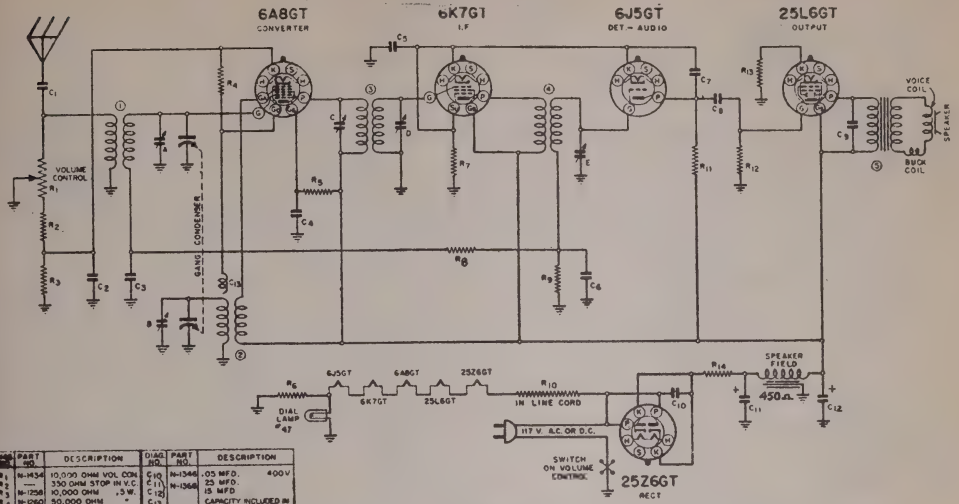
MODEL B-10700,
B-10702 LATE

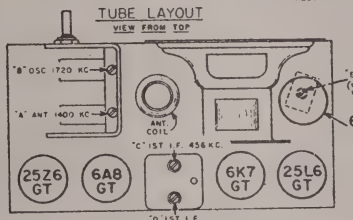
ALLIED RADIO CORP.

MODEL B-10700



DIAG NO.	PART NO.	DESCRIPTION	DIAG NO.	PART NO.	DESCRIPTION
R1	N-1434	10,000 OHM VOL CON.	C10	N-1344	.05 MFD. 400V
R2	—	350 OHM STOP IN V.C.	C11	N-1368	25 MFD.
R3	N-1258	10,000 OHM .5W.	C12		15 MFD
R4	N-1260	50,000 OHM "	C13		CAPACITY INCLUDED IN OSCILLATOR COIL
R5	N-1460	30,000 OHM "	"E"	N-1453	2ND I.F. TRIMMER
R6	N-1415	30 OHM 1.0W.			
R7	N-1459	600 OHM .5W			
R8	N-1262	1.0 MEGOHM "			
R9	N-1378	2.0 MEGOHM "			
R10	N-1436	150 OHM IN LINE CORD	①	N-1431	ANTENNA COIL
R11	N-1377	200,000 OHM .5W	②	N-1432	OSCILLATOR COIL
R12	N-1264	500,000 OHM "	③	N-1433	1ST I.F. TRANS.
R13	N-1457	125 OHM "	④	N-1432	2ND I.F. TRANS
R14	N-1458	25 OHM "	⑤	N-1370	3" SPK. & TRANS
C1	N-1344	.01 MFD 400 V		N-1431	GANG CONDENSER
C2	N-1345	.05 MFD. 200 V			
C3	N-1345	.05 MFD. "			
C4	N-1345	.05 MFD. "			
C5	N-1351	.10 MFD "			
C6	N-1344	.01 MFD 400 V			
C7	N-1467	.0005 MFD "			
C8	N-1344	.01 MFD. "			
C9	N-1344	.01 MFD "			

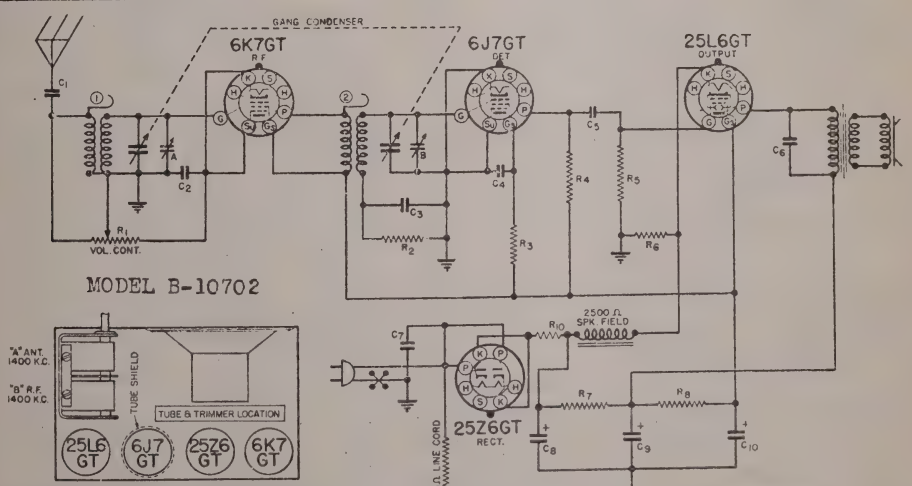
TUBE LAYOUT
VIEW FROM TOP



I.F. 456 KC.

5 TUBE A.C.-D.C.
SUPERHETERODYNE
SINGLE BAND

MODEL B-10702



DIAG NO.	PART NO.	DESCRIPTION	DIAG NO.	PART NO.	DESCRIPTION
C1	N-1344	.01 MFD 400 V.	R1	V-23	25,000 OHM VOL.
C2	N-1345	.05 MFD 200 V.	R2	N-1318	3.5 MEG. .5 W.
C3	N-1345	.05 MFD 200 V	R3	N-1419	6 MEG. .5 W
C4	N-1344	.01 MFD. 400 V	R4	N-1262	1 MEG .5 W.
C5	N-1344	.01 MFD 400 V.	R5	N-1264	.5 MEG. .5 W.
C6	N-1344	.01 MFD. 400 V	R6	N-1416	125 OHM ±10% .5 W.
C7	N-1346	.05 MFD 400 V	R7	N-1420	125 OHM 1 W.
C8		16 MFD 150 W V	R8	N-1417	3,000 OHM .5 W
C9	C-233	8 MFD 150 W V	R9	N-1415	30 OHM 1.0 W
C10		6 MFD 150 W V	R10	N-1251	25 OHM 1 W
	S-300	SPEAKER	1	L-110	ANTENNA COIL
	G-25	GANG CONDENSER	2	L-111	R.F. COIL

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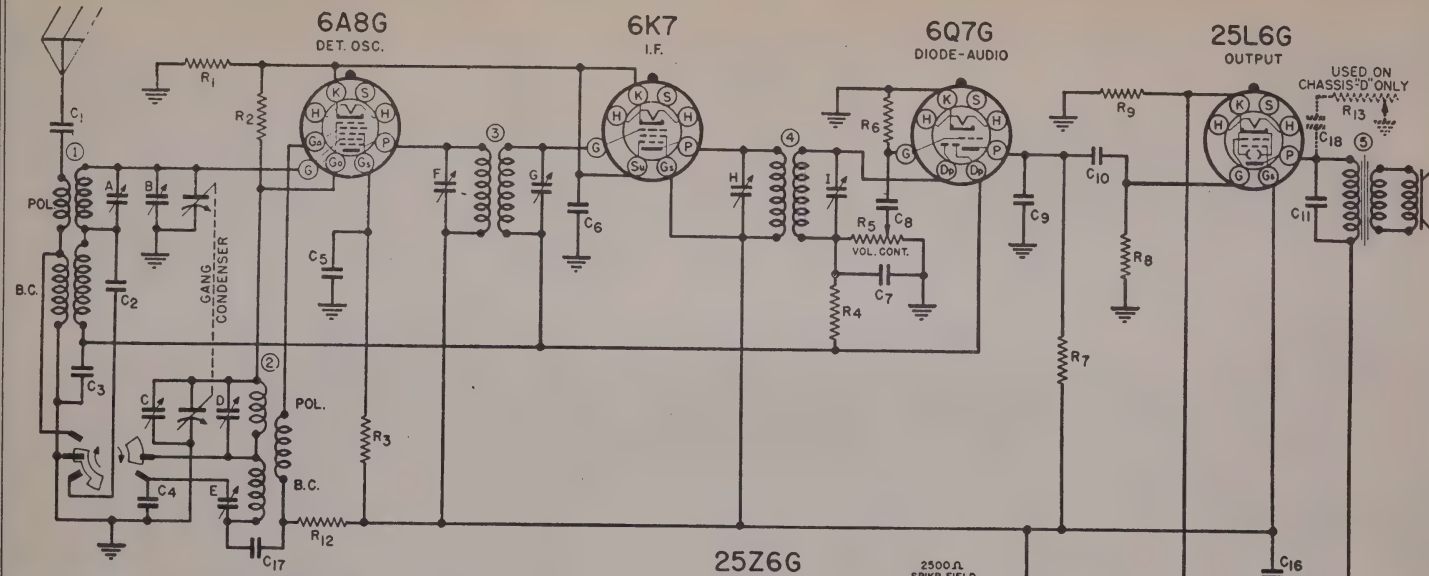
MODELS E-10704, E-10800
MODELS E-10803, E-10818

ALLIED RADIO CORP.



DIAG. NO.	PART NO.	DESCRIPTION
R_1	R-6	200 OHM .25 W.
R_2	R-33	50,000 "
R_3	R-29	30,000 OHM "
R_4	R-44	2 MEGOHM "
R_5	V-20	1 MEGOHM VOLUME CONT.
R_6	R-46	6 MEGOHM .25 W.
R_7	R-41	.25 MEGOHM "
R_8	R-48	.3 MEGOHM "
R_9	R-105	125 OHM ± 10% .5 W.
R_{10}	R-110	400 OHM "
R_{11}	R-14	1000 OHM .25 W.
R_{12}	R-25	10,000 OHM .25 W.
C_1	C-4	.01 MFD. 400 V.
C_2	C-4	.01 MFD. "
C_3	C-13	.05 MFD. 200 V.
C_4	C-1178	1425 MMFD. ± 5%
C_5	C-4	.01 MFD. 400 V.
C_6	C-16	.25 MFD. 200 V.
C_7	C-110	100 MMFD. 20%
C_8	C-27	.006 MFD. 800 V.
C_9	C-111	250 MMFD. 20%
C_{10}	C-4	.01 MFD. 400 V.
C_{11}	C-4	.01 MFD. 400 V.
C_{12}	C-14	.05 MFD. 400 V.
C_{13}	C-237	30 MFD. 150 V.
C_{14}		10 MFD. 150 V.
C_{15}		30 MFD. 150 V.
C_{16}	C-13	.05 MFD. 200 V.

DIAG. NO.	PART NO.	DESCRIPTION
C_{17}	C-13	.05 MFD. 200 V.
C_{18}	C-14	.05 MFD. 400 V.
E	P-3	300-600 MMFD. B.C. PAD
1	L-42	ANTENNA COIL
2	L-43	OSCILLATOR COIL
3	I-27	IST. I.F. TRANSFORMER
4	I-28	2ND. I.F. "
5	S-519	SPEAKER 8 "
	G-17	2 GANG VARIABLE COND.
	X-16	BAND SWITCH
R_{13}	V-109	25,000 OHM TONE CONT.

NOTE:
CHASSIS "D" & "D-D" USE BALLAST TUBE K49C OR 165R8G.
CHASSIS "D" USE SPEAKER S-615
CHASSIS "D-D" USE SPEAKER S-519B

6 TUBE-A.C.-D.C.
SUPERHETERODYNE
TWO BAND
I.F. PEAK 456 K.C.
CHASSIS - B, D, D-D

©John F. Rider

ALLIED RADIO CORP.

ALIGNMENT DATA AND SERVICING

MODELS E-10704, E-10800; MODELS E-10803, E-10818

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1500, 2500 and 6000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

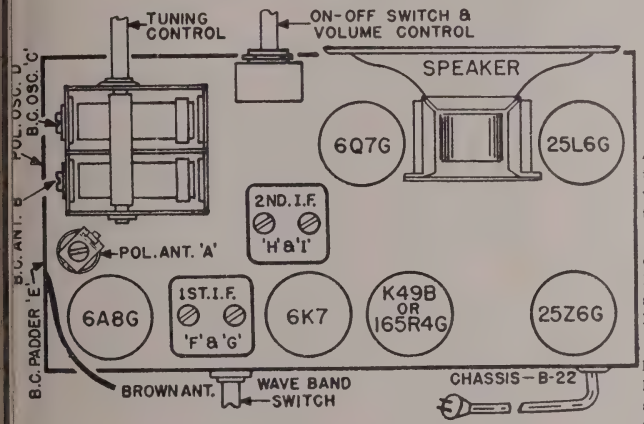
CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast and Police bands in the order given, should be the next procedure.

I. F. ALIGNMENT. With the wave switch in the Broadcast Band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A8G) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

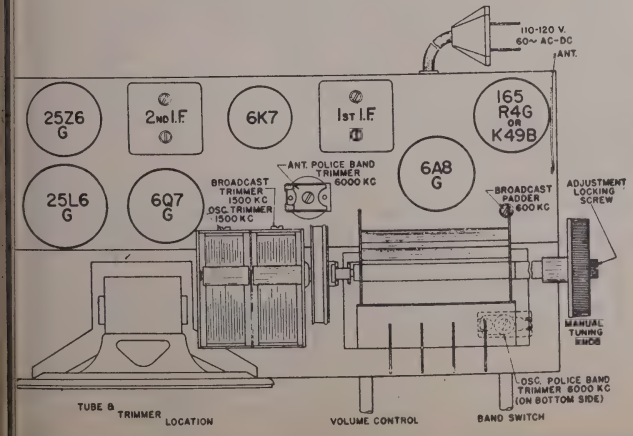
BROADCAST BAND ALIGNMENT. With the switch turned to the broadcast position, connect the antenna to the generator through a 200 MMF dummy and set the dial and generator at 1500 KC. Align the BC oscillator trimmer first and then the BC antenna trimmer. Set the generator at 600 KC and adjust the BC pad by rocking the gang back and forth while adjusting the pad until the maximum output is obtained. Recheck the adjustment at 1500 KC as the pad adjustment may have caused misalignment.

POLICE BAND ALIGNMENT. Change the band switch to the police position and with a 400 ohm dummy antenna instead of the 200 MMF dummy, align the police oscillator and antenna trimmers with the generator set at 6000 KC and the dial set at the same frequency. Next set the generator at 2500 KC and tune in the signal to check sensitivity. The pad is fixed and alignment at the point will be correct unless the pad or either of the coils have been damaged.

MODELS E-10803, E-10818



MODELS E-10704, E-10800



PUSH-BUTTON ADJUSTMENT
MODELS E-10704, E-10800

ADJUSTMENT. It is well to remember at this time that the accuracy of Automatic Station Selection depends wholly on the care exercised by the individual setting up the stations.

The first procedure in setting up stations is to loosen the adjustment locking screw by turning 3 or 4 turns to the left. Any coin may be used for this purpose. The locking screw is located in the center of the Manual Tuning control knob at the right side of the cabinet.

With the set in operation, fully depress any one push button and hold down while tuning any station desired to be automatically operated from this button. When the station is tuned to resonance, that is, maximum clarity and volume, release push button. Depress a second button and tune to another station while holding the push button depressed. Release push button and repeat procedure for the remaining two push buttons.

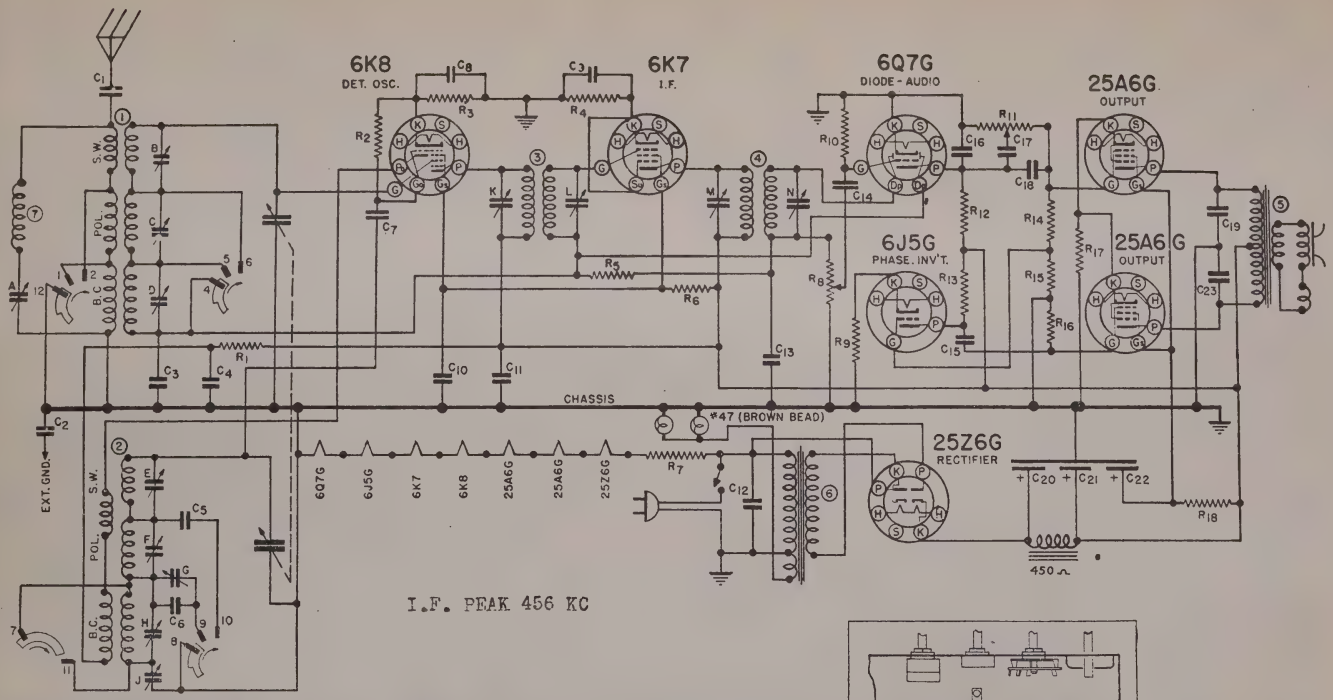
The settings should now be locked by securely tightening the locking screw, meanwhile hold the manual tuning knob to prevent turning.

A set of station call letter tabs and celluloid cover discs is furnished to mark each push button. Remove tabs from perforated sheet with station call letters corresponding to stations set up. Insert tab in recessed top of push button and cover with the celluloid discs which snap in place.

MODELS E-10707,
E-10870 LATE

ALLIED RADIO CORP.

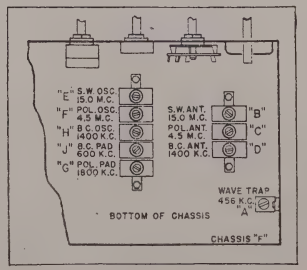
©John F. Rider



DIAG. NO.	PART NO.	DESCRIPTION		DIAG. NO.	PART NO.	DESCRIPTION	
C_1	C-4	.01 MFD.	400 V.	C_{18}	C-4	.01 MFD.	400 V.
C_2	C-4	.01 MFD.	400 V.	C_{19}	C-5	.01 MFD.	600 V.
C_3	C-13	.05 MFD.	200 V.	C_{20}		10 MFD.	350 V.
C_4	C-14	.05 MFD.	400 V.	C_{21}	C-239	15 MFD.	250 V.
C_5	C-109C	4,000 MMFD.	±3%	C_{22}		5 MFD.	300 V.
C_6	C-118B	500 MMFD.	±3%	C_{23}	C-5	.01 MFD.	600 V.
C_7	C-115	50 MMFD.	±20%				
C_8	C-13	.05MFD.	200 V.				
C_9	C-13	.05 MFD.	200 V.				
C_{10}	C-1	.1 MFD.	200 V.				
C_{11}	C-2	.1 MFD.	400 V.	R_1	R-125	10,000 OHM	.5W.
C_{12}	C-14	.05MFD.	400 V.	R_2	R-37	40,000 OHM	.25W.
C_{13}	C-110	100 MMFD.	±20%	R_3	R-6	200 OHM	"
C_{14}	C-27	.006 MFD.	800 V.	R_4	R-9	350 OHM	"
C_{15}	C-4	.01 MFD.	400 V.	R_5	R-44	2 MEGOHM	"
C_{16}	C-111	250 MMFD.	±20%	R_6	R-125	10,000 OHM	.5W.
C_{17}	C-27	.006 MMFD.	800 V.	R_7	R-508	58 OHM	5.5 W.

DIAG. NO.	PART NO.	DESCRIPTION
R_8	V-20	1 MEGOHM VOLUME CONT.
R_9	R-18	3,000 OHM .25 W.
R_{10}	R-46	6 MEGOHM
R_{11}	V-15	.5 MEGOHM TONE CONT.
R_{12}	R-41	.25 MEGOHM .25 W.
R_{13}	R-36	.1 MEGOHM "
R_{14}	R-51	.5 MEGOHM ±5% "
R_{15}	R-50	45,000 OHM ±5% "
R_{16}	R-41	.25 MEGOHM "
R_{17}	R-310	475 OHM 1.0 W.
R_{18}	R-122	5,000 OHM .5 W.
	G-20	2 GANG VARIABLE COND.
	X-15	BAND SWITCH

DIAG. NO	PART. NO.	DESCRIPTION
1	L-50	ANTENNA COIL
2	L-51	OSCILLATOR COIL
3	I-20	1ST. I.F. TRANSFORMER
4	I-28	2 ND. I.F. "
5	S-613	SPKR. 8 "
6	T-23	POWER "
7	L-52	WAVE TRAP
A		3-35 MMFD.
B		3-35 MMFD.
C		3-35 "
D		3-35 "
E		3-35 "
F		3-35 "
G		200-600 MMFD.
H		3-35 MMFD.
J		200-600 MMFD.

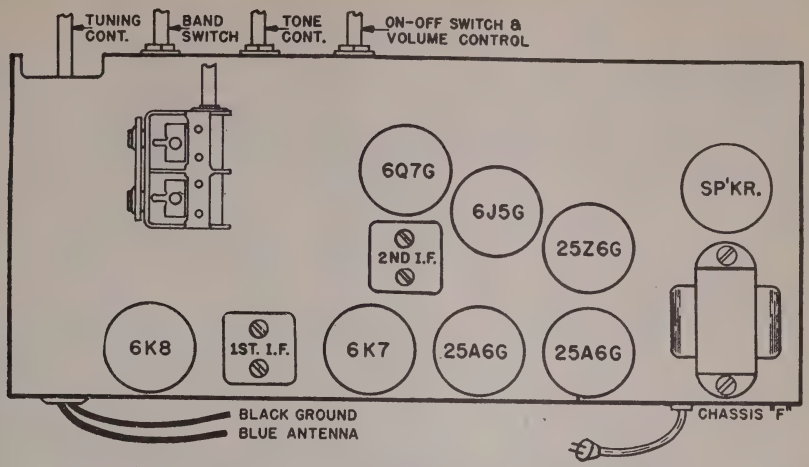


TRIMMER LOCATION 7 TUBE A.C.

7 TUBE A.C.
SUPERHETERODYNE
THREE BAND
I.F. PEAK 456 K.C.
CHASSIS – F

MODELS E-10707, E-10870

ALLIED RADIO CORP.



ALIGNMENT DATA AND SERVICING

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1800, 4500, 6000 and 15000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the wave trap and then the Short Wave, Police and Broadcast bands in the order given, should be the next procedure.

I. F. AND WAVE TRAP ALIGNMENT. With the wave switch in the Broadcast Band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6K8) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter. After aligning the I.F.'s, have the band switch in the broadcast band and the generator set at 456 KC. Connect the antenna lead to the generator through a 200 MMF condenser. Adjust the wave trap trimmer to give a minimum signal. It will be necessary to increase the output of the generator to secure an accurate minimum with the wave trap. (A)

SHORT WAVE BAND ALIGNMENT. Change the band switch to the S. W. position and connect the generator to the antenna with a 400 ohm dummy. Adjust the S. W. oscillator to give a maximum output with the dial at 1500 KC. Next adjust the S. W. antenna to give a maximum peak and check dial to prevent alignment on the image frequency. With a strong signal input turn the dial to approximately 1 M. C. lower in frequency and pick up the image frequency. If the image is not received, it will be necessary to return the dial to 15000 KC to reduce the capacity in the oscillator trimmer until a second signal is received. Proceed as before with the alignment of the antenna and recheck for image frequency. Check the sensitivity at 6000 KC to determine if the coils and mica pad are not defective.

POLICE BAND ALIGNMENT. Change the band switch to the police position and, with the same dummy antenna, line up the police oscillator trimmer and police antenna trimmer in the same way as for the short wave band, setting the dial at 4500 KC and the generator at the same frequency. Check for image frequency at approximately 1 MC lower on the dial as described for the short wave band. Next, set the generator at 1800 KC and tune in the signal with the dial. Adjust the police pad by rocking the gang back and forth while adjusting the pad until maximum output is attained. Recheck the adjustment at 4500 KC as the pad adjustment may have caused misalignment.

BROADCAST BAND ALIGNMENT. With the switch turned to the broadcast position, connect the antenna to the generator through a 200 MMF dummy and set the dial and generator at 1400 KC. Align the BC oscillator trimmer and BC antenna trimmer. Set the generator at 600 KC and adjust the BC pad as described for the police band. Return to 1400 KC and recheck alignment at this point.

PUSH-BUTTON ADJUSTMENT

ADJUSTMENT. All adjustments are simply made from the front of the cabinet without the use of tools since the push-button knobs serve this purpose.

To make adjustments, turn each knob to the left about 1 complete turn. The knob is knurled to provide a positive grip for this purpose. A groove is also provided across the knob for use of a small coin to lock each setting with ease and surety.

With the knob turned free, depress as far as possible and hold down, meanwhile tune to any desired station with the manual tuning control. At this point, the automatic push button knob should be turned to the right until securely tightened. Be sure the knob is being held down in position while it is being tightened. To assure accurate adjustment, the volume control should be set at a moderate level and the station tuned in slowly to a point of maximum volume and clarity.

It is not necessary to follow any particular sequence of stations since each button is adjustable to any station.

With each button definitely set and securely tightened to the selected stations, the tuner is ready for operation.

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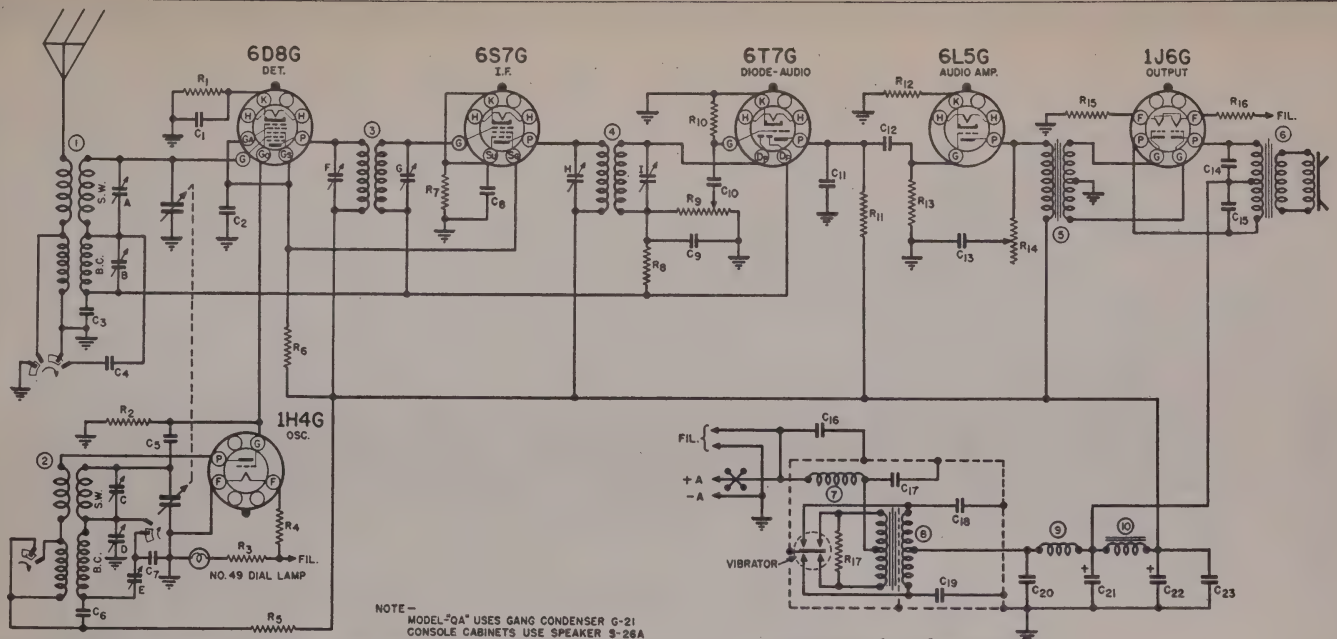
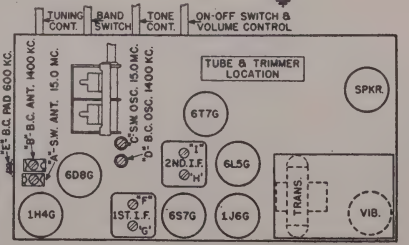


NOTE—
MODEL "QA" USES GANG CONDENSER G-21
CONSOLE CABINETS USE SPEAKER S-26A

DIAG. NO.	PART NO.	DESCRIPTION		DIAG. NO.	PART NO.	DESCRIPTION		DIAG. NO.	PART NO.	DESCRIPTION		DIAG. NO.	PART NO.	DESCRIPTION
C_1	C-13	.05 MFD.	200 V.	C_{19}	C-71	.01 MFD.(OIL)	1000 V.	R_9	V-20	1 MEG. VOLUME CONT.		1	L-44	ANTENNA COIL
C_2	C-1	.1 MFD.	200 V.	C_{20}	C-5	.01 MFD.	600 V.	R_{10}	R-55	10 MEGOHM .25 W.		2	L-63	OSCILLATOR COIL
C_3	C-13	.05 MFD.	200 V.	C_{21}	C-242	10 MFD.	250 V.	R_{11}	R-41	.25 MEGOHM .25 W.		3	I-20	1ST. I.F. TRANS.
C_4	C-4	.01 MFD.	400 V.	C_{22}		15 MFD.	250 V.	R_{12}	R-16	2,000 OHM .25 W.		4	I-28	2ND.I.F. "
C_5	C-115	50 MMFD.		C_{23}	C-1	.1 MFD.	200 V.	R_{13}	R-42	.5 MEGOHM .25 W.		5	T-103	AUDIO "
C_6	C-4	.01 MFD.	400 V.					R_{14}	V-110	.1 MEG. TONE CONT.		6	S-26	SPKR. "
C_7	C-109C	4,000 MMFD.	3 %					R_{15}	R-510	8.3 OHM 5% .5 W.		7	H-206	"A" CHOKE
C_8	C-13	.05 MFD.	200 V.					R_{16}	R-510	8.3 OHM 5% .5 W.		8	T-26	POWER TRANS.
C_9	C-HO	100 MMFD.						R_{17}	R-107	200 OHM .5 W.		9	H-207	R.F. CHOKE
C_{10}	C-27	.006 MFD.	800 V.									10	H-9	AUDIO CHOKE
C_{11}	C-111	250 MMFD.		R_1	R-12	500 OHM	.25 W.					A		2-35 MMFD.
C_{12}	C-4	.01 MFD.	400 V.	R_2	R-33	50,000 OHM	.25 W.					B		"
C_{13}	C-27	.006 MFD.	800 V.	R_3	R-511	67.0 OHM	.5 W.					C		"
C_{14}	C-5	.01 MFD.	600 V.	R_4	R-511	67.0 OHM	.5 W.					D		"
C_{15}	C-5	.01 MFD.	600 V.	R_5	R-25	10,000 OHM	.25 W.		X-17	BAND SWITCH		E	P-2	200-750 MMFD.
C_{16}	C-22	.5 MFD.	50 V.	R_6	R-26	15 000 OHM	.25 W.		G-20	GANG CONDENSER				
C_{17}	C-22	.5 MFD.	50 V.	R_7	R-13	750 OHM	.25 W.		F-4	SYN. VIBRATOR				
C_{18}	C-71	.01 MFD.(OIL)	1000 V.	R_8	R-44	2 MEGOHM	.25 W.		W-207	BATTERY CABLE				



6 TUBE-6 VOLT
SUPERHETERODYNE
TWO BAND
I.F. PEAK 456 KC.
MODEL-"Q"-"QA"

PUSH-BUTTON **ADJUSTMENT.** All adjustments are simply made from the front of the cabinet without the use of tools since the push-button knobs serve this purpose.

To make adjustments, turn each knob to the left about 1 complete turn. The knob is knurled to provide a positive grip for this purpose. A groove is also provided across the knob for use of a small coin to lock each setting with ease and surety.

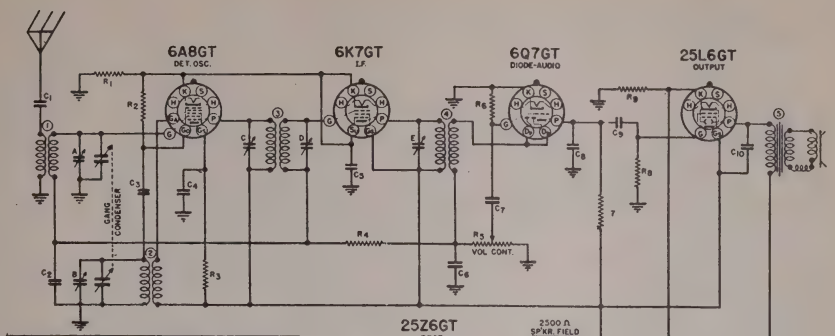
With the knob turned free, depress as far as possible and hold down, meanwhile tune to any desired station with the manual tuning control. At this point, the automatic push button knob should be turned to the right until securely tightened. Be sure the knob is being held down in position while it is being tightened. To assure accurate adjustment, the volume control should be set at a moderate level and the station tuned in slowly to a point of maximum volume and clarity.

It is not necessary to follow any particular sequence of stations since each button is adjustable to any station.

With each button definitely set and securely tightened to the selected stations, the tuner is ready for operation.

MODELS E-10801, E-10802
MODEL E-10806

ALLIED RADIO CORP.

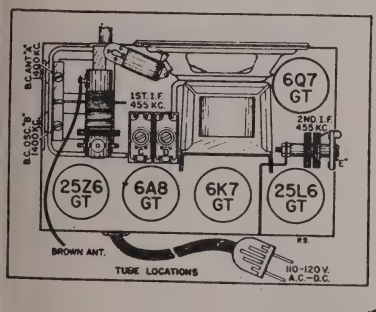


DIAG. NO.	PART NO.	DESCRIPTION		DIAG. NO.	PART NO.	DESCRIPTION
C_1	C-24	.01 MFD.	400 V.	R_6	R-52	15 MEGOHM .25 W.
C_2	C-24	.01 MFD.	400 V.	R_7	R-42	.5 MEGOHM .25 W.
C_3	C-115	50 MMFD.	±20%	R_8	R-42	.5 MEGOHM .25 W.
C_4	C-24	.01 MFD.	400 V.	R_9	R-105	125 OHM .5 W.
C_5	C-1	.1 MFD.	200 V.	R_{10}	R-15	1500 OHM .5 W.
C_6	C-110	100 MMFD.	±20%	R_{11}	R-250	30 OHM 10 W.
C_7	C-27	.006 MFD.	800 V.			
C_8	C-110	100 MMFD.	±20%			
C_9	C-24	.01 MFD.	400 V.	1	L-54	ANTENNA COIL
C_{10}	C-10	.02 MFD	400 V.	2	L-55	OSCILLATOR COIL
C_{11}	C-13	.05 MFD	200 V.	3	1-29	1ST. I.F. TRANS.
C_{12}	C-230	8 MFD.	150 V.	4	1-30	2ND. I.F. TRANS.
C_{13}	C-240	16 MFD.	150 W.	5	S-309	SPEAKER & TRANS.
C_{14}	C-240	16 MFD.	150 W.		G-23	GANG CONDENSER
					W-3	LINE CORD
R_1	R-4	100 OHM	.25 W.			
R_2	R-33	50,000 OHM	.25 W.			
R_3	R-28	25,000 OHM	.25 W.			
R_4	R-43	1 MEGOHM	.25 W.			
R_5	V-13	.5 MEG. VOL. CONT.				

5 TUBE A.C.-D.C.
SUPERHETERODYNE
SINGLE BAND "PEEWEE"
I.F. PEAK 455 KC.

MODELS E-10801, E-10802

ALIGNMENT DATA AND SERVICING

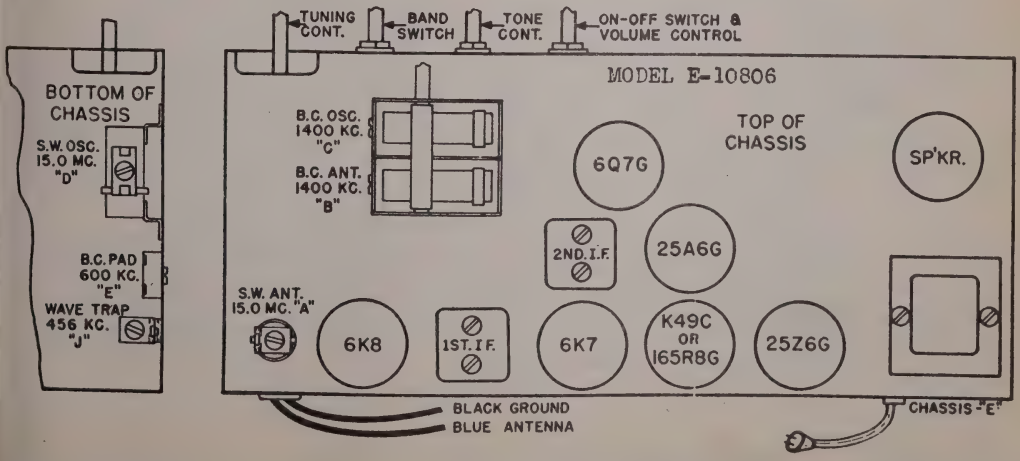


GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 455 and 1400 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast should be aligned.

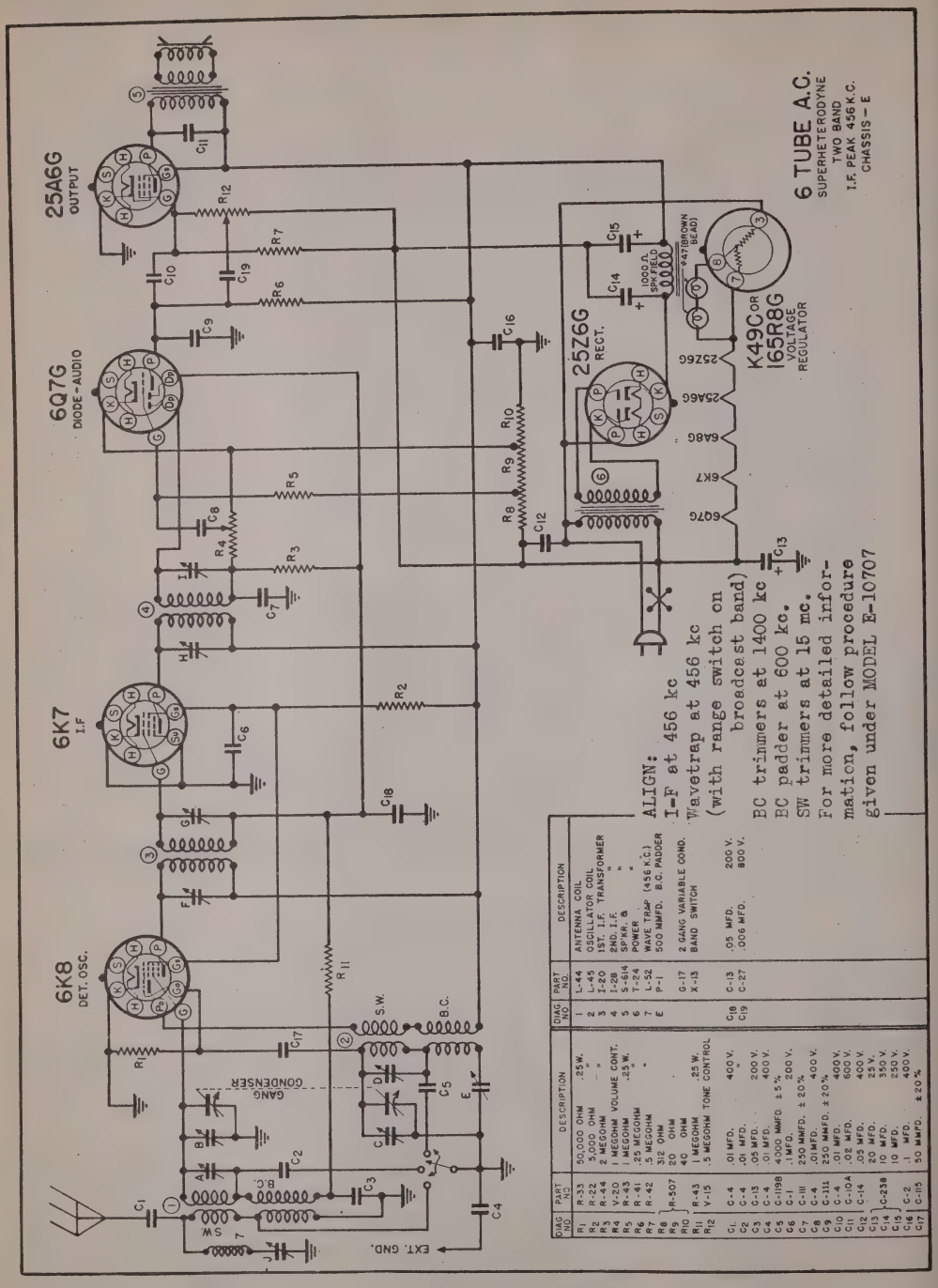
I. F. ALIGNMENT. With [redacted] the gang condenser set at minimum, adjust the test oscillator to 455 KC and connect the output to the grid of the first detector tube (6A8GT) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all four I. F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. [redacted] connect the antenna to the generator through a 100 MMF dummy and set the dial and generator at 1400 KC. Align the BC oscillator trimmer first and then the BC antenna trimmer.



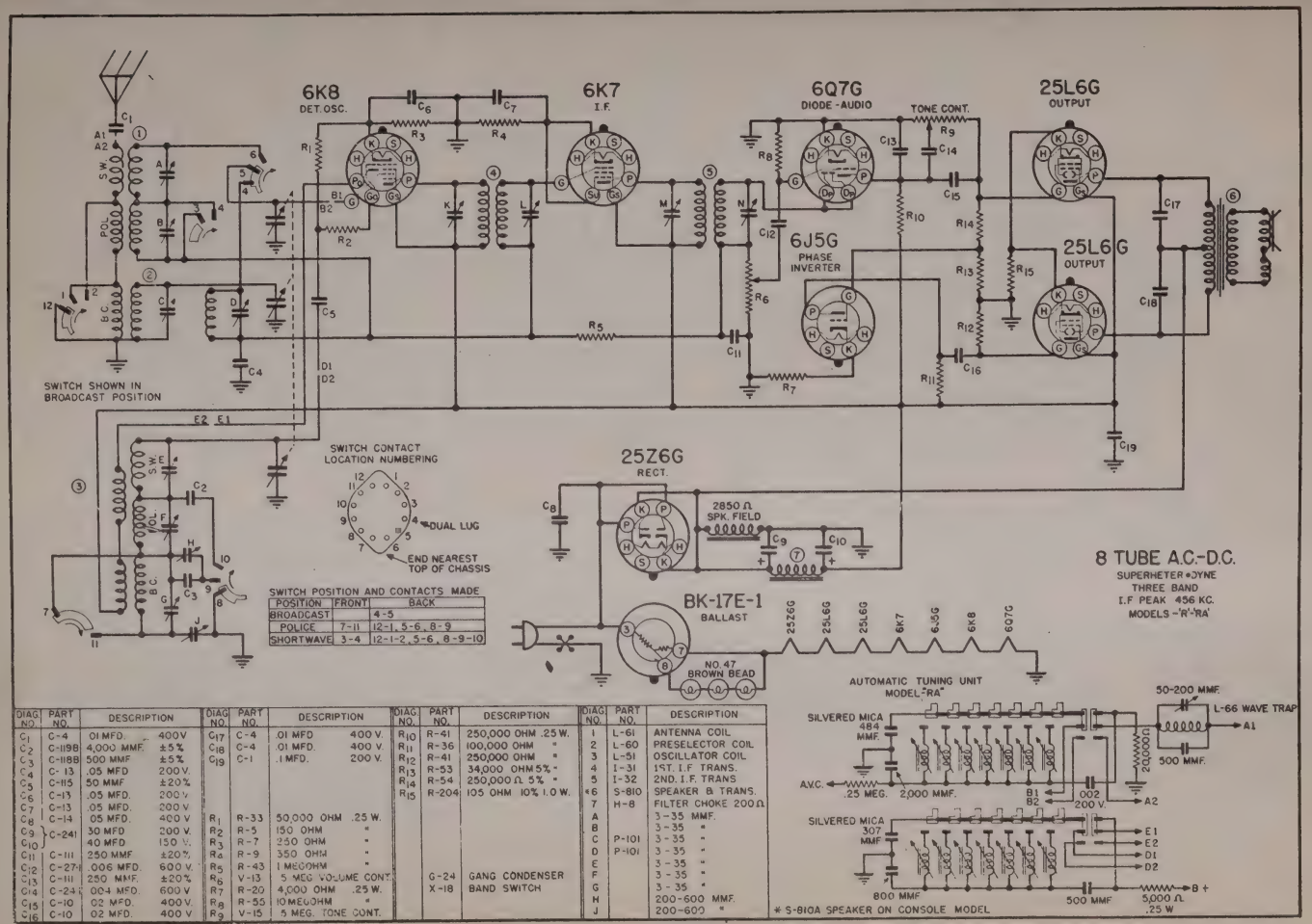
MODEL E-10806

ALLIED RADIO CORP.



DIAG NO	PART NO	DESCRIPTION
R1	R-33	50,000 OHM .25 W.
R2	R-22	5,000 OHM "
R3	R-44	2 MEGOHM "
R4	V-20	1 MEGOHM VOLUME CONT.
R5	R-43	1 MEGOHM .25 W.
R6	R-41	.25 MEGOHM "
R7	R-42	1 MEGOHM "
R8		312 OHM
R9	JR-507	20 OHM
R10		40 OHM
R11	R-43	1 MEGOHM .25 W.
R12	V-15	.5 MEGOHM TONE CONTROL
C1	C-4	.01 MFD. 400 V.
C2	C-4	.01 MFD. 400 V.
C3	C-13	.01 MFD. 200 V.
C4	C-4	.01 MFD. 400 V.
C5	C-198	4000 MMFD. ± 5%
C6	C-1	.1 MFD. 200 V.
C7	C-111	250 MMFD. ± 20%
C8	C-4	.01 MFD. 400 V.
C9	C-111	250 MMFD. ± 20%
C10	C-4	.01 MFD. 400 V.
C11	C-104	.02 MFD. 400 V.
C12	C-14	.25 MFD. 25 V.
C13		20 MFD. 350 V.
C14	C-238	10 MFD. 250 V.
C15		10 MFD. 250 V.
C16	C-2	.1 MFD. 400 V.
C17	C-115	30 MMFD. ± 20%

DIAG NO	PART NO	DESCRIPTION
1	L-44	ANTENNA COIL
2	L-45	OSCILLATOR COIL
3	I-20	1ST. I.F. TRANSFORMER
4	I-28	2ND. I.F. "
5	S-614	SPKR. "
6	S-613	POWER "
7	L-52	WAVE TRAP (456 K.C.)
E	P-1	500 MMFD. B.C. PADDER
	G-17	2 GANG VARIABLE COND.
	X-13	BAND SWITCH
C18	C-13	.05 MFD. 200 V.
C19	C-27	.006 MFD. 600 V.



SWITCH POSITION AND CONTACTS MADE

POSITION	FRONT	BACK
BROADCAST		4-5
POLICE	7-11	12-1, 5-6, 8-9
SHORTWAVE	3-4	12-1-2, 5-6, 8-9-10

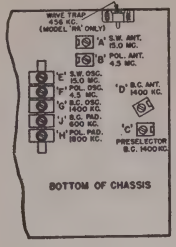
DIAG. NO.	PART NO.	DESCRIPTION
C_1	C-4	.01 MFD. 400V
C_2	C-1198	4,000 MMF. ±5%
C_3	C-1188	500 MMF ±5%
C_4	C-13	.05 MFD 200 V.
C_5	C-115	50 MMF ±20%
C_6	C-13	.05 MFD. 200 V.
C_7	C-13	.05 MFD. 200 V
C_8	C-13	.05 MFD. 400 V
C_9	C-241	30 MFD 200 V.
C_{10}		40 MFD 150 V.
C_{11}	C-111	250 MMF. ±20%
C_{12}	C-274	.006 MFD. 600 V.
C_{13}	C-111	250 MMF. ±20%
C_{14}	C-243	.004 MFD. 600 V
C_{15}	C-10	.02 MFD. 400 V.
C_{16}	C-10	.02 MFD. 400 V.
C_{17}	C-4	.01 MFD 400 V.
C_{18}	C-4	.01 MFD. 400 V.
C_{19}	C-1	.1 MFD. 200 V.
R_1	R-33	50,000 OHM .25 W.
R_2	R-5	150 OHM "
R_3	R-7	250 OHM "
R_4	R-9	350 OHM "
R_5	R-43	1 MEGOHM "
R_6	V-13	.5 MEG VOLUME CONT.
R_7	R-20	4,000 OHM .25 W.
R_8	R-55	10 MEGOHM "
R_9	V-15	.5 MEG. TONE CONT.
R_{10}	R-41	250,000 OHM .25 W.
R_{11}	R-36	100,000 OHM "
R_{12}	R-41	250,000 OHM "
R_{13}	R-53	34,000 OHM 5% "
R_{14}	R-54	250,000 Ω 5% "
R_{15}	R-204	105 OHM 10% 1.0 W.
	G-24	GANG CONDENSER
	X-18	BAND SWITCH

DIAG. NO.	PART NO.	DESCRIPTION
1	L-61	ANTENNA COIL
2	L-60	PRESELECTOR COIL
3	L-51	OSCILLATOR COIL
4	I-31	1ST. I.F. TRANS.
5	I-32	2ND. I.F. TRANS.
*6	S-810	SPEAKER B. TRANS.
7	H-8	FILTER CHOKE 200 Ω
A		3-35 MMF.
B		3-35 "
C	P-101	3-35 "
D	P-101	3-35 "
E		3-35 "
F		3-35 "
G		3-35 "
H		200-600 MMF.
J		200-600 "

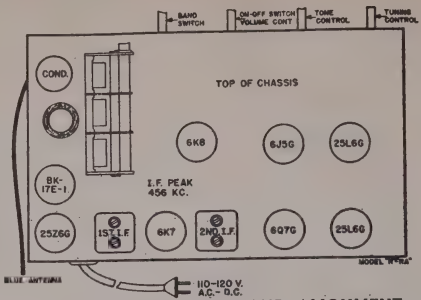
* S-810A SPEAKER ON CONSOLE MODEL

MODEL E-10807

ALLIED RADIO CORP.


WAVE TRAP 456 KC. (MODEL "RA" ONLY)
'A' S.W. ANT. 15.0 MC.
'B' POL. ANT. 4.5 MC.
'E' S.W. OSC. 15.0 MC.
'F' POL. OSC. 4.5 MC.
'G' B.C. OSC. 1400 KC.
'J' B.C. PAD. 600 KC.
'H' POL. PAD. 1500 KC.
'D' B.C. ANT. 1400 KC.
'C' PRESELECTOR B.C. 1400 KC.
BOTTOM OF CHASSIS

TRIMMER



GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 2200, 5000, 6000 and 15000 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings. (All adjustments on Model "RA" must be made with "Manual" button depressed.)

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the wave trap and then the Short Wave, Police and Broadcast bands in the order given, should be the next procedure. (Wave trap is not used on Model "R".)

I. F. AND WAVE TRAP ALIGNMENT. With the wave switch in the Broadcast Band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6K8) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter. After aligning the I.F.'s, have the band switch in the broadcast band and the generator set at 456 KC. Connect the antenna lead to the generator through a 200 MMF condenser. Adjust the wave trap trimmer to give a minimum signal. It will be necessary to increase the output of the generator to secure an accurate minimum with the wave trap. (Wave trap data applies to Model "RA" only.)

SHORT WAVE BAND ALIGNMENT. Change the band switch to the S. W. position and connect the generator to the antenna with a 400 ohm dummy. Adjust the S. W. oscillator to give a maximum output with the dial at 15000 KC. Next adjust the S. W. antenna to give a maximum peak and check dial to prevent alignment on the image frequency. With a strong signal input turn the dial to approximately 1 M. C. lower in frequency and pick up the image frequency. If the image is not received, it will be necessary to return the dial to 15000 KC to reduce the capacity in the oscillator trimmer until a second signal is received. Proceed as before with the alignment of the antenna and recheck for image frequency. Check the sensitivity at 6000 KC to determine if the coils and mica pad are not defective.

POLICE BAND ALIGNMENT. Change the band switch to the police position and, with the same dummy antenna, line up the police oscillator trimmer and police antenna trimmer in the same way as for the short wave band, setting the dial at 5000 KC and the generator at the same frequency. Check for image frequency at approximately 1 MC lower on the dial as described for the short wave band. Next, set the generator at 2200 KC and tune in the signal with the dial. Adjust the police pad by rocking the gang back and forth while adjusting the pad until maximum output is attained. Recheck the adjustment at 5000 KC as the pad adjustment may have caused misalignment.

BROADCAST BAND ALIGNMENT. With the switch turned to the broadcast position, connect the antenna to the generator through a 200 MMF dummy and set the dial and generator at 1400 KC. Align the BC oscillator trimmer and the two BC antenna trimmers. Set the generator at 600 KC and adjust the BC pad as described for the police band. Return to 1400 KC and recheck alignment at this point.

PUSH-BUTTON ADJUSTMENT

SETTING-UP PROCEDURE. To set up a list of stations on the automatic tuner proceed as follows:

(1) Make a list of the stations you listen to most frequently.

(2) Determine their frequencies from a station list or by adding a zero to their position on the dial, thus: 56 is 560 KC.

(3) Arrange them in order, starting with the lowest frequency first; then the next highest and so on until not more than seven of your favorite stations have been selected.

(4) Select the proper button for each station, starting at the top of your list (the lowest frequency station) and determine if it is within the required range of button No. 1 as shown on the button diagram below. If it is in this range assign button No. 1 to this station. If not, assign this station to the next button to the right that has the required range to accommodate this station. Take the second station on your list and determine if it can be assigned to the button to the right of the one already assigned. If it can be applied, proceed to the next button. If not, go to the next button to the right which has the proper range to accommodate the station. Proper assigning of stations to buttons will make it possible to set up the buttons to all the principal stations in every locality.

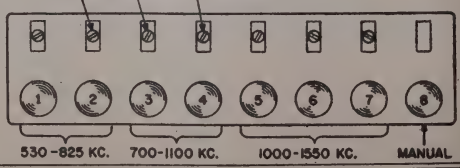
(5) Turn the band switch to the broadcast position and depress button No. 8 (manual button at extreme right); then tune in with the manual tuning control, the station on the top of your list (the lowest frequency station).

(6) Depress the button assigned to this station and with a screw driver carefully turn the screw head above the depressed button until the station you desire is tuned in. **Never try to turn the screw past the ends of its travel as you will damage the tuner.** The screw has approximately twenty complete turns.

(7) When the station is picked up adjust the screw carefully for maximum volume and least noise. Push the manual button and the same station will be heard if you have tuned in the correct station.

(8) Select a tab with the proper call letters, insert in slot above push button and then cover with celluloid tab.

PUSH BUTTON ARRANGEMENT



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MODELS E-10813, E-10814
E-10815

ALLIED RADIO CORP.

DIAG. NO.	PART NO.	DESCRIPTION
C1		484 MMF SILVERED 2%
C2	C-29	2000 MMF. 5%
C3	C-188	500 MMF. ±5%
C4	C-188	500 MMF. ±5%
C5	C-13	.05 MF.
C6		484 MMF SILVERED 2%
C7		800 MMF. ±2%
C8	C-2	.1 MF.
C9	C-113	500 MMF. ±10%
C10	C-188	500 MMF. ±5%
C11	C-188	500 MMF. ±5%
C12	C-17	.25 MF.
C13	C-15	.01 MF.
C14	C-13	.05 MF.
C15	C-13	.05 MF.
C16	C-2	.1 MF.
C17	C-10	.02 MF.
C18	C-10	.02 MF.
C19	C-111	250 MMF.
C20	C-13	.05 MF.
C21	C-27A	.006 MF.
C22	C-22	.004 MF.
C23	C-12A	.04 MF.
C24	C-17	.25 MF.
C25	C-10	.02 MF.
C26	C-10	.02 MF.
C27	C-10	.02 MF.
C28	C-27	.006 MF.
C29	C-247	.2U MF.
C30	C-246	.1 MF.
C31	C-245	.01 MF.
C32		.01 MF.
C33		

DIAG. NO.	PART NO.	DESCRIPTION
R1	R-41	.25 MEGOHM
R2	R-128	25,000 OHM
R3	R-128	25,000 OHM
R4	R-128	25,000 OHM
R5	R-125	10,000 OHM
R6	R-133	50,000 OHM
R7	R-77	250 OHM ±10%
R8	R-93	350 OHM ±10%
R9	R-41	.25 MEGOHM
R10	R-43	.1 MEGOHM
R11	R-36	.1 MEGOHM
R12	R-42	.5 MEGOHM
R13	R-43	.1 MEGOHM
R14	R-43	.1 MEGOHM
R15	R-122X	5,000 Ω ±10%
R16	R-38	.5 MEGOHM
R17	R-111	1 MEGOHM
R18	R-33	50,000 OHM
R19	R-41	.25 MEGOHM
R20	R-41	.25 MEGOHM

DIAG. NO.	PART NO.	DESCRIPTION
R21	R-36	.1 MEGOHM
R22	R-45	1 MEGOHM
R23	R-128	25,000 OHM
R24	R-AUX	230 OHM ±10%
R25	R-36	.1 MEGOHM
R26	R-125	10,000 OHM
R27	R-31	40,000 OHM
R28	R-AUX	12 OHM ±10%
R29	R-37A	2500 OHM
G-24		GANG CONDENSER
X-18		BAND SWITCH
X-606	L-69	AUTOMATIC TUNER

DIAG. NO.	PART NO.	DESCRIPTION
1	L-60	ANTENNA COIL
2	L-61	PRESELECTOR COIL
3	L-51	OSCILLATOR COIL
4	L-66	WAVE TRAP
5	I-33	1ST I.F. TRANS.
6	I-34	2ND I.F. TRANS.
7	S-81	6 SPK'R. & TRANS
7	S-1206	12" SPK'R. & TRANS.
8	T-69	POWER TRANS.
		50 -200 MMF.
		3 - 35 MMF.
		3 - 35 MMF.
		3 - 35 MMF.
		3 - 35 MMF.
		3 - 35 MMF.
		3 - 35 MMF.
		200 - 800 MMF.
		200 - 800 MMF.
A		
B		
C	P-101	
D	P-101	
E	P-101	
F		
G		
H		
I		
J		

FOR MORE DATA ON ALIGNMENT AND PUSH-BUTTON ADJUSTMENT
SEE MODEL E-10807

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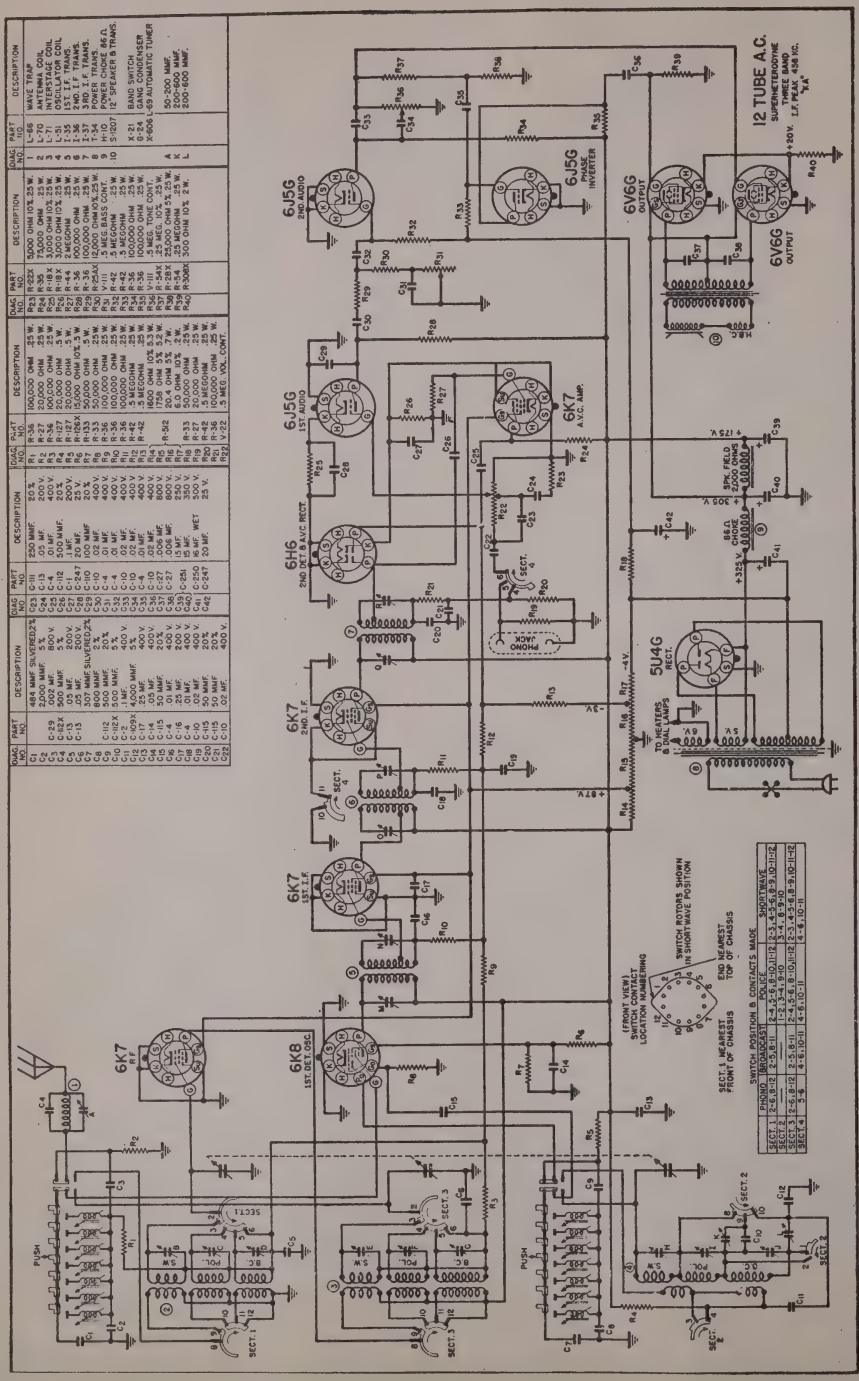
MODELS E-10821, E-10822

ALLIED RADIO CORP.



DIAG. NO.	PART NO.	DESCRIPTION
C1		484 MMF SILVERED(2%)
C2		2000 MMF 5%
C3	C-29	.002 MF 500 V.
C4	C-23	500 MMF 5%
C5	C-13	.05 MF 200 V.
C6	C-13	.05 MF 200 V.
C7		1211 MMF SILVERED(2%)
C8		800 MMF 2%
C9	C-112	500 MMF 5%
C10	C-113	500 MMF 5%
C11	C-2	.1 MF 400 V.
C12	C-107A	25 MF 25 V.
C13	C-14	.05 MF 400 V.
C14	C-23	500 MMF 5%
C15	C-41	.01 MF 400 V.
C16	C-16	.25 MF 200 V.
C17	C-10	.02 MF 400 V.
C18	C-10	.02 MF 400 V.
C19	C-115	.50 MMF 20%
C20	C-115	.50 MMF 20%
C21	C-10	.02 MF. 400 V.

DIAG. NO.	PART NO.	DESCRIPTION
C23	C-10	250 MMF
C24	C-13	.05 MF
C25	C-14	.05 MF
C26	C-10	.02 MF
C27	C-11	.1 MF.
C28	C-247	.02 MF
C29	C-247	.02 MF
C30	C-10	.02 MF
C31	C-4	.01 MF
C32	C-4	.01 MF
C33	C-10	.02 MF
C34	C-10	.02 MF
C35	C-4	.01 MF
C36	C-10	.02 MF
C37	C-10	.02 MF
C38	C-127	.006 MF
C39	C-251	.15 MF
C40	C-250	16 MF. WET
C41	C-250	16 MF. WET
C42	C-247	20 MF.

DIAG. NO.	PART NO.	DESCRIPTION
R1	R-35	100,000 OHM
R2	R-27	20,000 OHM
R3	R-34	100,000 OHM
R4	R-127	20,000 OHM
R5	R-127	20,000 OHM
R6	R-133A	50,000 OHM
R7	R-133A	50,000 OHM
R8	R-33	50,000 OHM
R9	R-36	100,000 OHM
R10	R-36	100,000 OHM
R11	R-36	100,000 OHM
R12	R-42	.5 MEGOHM
R13	R-42	.5 MEGOHM
R14	R-502	1600 OHM 10% 5.3 W.
R15	R-42	.5 MEGOHM
R16	R-502	20.4 OHM 5% 7 W.
R17	R-33	50,000 OHM
R18	R-42	.5 MEGOHM
R19	R-27	20,000 OHM
R20	R-42	.5 MEGOHM
R21	R-42	.5 MEG. VOL. CONT.

DIAG. NO.	PART NO.	DESCRIPTION
R23	R-22X	5000 OHM 10% 25 W.
R24	R-35	75,000 OHM 25 W.
R25	R-18X	3000 OHM 10% 25 W.
R26	R-18X	3000 OHM 10% 25 W.
R27	R-44	2 MEGOHM 25 W.
R28	R-35	100,000 OHM 25 W.
R29	R-35	100,000 OHM 25 W.
R30	R-254A	12,000 OHM 10% 25 W.
R31	V-III	1.5 MEG. VOL. CONT.
R32	R-42	.5 MEGOHM 25 W.
R33	R-42	.5 MEGOHM 25 W.
R34	R-35	100,000 OHM 25 W.
R35	R-36	100,000 OHM 25 W.
R36	R-28X	25,000 OHM 5% 25 W.
R37	V-III	.5 MEG. TONE CONT.
R38	R-34	25 MEGOHM 25 W.
R39	R-34	25 MEGOHM 25 W.
R40	R-308X	300 OHM 10% 2 W.

DIAG. NO.	PART NO.	DESCRIPTION
1	L-66	WAVE TRAP
2	L-70	ANTENNA COIL
3	L-71	R.F. INTERSTAGE COIL
4	L-31	OSCILLATOR COIL
5	I-35	1ST. I.F. TRANS.
6	I-36	2ND. I.F. TRANS.
7	I-37	3RD. I.F. TRANS.
8	T-34	POWER TRANS.
9	T-35	POWER CHOKE 86 Ω.
10	S-1027	12" SPEAKER & TRANS.
	X-21	BAND SWITCH
	G-24	GANG CONDENSER
	X-606L-69	AUTOMATIC TUNER
A		50-200 MMF.
K		200-600 MMF.
L		2000-6000 MMF.

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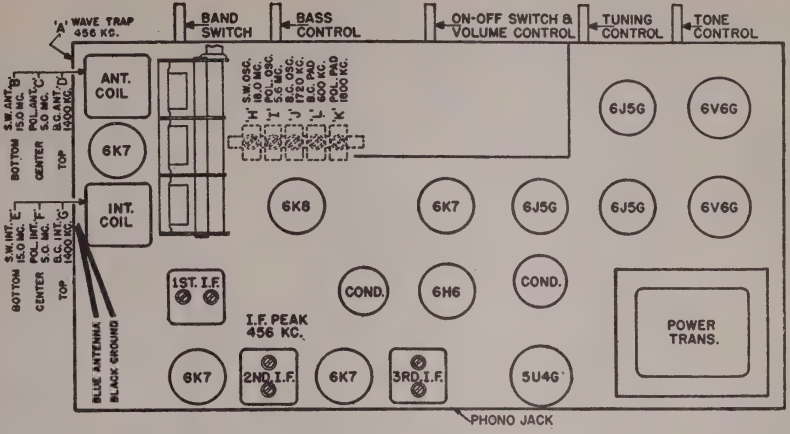
MODELS E-10821, E-10822

ALLIED RADIO CORP.



ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 700, 1400, 1720, 1800, 5000, 5600, 6000, 15000 and 18100 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings. (All adjustments on sets with automatic tuning must be made with "Manual" button depressed.)

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the wave trap and then the Short Wave, Police and Broadcast bands in the order given, should be the next procedure.

I. F. AND WAVE TRAP ALIGNMENT. With the wave switch in the Broadcast Band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6K8) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all six I.F. trimmers to peak or maximum reading on the output meter. After aligning the I.F.'s, have the band switch in the broadcast band and the generator set at 456 KC. Connect the antenna lead to the generator through a 200 MMF condenser. Adjust the wave trap trimmer to give a minimum signal. It will be necessary to increase the output of the generator to secure an accurate minimum with the wave trap.

SHORT WAVE BAND ALIGNMENT. Change the band switch to the S. W. position and connect the generator to the antenna with a 400 ohm dummy. Adjust the S. W. oscillator to give a maximum output at 18100 KC with the dial at the extreme left. Set the signal generator and receiver dials to 15000 KC and adjust the S.W. antenna and R. F. trimmers (bottom row) to give a maximum peak and check dial to prevent alignment on the image frequency. With a strong signal input turn the dial to approximately 1 M. C. lower in frequency and pick up the image frequency. If the image is not received, it will be necessary to return the dial to 18100 KC to reduce the capacity in the oscillator trimmer until a second signal is received. Proceed as before with the alignment of the antenna and recheck for image frequency. Check the sensitivity at 6000 KC to determine if the coils and mica pad are not defective.

POLICE BAND ALIGNMENT. Change the band switch to the police position and, with the same dummy antenna, line up the police oscillator trimmer at 5600 KC with the receiver pointer at the extreme left end of the dial and then adjust the police antenna and R. F. trimmers (center row) in the same way as for the short wave band, setting the dial at 5000 KC and the generator at the same frequency. Check for image frequency at approximately 1 MC lower on the dial as described for the short wave band. Next, set the generator at 1800 KC and tune in the signal with the dial. Adjust the police pad by rocking the gang back and forth while adjusting the pad until maximum output is attained. Recheck the adjustment at 5000 KC as the pad adjustment may have caused misalignment.

BROADCAST BAND ALIGNMENT. With the switch turned to the broadcast position, connect the antenna to the generator through a 200 MMF dummy and set the dial to the extreme left and the generator at 1720 KC. Align the BC oscillator trimmer for maximum output, then set the generator to 1400 KC, tune in the signal on the receiver and adjust the BC antenna and R.F. trimmers (top row). Set the generator at 600 KC and adjust the BC pad as described for the police band. Return to 1400 KC and recheck alignment at this point. Next tune in a signal from a station of known frequency close to 700 KC. If the dial does not indicate correctly, set your signal generator to 700 KC, tune in the signal and after loosening the dial drum by releasing the set screws, adjust the drum so that the pointer indicates 700 KC. Tighten the set screws and check on the station near that frequency to see whether the calibration is satisfactory, then check on several other stations as a final check.

FOR DATA ON PUSH-BUTTON ADJUSTMENT, SEE MODEL E-10807.

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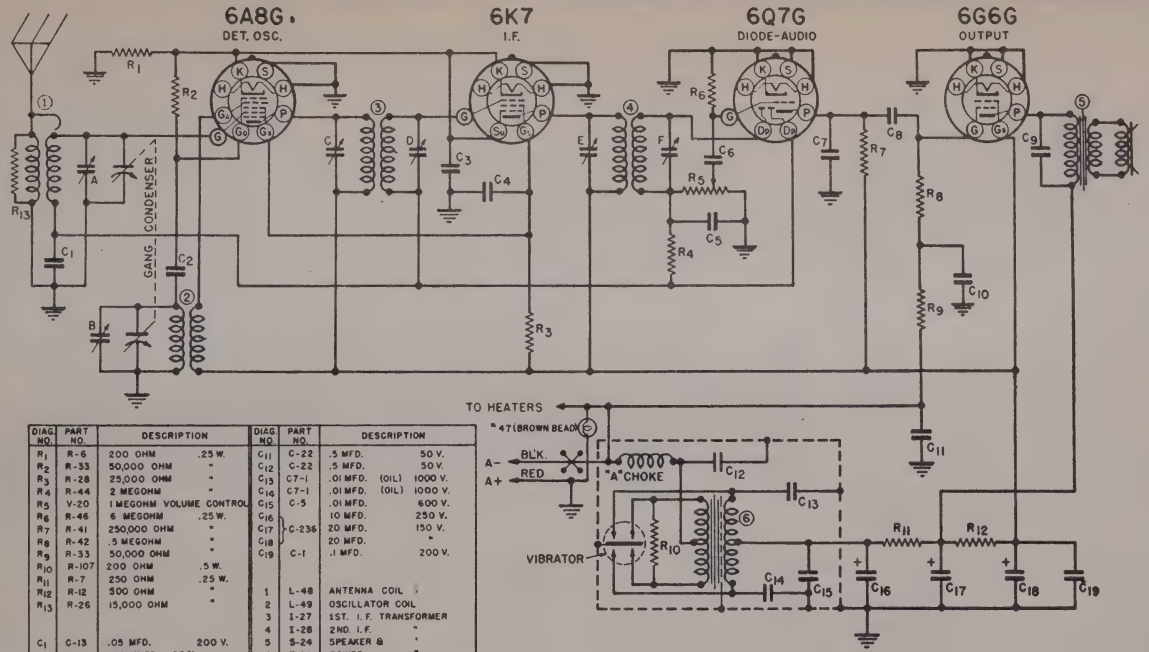
MODELS E-10831, E-10832

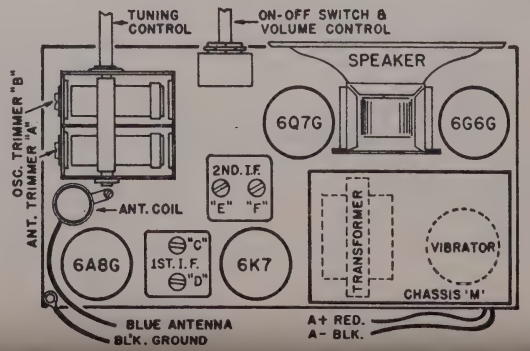
ALLIED RADIO CORP.



DIAG. NO.	PART NO.	DESCRIPTION		DIAG NO.	PART NO.	DESCRIPTION	
R_1	R-6	200 OHM	.25 W.	C_{11}	C-22	.5 MFD.	50 V.
R_2	R-33	50,000 OHM	"	C_{12}	C-22	.5 MFD.	50 V.
R_3	R-28	25,000 OHM	"	C_{13}	C7-1	.01 MFD. (OIL)	1000 V.
R_4	R-44	2 MEGOHM	"	C_{14}	C7-1	.01 MFD. (OIL)	1000 V.
R_5	V-20	1 MEGOHM VOLUME CONTROL		C_{15}	C-5	.01 MFD.	600 V.
R_6	R-46	6 MEGOHM	.25 W.	C_{16}		10 MFD.	250 V.
R_7	R-41	250,000 OHM	"	C_{17}	C-236	20 MFD.	150 V.
R_8	R-42	.5 MEGOHM	"	C_{18}		20 MFD.	"
R_9	R-33	50,000 OHM	"	C_{19}	C-1	.1 MFD.	200 V.
R_{10}	R-107	200 OHM	.5 W.				
R_{11}	R-7	250 OHM	.25 W.				
R_{12}	R-12	500 OHM	"	1	L-48	ANTENNA COIL	
R_{13}	R-26	15,000 OHM	"	2	L-49	OSCILLATOR COIL	
				3	I-27	1ST. I. F. TRANSFORMER	
				4	I-28	2ND. I. F. "	
C_1	C-13	.05 MFD.	200 V.	5	S-24	SPEAKER & "	
C_2	C-110	100 MMFD. 20%		6	T-22	POWER "	
C_3	C-16	.25 MFD.	200 V.				
C_4	C-1	.1 MFD.	200 V.		G-19	2 GANG VARIABLE CONDENSER	
C_5	C-110	100 MMFD. 20%			206	"A" CHOKE	
C_6	C-27	.006 MFD.	600 V.		F-4	SYNCHRONOUS VIBRATOR	
C_7	C-111	250 MMFD. 20%					
C_8	C-4	.01 MFD.	400 V.				
C_9	C-27	.006 MFD.	600 V.				
C_{10}	C-13	.05 MFD.	200 V.				

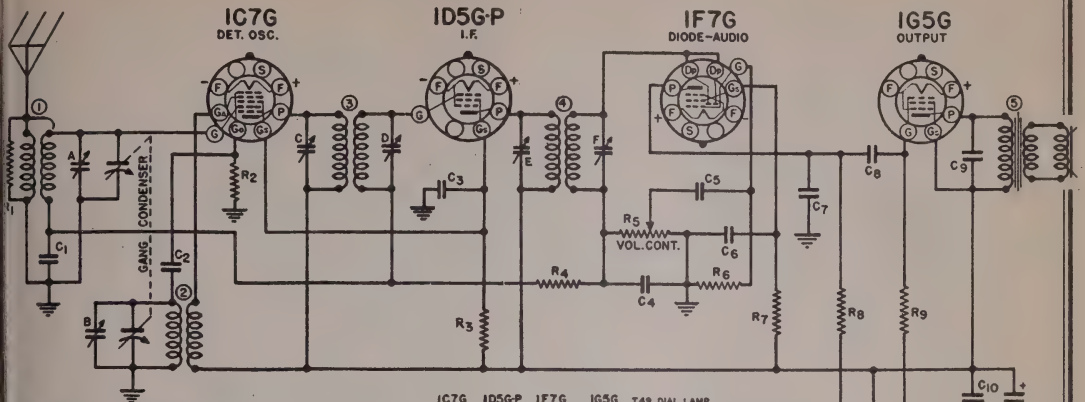
I.F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A8G) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

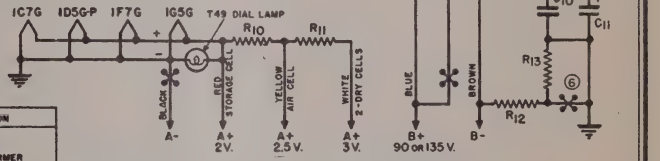
BROADCAST BAND ALIGNMENT. Connect the antenna to the generator through a 200 MMF dummy and set the dial and generator at 1400 KC. Align the BC oscillator trimmer and BC antenna trimmer. Set the generator at 600 KC and tune in the signal to check sensitivity at this point to determine if coils or gang condenser have not been damaged.



MODELS E-10835, E-10836

ALLIED RADIO CORP.



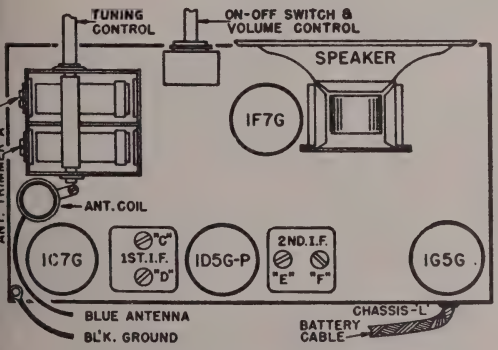


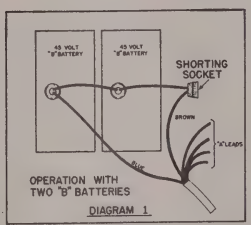
DIAG. NO.	PART NO.	DESCRIPTION
R_1	R-26	15,000 OHM .25 W
R_2	R-33	50,000 OHM "
R_3	R-26	15,000 OHM "
R_4	R-43	1 MEGOHM "
R_5	V-18	.5 MEG. VOLUME CONTROL
R_6	R-46	6 MEGOHM .25W.
R_7	R-43	1 MEGOHM "
R_8	R-41	.25 MEGOHM "
R_9	R-43	1 MEGOHM "
R_{10}	R-506	.66 OHM CANDOHM
R_{11}		1,200 OHM
R_{12}	R-10	400 OHM 10% .25W.
R_{13}	R-10	400 OHM 10% .25W.
C_1	C-13	.05 MFD. 200 V.
C_2	C-110	100 MMFD. 20%
C_3	C-1	.1 MFD. 200 V.
C_4	C-112	500 MMFD. 20%
C_5	C-27	.006 MFD. 600 V.
C_6	C-4	.01 MFD. 400 V.
C_7	C-111	250 MMFD. 20%
C_8	C-4	.01 MFD. 400 V.
C_9	C-27	.006 MFD. 600 V.
C_{10}	C-13	.05 MFD. 200 V.
C_{11}	C-230	8 MFD. 150 V.

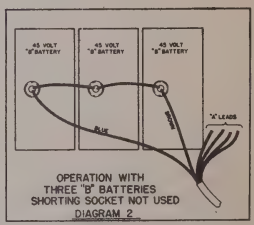
DIAG. NO.	PART NO.	DESCRIPTION
1	L-46	ANTENNA COIL
2	L-49	OSCILLATOR COIL
3	I-20	1ST. I.F. TRANSFORMER
4	I-21	2ND. I.F. "
5	S-25	5 POS. SP. KR. & TRANS.
6	X-103	BATTERY ECONOMY SWITCH
	6-19	2 GANG VARIABLE COND.
	W-208	BATTERY CABLE

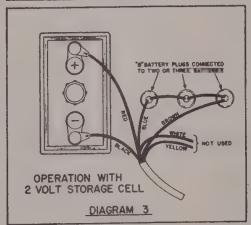
4 TUBE - 2 VOLT

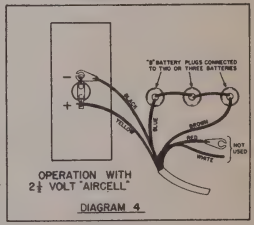
SUPERHETERODYNE
SINGLE BAND
I.F. PEAK 456 K.C.
CHASSIS - L

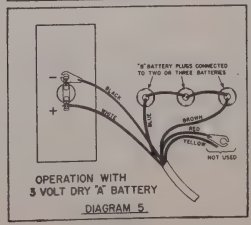


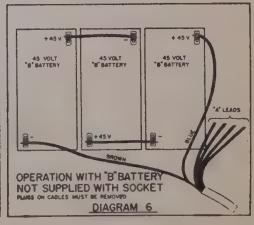










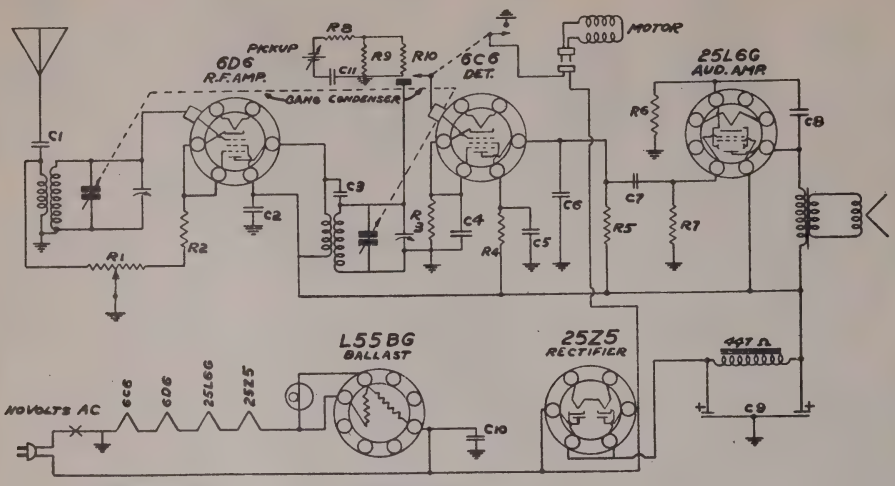


I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1C7G) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the antenna to the generator through a 200 MMF dummy and set the dial and generator at 1400 KC. Align the BC oscillator trimmer and BC antenna trimmer. Set the generator at 600 KC and tune in the signal to check sensitivity at this point to determine if coils or gang condenser have not been damaged.

MODEL E-10863

ALLIED RADIO CORP.

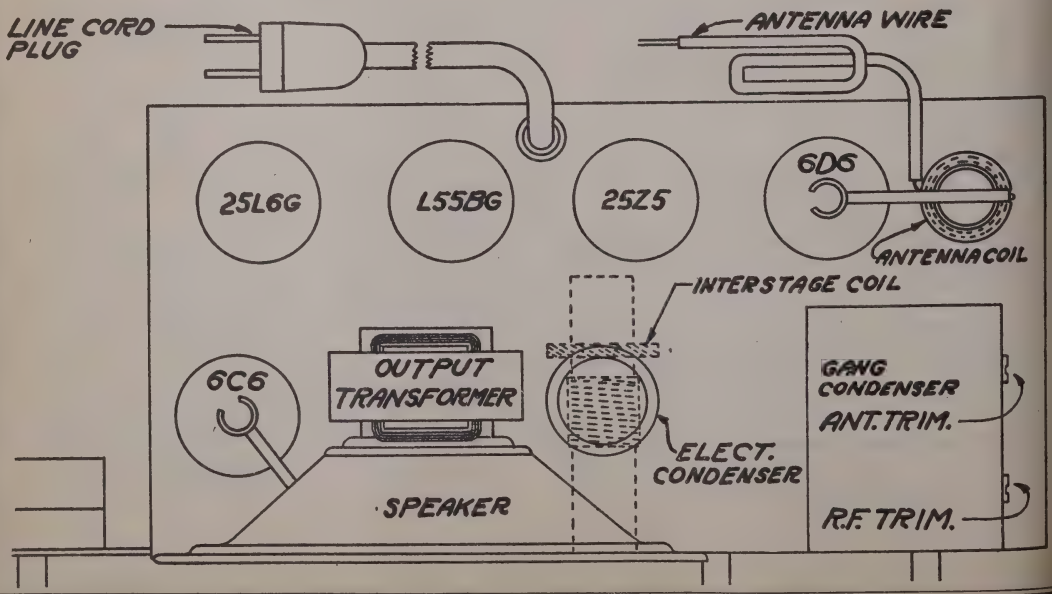


CONDENSERS		
NO.	CAPACITY	TYPE
C1	.002 MFD.	400 V.
C2	.1 "	200 V.
C3	1.5 mf.	GIMMIK
C4	.25 MFD.	200 V.
C5	.1 "	200 V.
C6	.0002 "	600 V.
C7	.01 "	400 V.
C8	.02 "	400 V.
C9	16-16 "	150 V. ELECT.
C10	.1 "	400 V.
C11	.005 "	600 V.

RESISTORS			
NO.	OHMS	WATTS	
R1	75,000		VOL. CONT.
R2	250	1/2	
R3	25,000	1/2	
R4	2,000,000	1/2	
R5	500,000	1/2	
R6	110	1/2	WIRE WOUND
R7	500,000	1/2	
R8	1,000,000	1/2	
R9	250,000	1/2	
R10	500,000		PHONO VOL. CONT.

ALIGNMENT DATA AND SERVICING

Connect a signal generator to the antenna lead of the receiver through a 100 Mmf. condenser. Set the dial pointer at 1400 KC. Set the generator at 1400 KC. Now adjust the antenna and RF trimmers of the gang condenser to maximum output.



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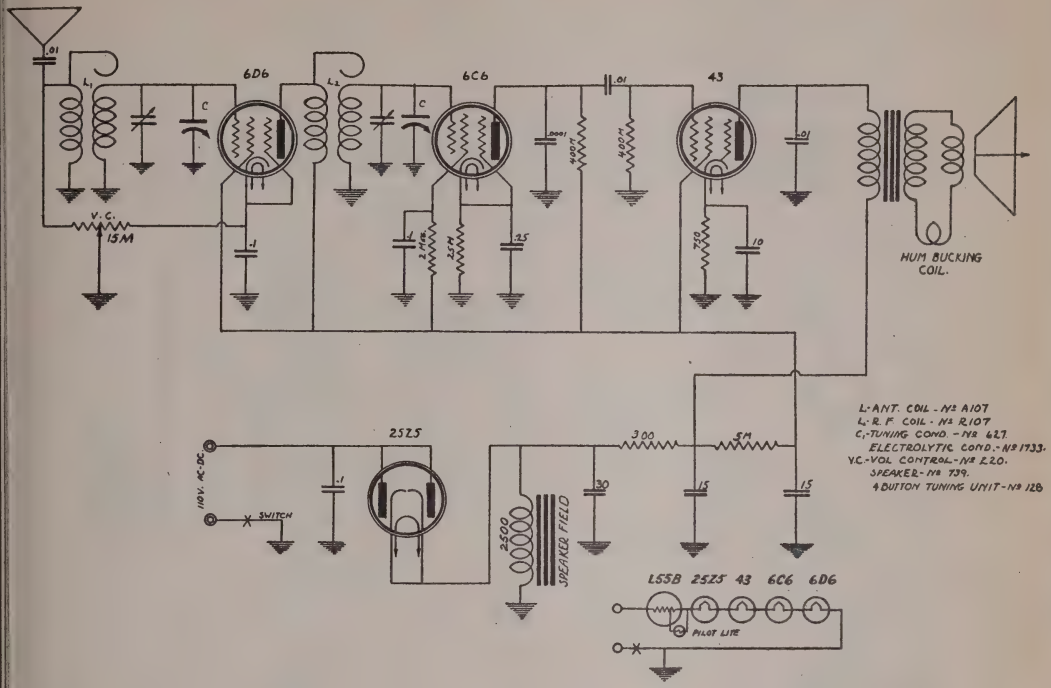
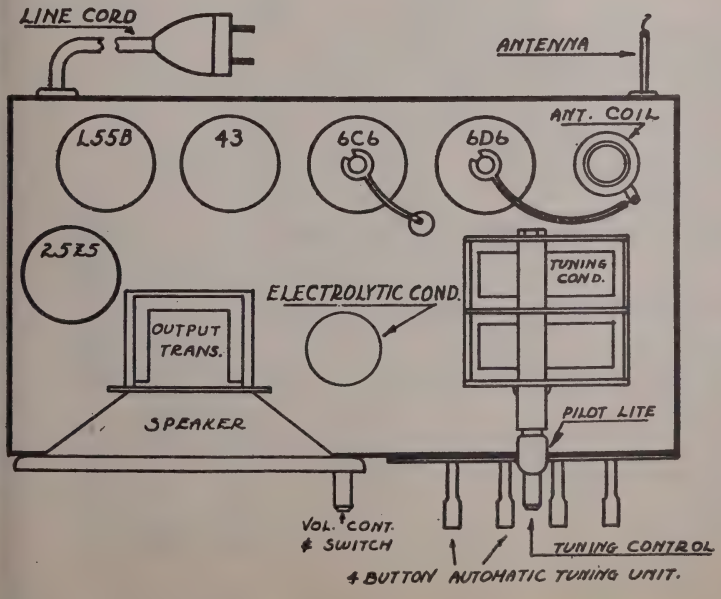
MODEL E-10893

ALLIED RADIO CORP.





ALIGNMENT

A dummy antenna of approximately 180 mmfd. should be used and connected to antenna with aerial coil left unwound.

Align at 1400 kc with dial set at 1400 and volume control at maximum. Check the alignment at 1000 kc and at 600 kc. The receiver should check OK at these points.

It is only necessary to adjust at one point on the dial.

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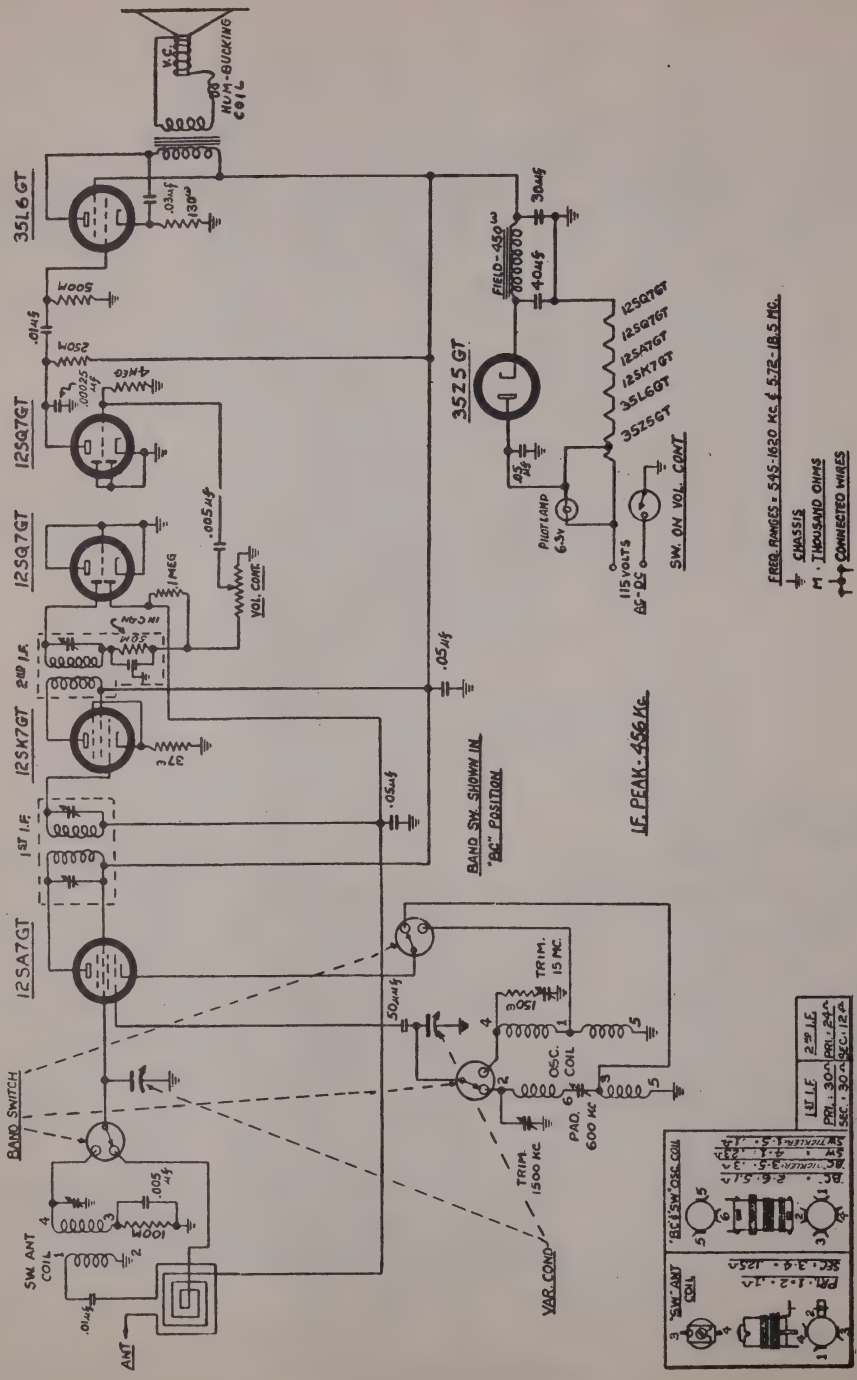
MODEL B-17100

ALLIED RADIO CORP.



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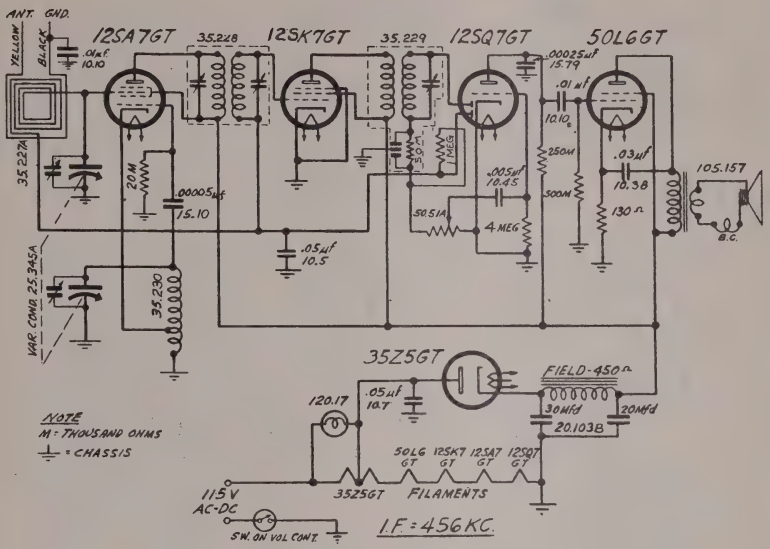
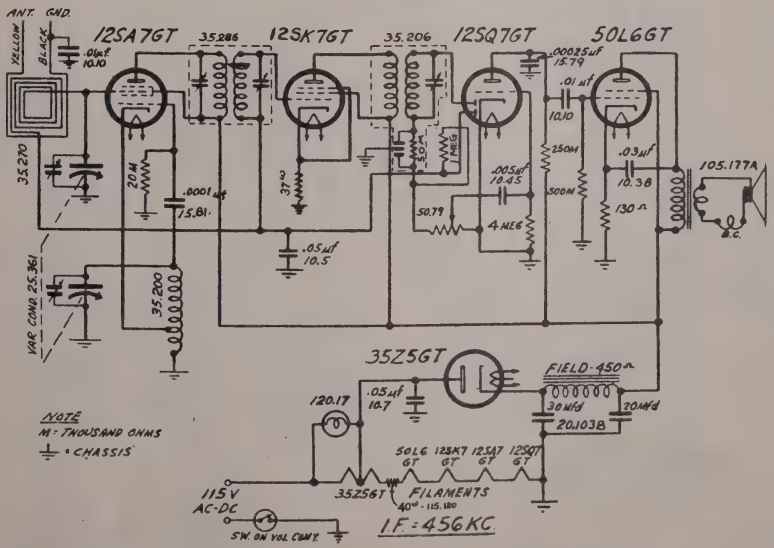
ALLIED RADIO CORP.

MODEL B 17101

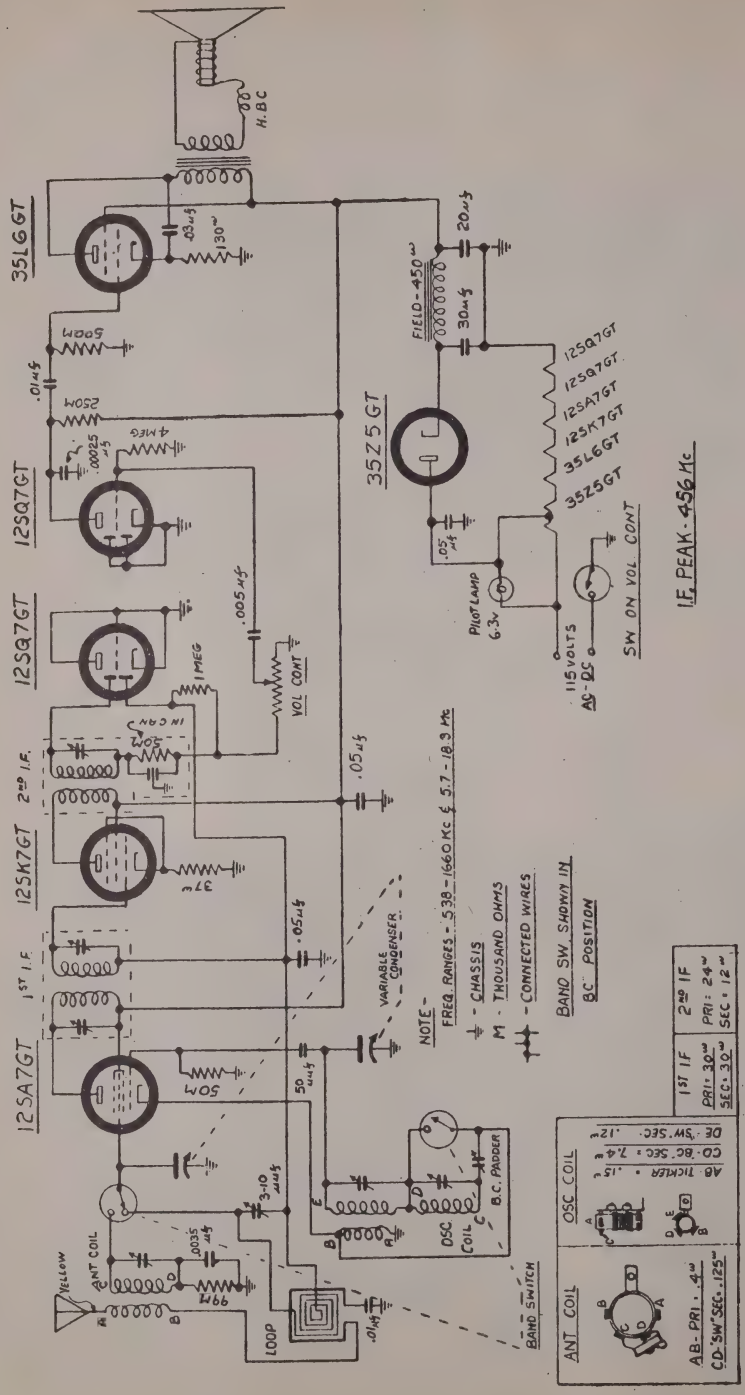


MODEL B17102



MODELS B-17103, B-17104

ALLIED RADIO CORP.



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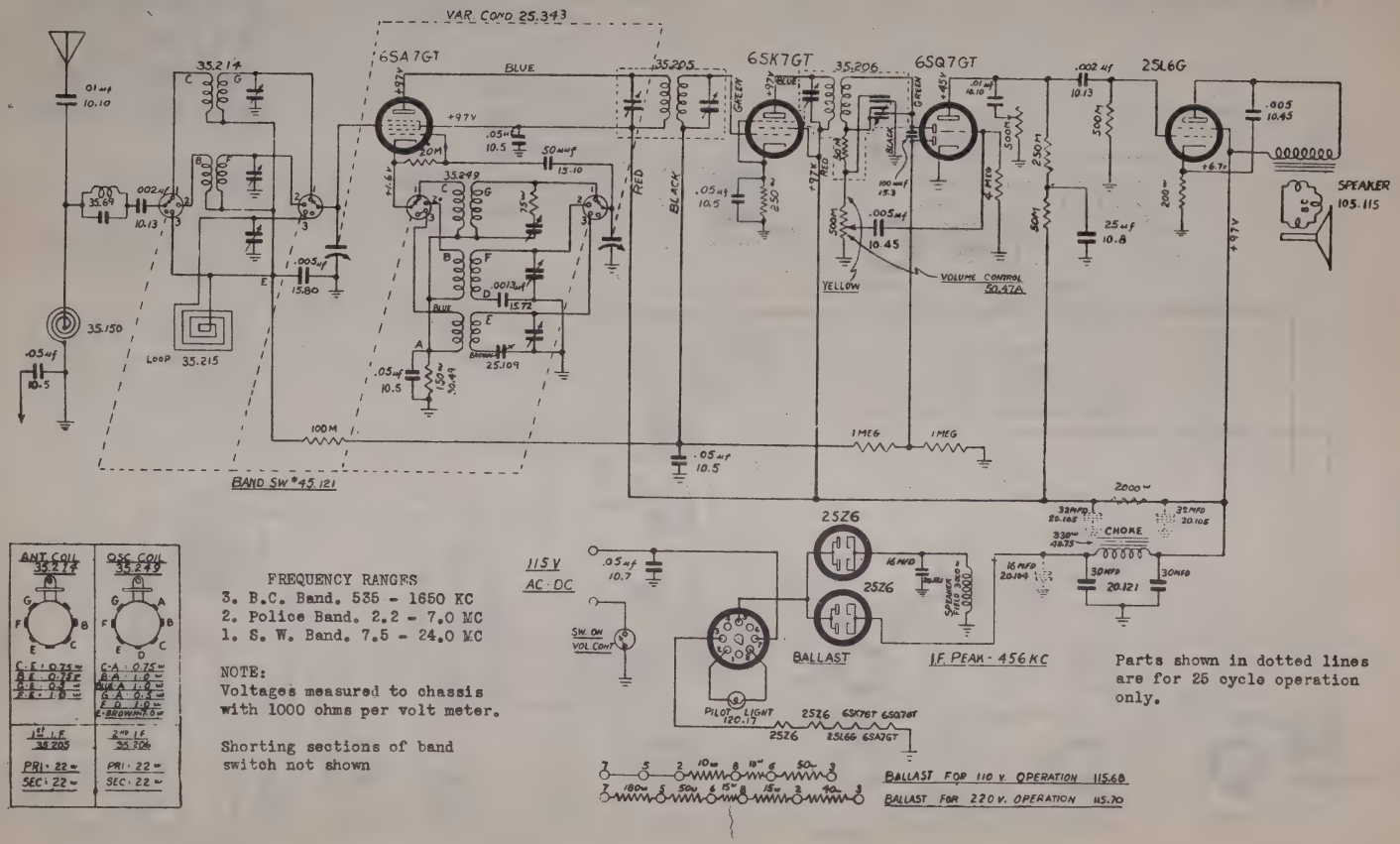
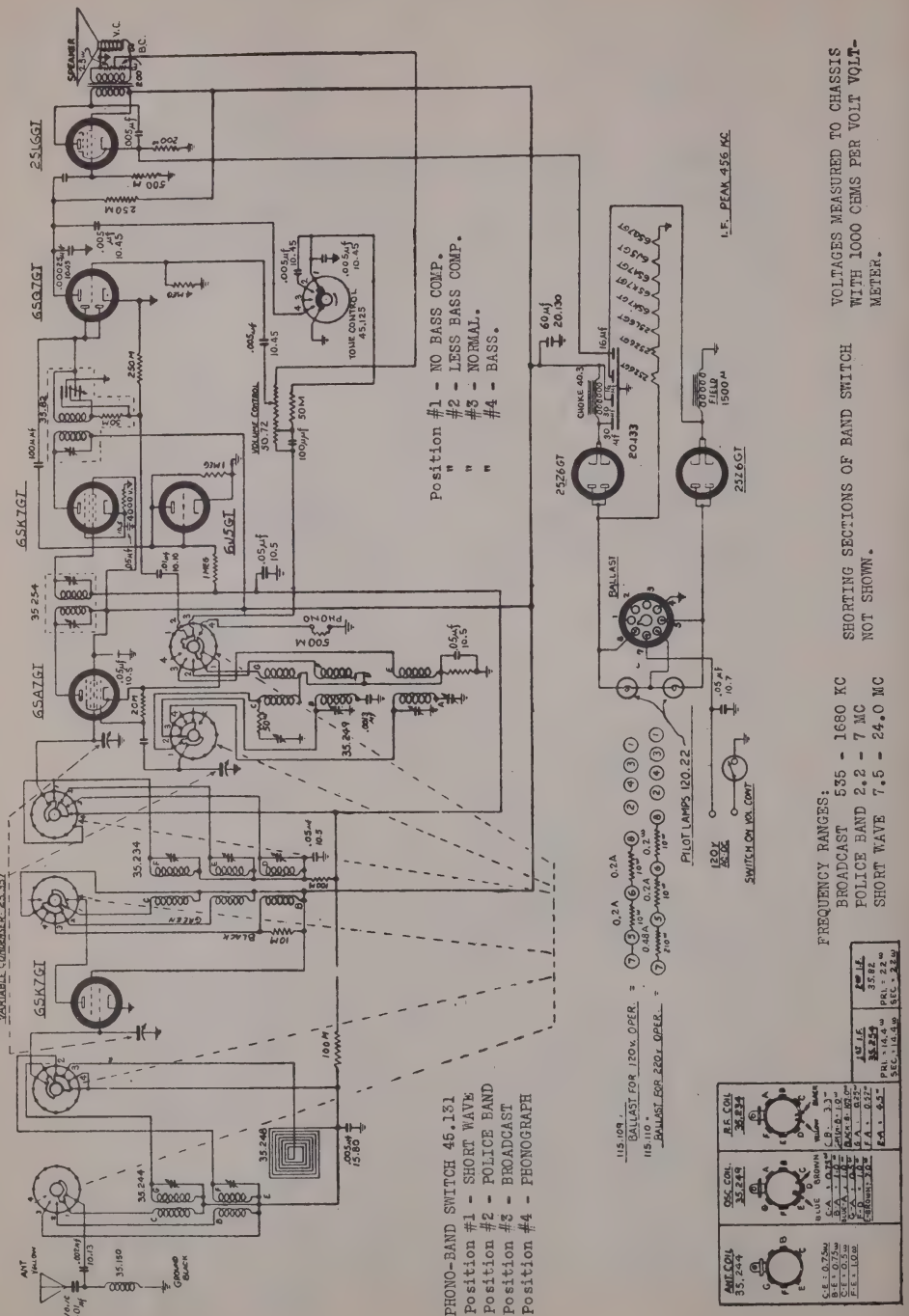

VAR COND 25.343
6SA7GT
6SK7GT
6SQ7GT
25L6G
35.214
35.205
35.206
35.249
35.150
35.215
BLUE
GREEN
RED
BLACK
YELLOW
BROWN
SPEAKER
105.115
VOLUME CONTROL
50.47A
BAND SW 45.121
CHOKE
2526
BALLAST
115 V AC-DC
SW ON VOL CONT
PILOT LIGHT 120.17
IF PEAK - 456 KC
ANT COIL 35.212
OSC COIL 35.249
1st I.F. 35.205
2nd I.F. 35.206
FREQUENCY RANGES
3. B.C. Band. 535 - 1650 KC
2. Police Band. 2.2 - 7.0 MC
1. S. W. Band. 7.5 - 24.0 MC
NOTE:
Voltages measured to chassis with 1000 ohms per volt meter.
Shorting sections of band switch not shown
Parts shown in dotted lines are for 25 cycle operation only.
BALLAST FOR 110 V. OPERATION 115.68
BALLAST FOR 220 V. OPERATION 115.70

MODEL B-17106

ALLIED RADIO CORP.



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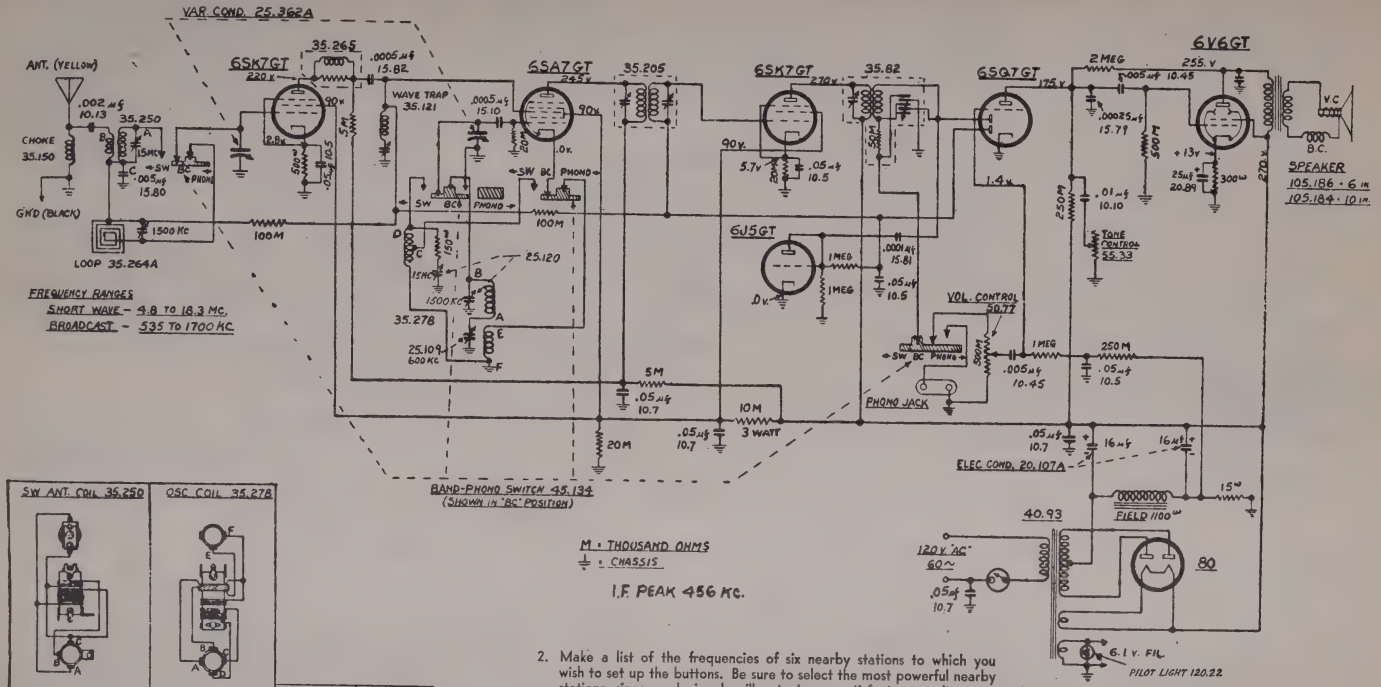
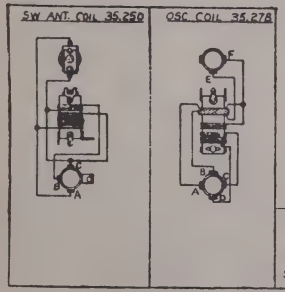




1ST I.F. COIL 35.205	2ND I.F. COIL 35.82
PRI = 22 MH	PRI = 22 MH
SEC = 22 MH	SEC = 22 MH

INSTRUCTIONS FOR SETTING BUTTONS

Setting up the stations to be tuned in automatically by the Station Selector buttons has been made extremely easy. Follow these instructions carefully:

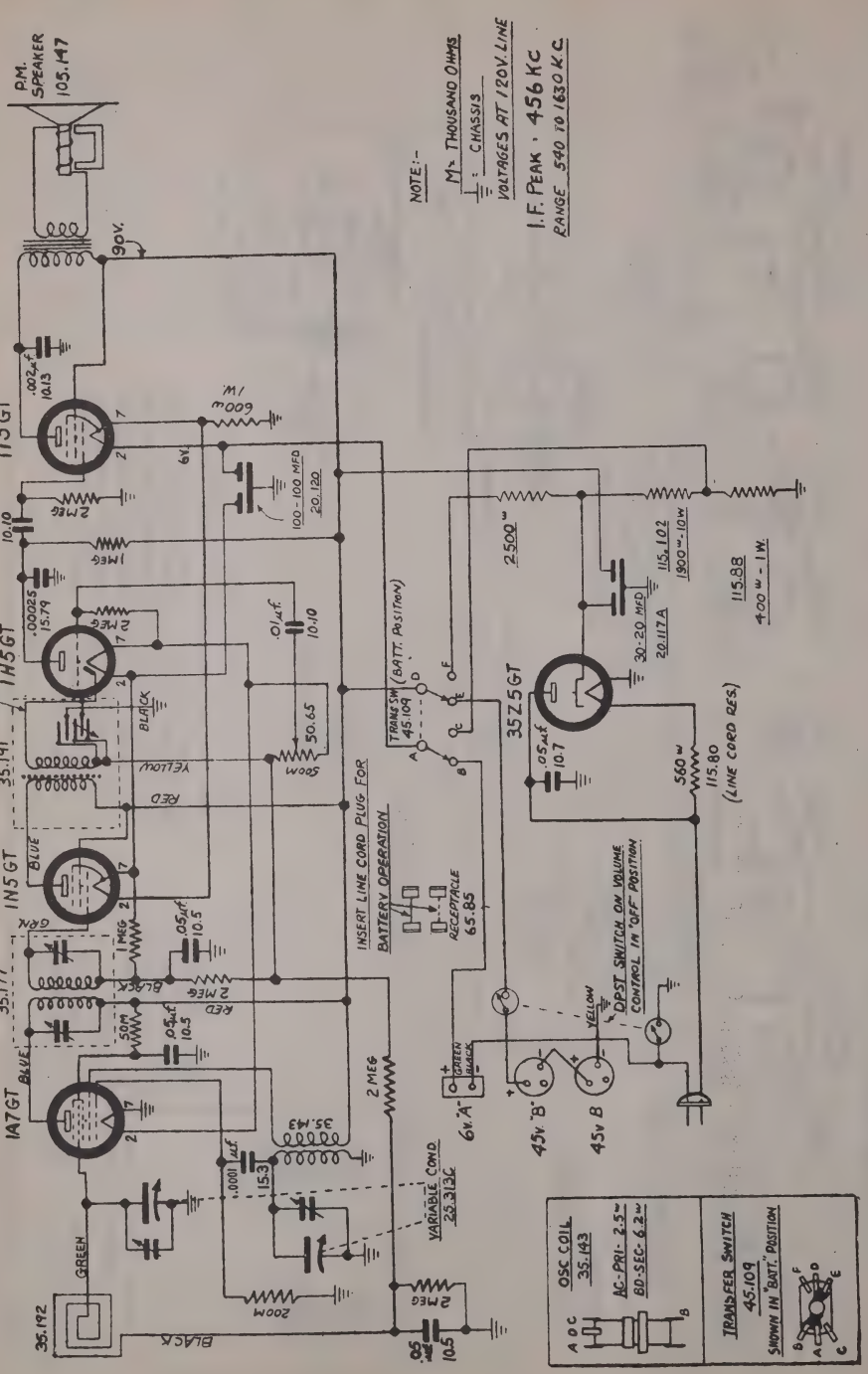
1. Turn the set on and allow it to operate at least fifteen minutes before attempting to set up button.
2. Make a list of the frequencies of six nearby stations to which you wish to set up the buttons. Be sure to select the most powerful nearby stations, since weak signals will not give as satisfactory results.
3. Push up button to be adjusted. There will then be exposed a screwdriver slot recessed in the plunger button. This screw when rotated counter-clockwise by means of a small screwdriver, unlocks the tuner setting for that particular button. The plunger for the button to be set up is then held in a fully depressed position (by the screwdriver) while the desired station is tuned by means of the Vernier Dial Tuning Control. The plunger is then released and the lockup screw is rotated in a clockwise direction, with the screwdriver in order to lock the station permanently in tune.

Repeat the above for each of the other five buttons.

It is advisable to set the lowest frequency station on the left-hand button and the rest in ascending order.

MODELS B-17111, B-17112

ALLIED RADIO CORP.



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ALLIED RADIO CORP.

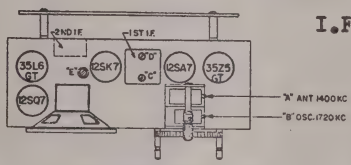
MODELS B-17125, B-17126
MODELS B-17127, B-17128
B-17129

12SA7 CONVERTER
12SK7 I.F.
12SQ7 DIODE-AUDIO
35L6GT OUTPUT

DIAG NO	PART NO	DESCRIPTION
R1	N-1627	20,000 OHM .5W 20%
R2	N-1250	50,000 OHM .5W 20%
R3	N-1252	1 MEGOHM .5W 20%
R4	N-1307	.5 MEGOHM VOL.CONT.
R5	N-1419	6 MEGOHM .5W 20%
R6	N-1261	250,000 OHM .5W 20%
R7	N-1264	500,000 OHM .5W 20%
R8	N-1616	250 OHM .5W 10%
R9	N-3341	1,000 OHM .5W 20%
R10	N-1742	25 OHM .5W 20%
R11	N-1618	80 OHM .5W 10%
C1	N-1344	.01 MFD. 400V.
C2	N-1345	.05 MFD. 200V.
C3	N-3368	.22 MFD. 200V.
C4	N-1374	100 MMFD.
C5	N-2712	.004 MFD. 400V.
C6	N-1447	.0005 MFD. 400V.
C7	N-1344	.01 MFD. 400V.
C8	N-1376	.02 MFD. 400V.
C9	N-3302	35 MFD. 150V. ELECT
C10		30 MFD. 30V.
C11	N-1346	.05 MFD. 400V.

DIAG NO	PART NO	DESCRIPTION
1	N-3299	ANTENNA COIL LOOP
2	N-3298	OSCILLATOR COIL
3	N-3300	1ST. I.F. TRANSFORMER
4	N-3301	2ND I.F. TRANSFORMER
5	N-3295	5" SPEAKER
6	N-3296	OUTPUT TRANSFORMER
	N-3297	2 GANG CONDENSER

NOTE: VOLTAGES SHOWN ARE FROM TERMINAL TO BUSS. ---------- HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING.



TUBE AND TRIMMER LOCATIONS

I.F. - 456 KC

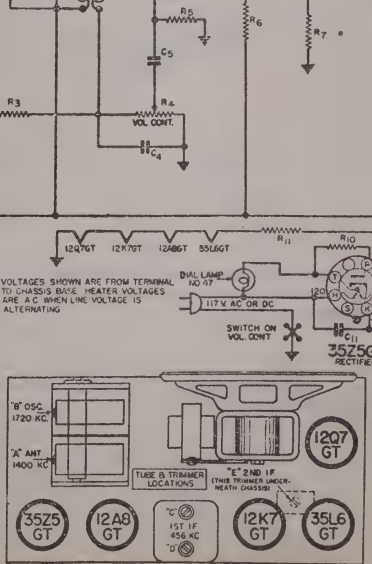
MODELS B-17125, B-17126 .

12A8GT CONVERTER
12K7GT I.F.
12Q7GT DIODE-AUDIO
35L6GT OUTPUT

DIAG NO	PART NO	DESCRIPTION
R1	N-1250	50,000 OHM .5W 20%
R2	N-1259	15,000 OHM .5W 20%
R3	N-1262	1 MEGOHM .5W 20%
R4	N-2886	.5 MEGOHM VOL. CONT.
R5	N-1263	10 MEGOHM .5W 20%
R6	N-1377	200,000 OHM .5W 20%
R7	N-1264	500,000 OHM .5W 20%
R8	N-1616	250 OHM .5W 10%
R9	N-1257	2,000 OHM .5W 20%
R10	N-1742	25 OHM .5W 20%
R11	N-1618	80 OHM 2 W 10%
C1	N-1344	.01 MFD. 400 V.
C2	N-1345	.05 MFD. 200 V.
C3	N-1345	.05 MFD. 200 V.
C4	N-1374	100 MMFD.
C5	N-1344	.01 MFD. 400 V.
C6	N-1447	.0005 MFD. 400 V.
C7	N-1344	.01 MFD. 400 V.
C8	N-1376	.02 MFD. 400 V.
C9	N-1368	30 MFD. 150 V. ELECTRO. 15 MFD. 150 V
C10		
C11	N-1346	.05 MFD. 400 V.

DIAG NO	PART NO	DESCRIPTION
1	N-2902	ANTENNA COIL LOOP
2	N-1452	OSCILLATOR COIL
3	N-1598	1ST I.F. TRANSFORMER
4	N-2890	2ND I.F. TRANSFORMER
5	N-2889	4-1/2" SPEAKER & TRANS.
E	N-1597	2ND I.F. TRIMMING COND.
	N-2901	2 GANG CONDENSER

NOTE: VOLTAGES SHOWN ARE FROM TERMINAL TO CHASSIS BASE. HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING



I.F. 456 KC

MODELS B-17127, B-17128, B-17129

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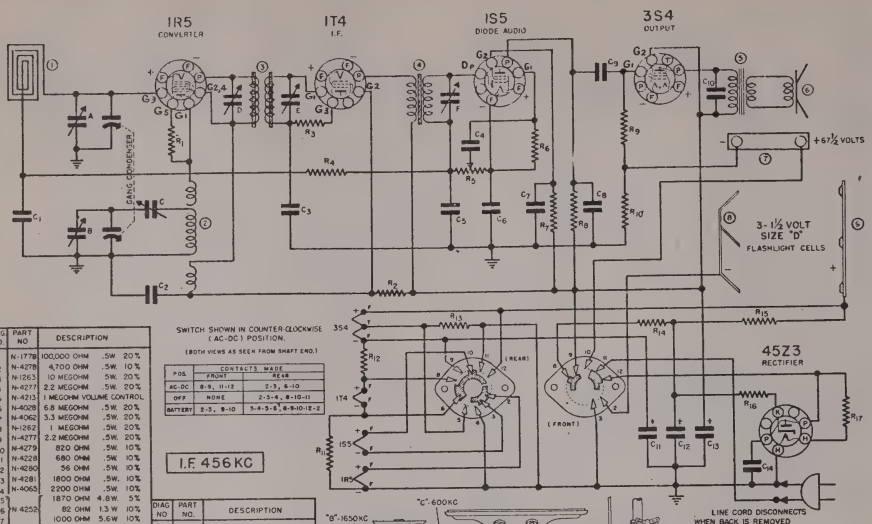
MODELS B-17132, B-17133
B-17134

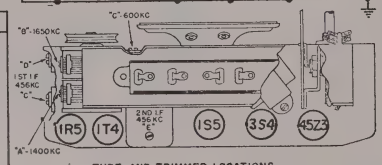
ALLIED RADIO CORP.



DIAG. NO	PART NO	DESCRIPTION
R_1	N-1778	100,000 OHM .5W 20%
R_2	N-4278	4,700 OHM .5W 10%
R_3	N-1263	10 MEGOHM .5W 20%
R_4	N-4277	2.2 MEGOHM .5W 20%
R_5	N-4213	1 MEGOHM VOLUME CONTROL
R_6	N-4028	6.8 MEGOHM .5W 20%
R_7	N-4062	3.3 MEGOHM .5W 20%
R_8	N-1262	1 MEGOHM .5W 20%
R_9	N-4277	2.2 MEGOHM .5W 20%
R_{10}	N-4279	820 OHM .5W 10%
R_{11}	N-4228	680 OHM .5W 10%
R_{12}	N-4280	56 OHM .5W 10%
R_{13}	N-4281	1800 OHM .5W 10%
R_{14}	N-4065	2200 OHM .5W 10%
R_{15}		1870 OHM 4.8W 5%
R_{16}	N-4252	82 OHM 1.3 W 10%
R_{17}		1000 OHM 5.6W 10%

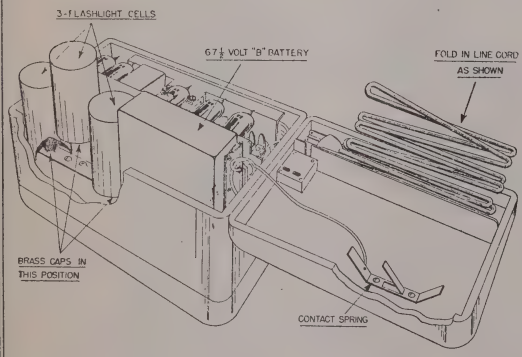
DIAG NO	PART NO.	DESCRIPTION
C_1	N-1345	.05 MFD. 200 V.
C_2	N-1345	.05 MFD. 200 V.
C_3	N-1344	.01 MFD. 400 V.
C_4	N-2712	.004 MFD. 400 V
C_5		.0001 MFD. (IN 2nd I.F. CAN)
C_6	N-1351	.1 MFD. 200 V.
C_7	N-1344	.01 MFD. 400 V.
C_8	N-1342	50 MMFD. MICA
C_9	N-1344	.01 MFD. 400 V.
C_{10}	N-2712	.004 MFD. 400 V.
C_{11}		100 MFD. 12V
C_{12}	N-4206	30 MFD. 150V. ELECTROLYTIC
C_{13}		30 MFD. 150V.
C_{14}	N-1346	.05 MFD. 400 V.

	N-4185	2 GANG CONDENSER
1	N-4296	LOOP ANTENNA (WOOD)
	N-4253	LOOP ANTENNA (PLASTIC)
2	N-4257	OSCILLATOR COIL
3	N-4270	1 ST I.F. TRANSFORMER
4	N-4259	2 ND I.F. TRANSFORMER
5	N-4256	OUTPUT TRANSFORMER
6	N-4255	3½" P.M. SPEAKER
7	N-4274	B BATTERY CONNECTOR
8	N-4220	A BATTERY SPRING CONTACT (NEGATIVE)
9	N-4222	A BATTERY CONTACT STRIP (POSITIVE)
	N-4215	CHANGEOVER SWITCH



TUBE AND TRIMMER LOCATIONS

5 TUBE - 3 WAY PORTABLE
BATTERY, 110-120 VOLTS AC OR DC. SUPERHETERODYNE.
SINGLE BAND



BATTERIES. The receiver requires three standard flashlight cells for the "A" battery and one 67 volt "B" battery. The three "A" cells will give 25 hours of service and the "B" battery will give 50 hours of service. Use two sets of these "A" cells during the life of one "B" battery for the most economical operation.

The "A" cells are standard flashlight cells which are 2-5/16" long and 1-5/16" in diameter and are usually marked size D. These cells can be purchased from any store that handles flashlights. The cells should not be older than the date limit stamped on the case by the manufacturer if satisfactory life is to be expected from them.

The 67 volt "B" battery is approximately $2\frac{5}{8}$" x $1\frac{5}{16}$" x $3\frac{19}{32}$". This battery can be obtained from most radio stores and will have the numbers indicated below for the various manufacturers.

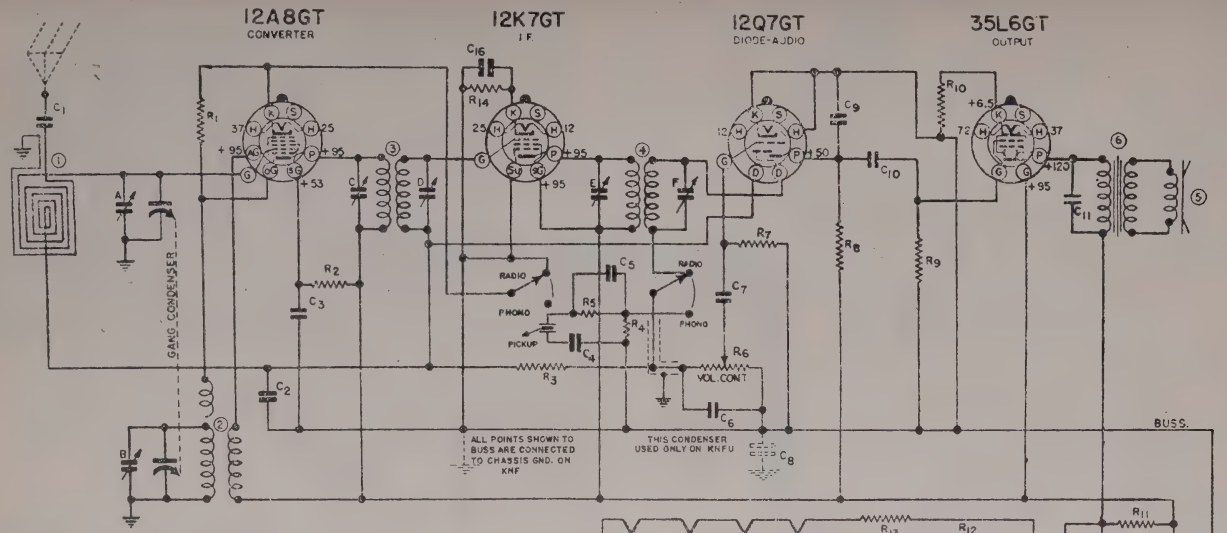
Manufacturer	Designation
Burgess	XX45
Eveready	467
General Dry Battery	W45A
Ray-O-Vac	P4367

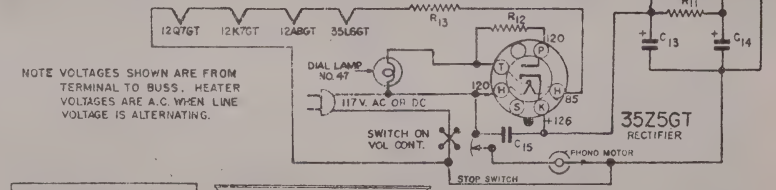
CAUTION. Never leave dead batteries in the receiver or store the receiver with the batteries in it for long periods as the batteries are apt to swell and damage the radio.

BROADCAST BAND ALIGNMENT. Make a loop consisting of two turns of wire approximately one foot in diameter and connect across the generator terminals. Place this loop parallel to the loop antenna and about six inches away from it.

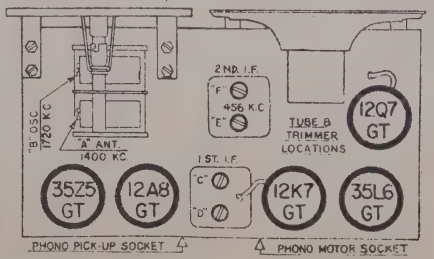
Set the dial and generator at 1650 KC (gang at minimum capacity). Adjust the oscillator trimmer for maximum output. Set the generator at 1400 KC and tune in the signal. Adjust the antenna trimmer for maximum output. Next set the test oscillator at 600 KC and tune in the signal with the dial. Adjust the 600 KC padder for maximum output while slowly rocking the gang at the 600 KC position on the dial. If this padder is badly out of adjustment it is necessary to repeat the 1650 and 1400 KC adjustments.

I. F. ALIGNMENT. Remove the chassis and loop antenna from the cabinet and set them up on the bench so that they occupy exactly the same respective positions on the bench as they did in the cabinet. Care should be taken to have no iron or other metal near the loop. Do not make this set-up on a metal bench. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1R5) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all three I.F. trimmers to peak or maximum reading on the output meter.





NOTE VOLTAGES SHOWN ARE FROM TERMINAL TO BUSS. HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING.



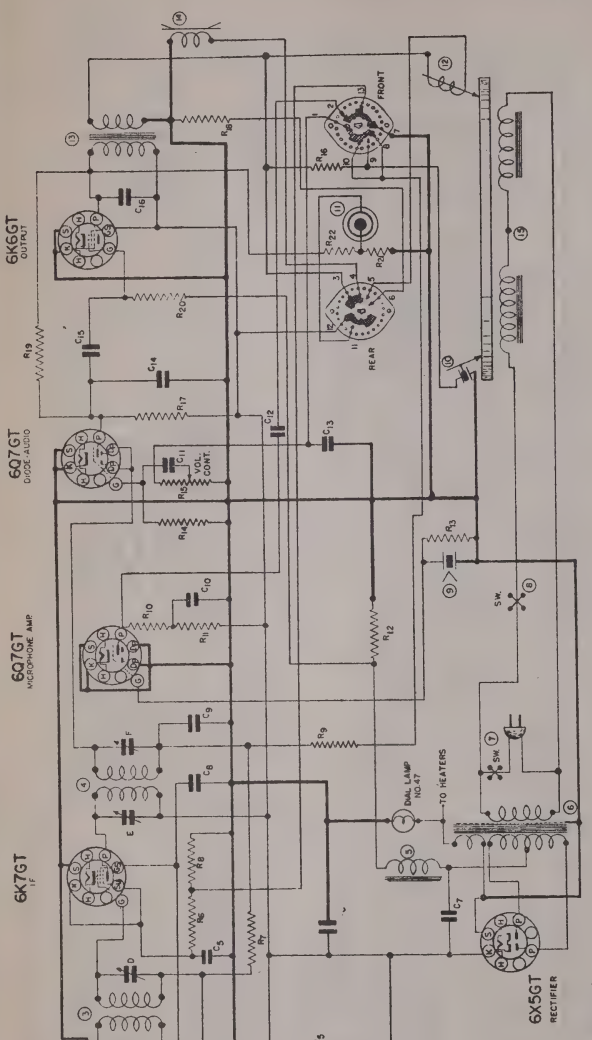
I.F. 456 KC.

5 TUBE AC-DC
SUPERHETERODYNE
SINGLE BAND
PHONO COMBINATION

DIAG NO.	PART NO.	DESCRIPTION	DIAG NO.	PART NO.	DESCRIPTION
R1	N-1260	50,000 OHM .5W. 20%	C10	N-1344	.01 MFD. 400 V.
R2	N-1259	15,000 OHM .5W. 20%	C11	N-1376	.02 MFD. 400 V.
R3	N-1262	1 MEGOHM .5W. 20%			
R4	N-1377	200,000 OHM .5W. 20%	C13	N-3114	40 MFD. 150 V. ELECTRO.
R5	N-1696	400,000 OHM .5W. 20%	C14		25 MFD. 150 V.
R6	N-3045	0.5 MEGOHM VOL. CON.	C15	N-1346	.05 MFD. 400 V.
R7	N-1263	10 MEGOHM .5W. 20%	C16	N-1351	.1 MFD. 200 V.
R8	N-1377	200,000 OHM .5W. 20%			
R9	N-1264	500,000 OHM .5W. 20%	1	N-3041	LOOP ANTENNA COIL
R10	N-1616	250 OHM .5W. 10%	2	N-1452	OSCILLATOR COIL
R11	N-1257	2,000 OHM .5W. 20%	3	N-3043	1ST. I.F. TRANSFORMER
R12	N-1742	25 OHM .5W. 20%	4	N-3044	2ND. I.F. TRANSFORMER
R13	N-1518	80 OHM 2W. 10%	5	N-2624	5" P.M. SPEAKER
R14	N-2487	200 OHM .5W. 20%	6	N-3568	OUTPUT TRANSFORMER
C1	N-1344	.01 MFD. 400 V.			
C2	N-1345	.05 MFD. 200 V.		N-3046	2 GANG CONDENSER
C3	N-1345	.05 MFD. 200 V.			
C4	N-2642	.09 MFD. 200 V.		N-3550	RADIO-PHONO SWITCH
C5	N-1447	.0005 MFD. 400 V.			
C6	N-1374	.0001 MFD. MICA		N-3551	CRYSTAL PICK-UP
C7	N-1344	.01 MFD. 400 V.		N-3143	PHONO MOTOR & TURNTABLE
C8	N-3050	.22 MFD. 200 V.			
C9	N-1447	.0005 MFD. 400 V.			

MODEL B-17136

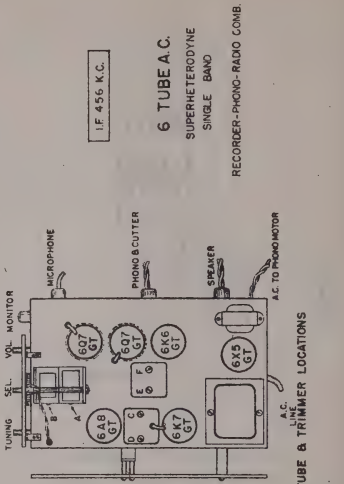
ALLIED RADIO CORP.



DIAG. NO.	PART NO.	DESCRIPTION	DIAG. NO.	PART NO.	DESCRIPTION
R1	N-1260	50,000 OHM, .5W, 20%	C1	N-1345	.05 MFD. 200V.
R2	N-4121	270 OHM, .5W, 10%	C2	N-1345	.05 MFD. 200V.
R3	N-4120	68,000 OHM, .5W, 20%	C3	N-1479	.23 MFD. 200V.
R4	N-4127	47,000 OHM, .5W, 20%	C4	N-1351	.1 MFD. 200V.
R5	N-4066	33,000 OHM, .5W, 20%	C5	N-1479	.25 MFD. 200V.
R6	N-4066	470 OHM, .5W, 10%	C6	N-1351	.1 MFD. 200V.
R7	N-1262	1 MEGOHM, .5W, 20%	C7	N-3440	.15 MFD. 300 V. ELECTRO.
R8	N-1257	2000 OHM, .5W, 20%	C8	N-1351	.1 MFD. 200V.
R9	N-1474	25,000 OHM, .5W, 20%	C9	N-1343	.00025 MFD. MICA
R10	N-1778	150,000 OHM, .5W, 20%	C10	N-1479	.25 MFD. 200 V.
R11	N-1778	150,000 OHM, .5W, 20%	C11	N-1344	.01 MFD. 400 V.
R12	N-3495	325 OHM, 1 W, 10%	C12	N-1344	.01 MFD. 400 V.
R13	N-2189	4MEGOHM, .5W, 20%	C13	N-1342	.0005 MFD. MICA
R14	N-1419	6 MEGOHM, .5W, 20%	C14	N-1374	.0001 MFD. MICA
R15	N-3065	500,000 OHM VOL. CONT.	C15	N-1344	.01 MFD. 400 V.
R16	N-4086	2.2 MEGOHM, .5W, 20%	C16	N-1347	.006 MFD. 600 V.
R17	N-1262	1 MEGOHM, .5W, 20%			
R18	N-4238	200,000 OHM, .5W, 10%			
R19	N-2189	4 MEGOHM, .5W, 20%			
R20	N-1264	500,000 OHM, .5W, 20%			
R21	N-3450	1.5 MEGOHM, .5W, 20%			
R22	N-1778	150,000 OHM, .5W, 20%			

DIAG. NO.	PART NO.	DESCRIPTION
1	N-4115	LOOP ANTENNA COIL
2	N-3055	OSCILLATOR TRANSFORMER
3	N-3436	1ST I.F. TRANSFORMER
4	N-3437	2ND I.F. TRANSFORMER
5		SPEAKER FIELD (1200 OHMS)
6	N-3438	POWER TRANSFORMER
7		SWITCH ON VOLUME CONTROL
8	N-980	PHONO MOTOR SWITCH
9	N-3439	PHONOGRAPH PICKUP (ON N-4237)
10	N-1389	NEON MONITOR (G.E. NE-2)
11		CUTTING HEAD (ON N-4237)
12	N-3436	OUTPUT TRANSFORMER
13	N-3436	5" DYNAMIC SPEAKER
14	N-4237	PHONO MOTOR AND TURNTABLE
15		I.F. 456 K.C.

SELECTOR SWITCH CONTACTS	
POSITION AS VIEWED FROM SHAFT END	CONTACTS CLOSED
PHONO	3-4, 1-2, 7-8
RADIO RECORDING	3-4, 1-2, 7-8
MICRO. RECORDING	4-5, 11-12, 7-8, 1-2
HOME BROADCASTING	3-4, 7-8, 10-12



I.F. 456 K.C.

6 TUBE A.C.
SUPERHETERODYNE
SINGLE BAND
RECORDER-PHONO-RADIO COMB.

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ALLIED RADIO CORP.

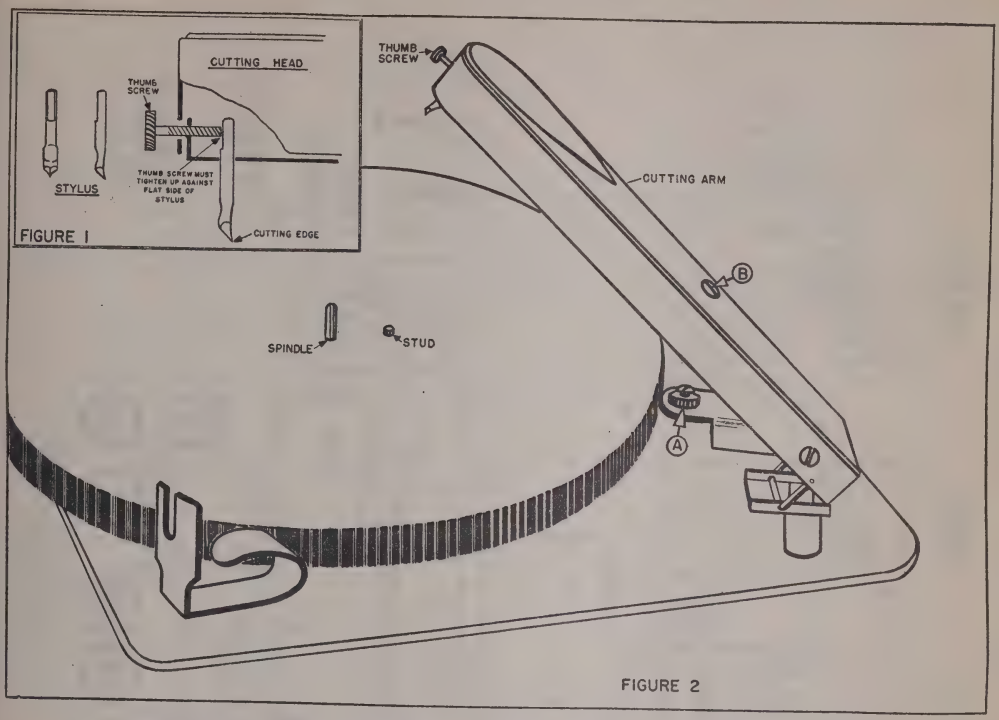


FIGURE 2

GENERAL INFORMATION FOR MAKING RECORDINGS

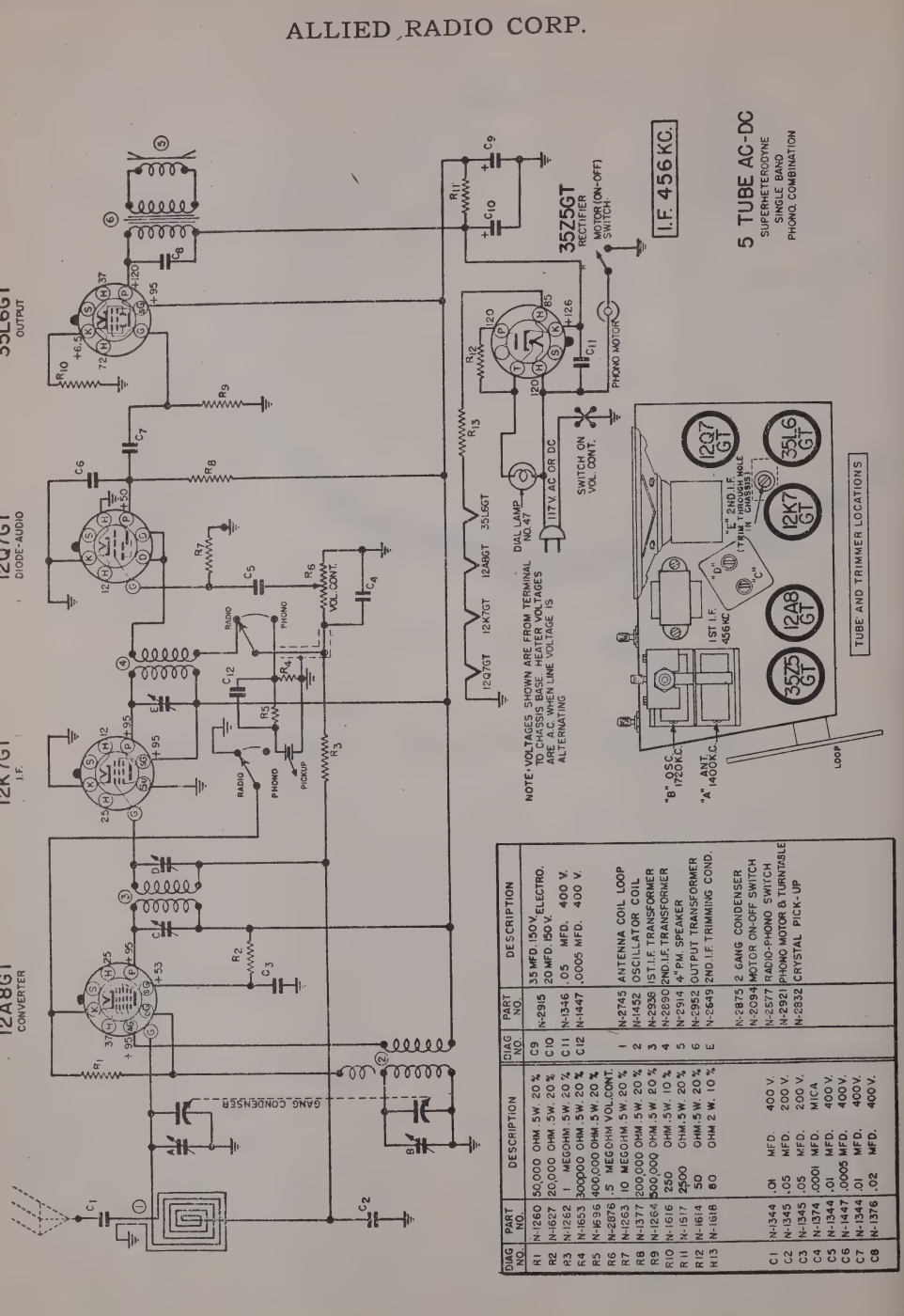
STYLUS. Before cutting a record the stylus should be tightened, as it has a tendency to work loose due to the vibration of the cutting head. The fine point of the stylus should not be touched against any metal or otherwise abused, as it is liable to lose its cutting qualities. Only the best grade of stylus should be used for this purpose, as the success of recording depends to a large extent on the condition of the stylus point. Your dealer will be glad to supply the proper stylus for this recorder as recommended by the manufacturer. Be sure the stylus you buy is the same length as the one now used, otherwise it may be necessary to change the cutting arm or head adjustment as described in the following paragraph. If the stylus is cutting properly, it will throw out a fine shaving towards the center of the record, and will cut quietly, without any scratching noise. The resulting grooves will be shiny, not dull, and the background noise when playing the record back will be very low.

CUTTING ARM AND HEAD ADJUSTMENT. The recorder unit was properly adjusted and records were cut on it at the factory, but there is a possibility that this equipment may be thrown out of adjustment due to shipping, and the following information is given so that you may determine if the head is properly adjusted for satisfactory recording. Place a blank record on the turntable without the motor running. Lower the cutting head to this record and note if the set screw which holds the stylus in place is in the center of the slot on the end of the cutting head. If this condition exists, the cutting head is in the correct position. If not, adjust screw A (figure 2), which is located near the pivot of the cutting arm and becomes exposed when the arm is lifted to a vertical position. To make the correct adjustment, this screw should be raised or lowered as required, and its lock nut tightened. Next, make a short blank recording to determine if the correct spring tension is applied to the cutting head. After this blank cutting is made, examine the record to see if the grooves are of the same width as the space between the grooves. If the groove is found to be too shallow (not as wide as the space), turn screw B (figure 2), which is located on the top of the cutting arm, in a clockwise direction. This will increase the depth of cut. If, on the other hand, you find the groove is too deep (wider than the space), turn this screw to the left and make another test cutting to determine if the correct spring adjustment has been made. The proper adjustment is one in which the groove is exactly as wide as the uncut portion between grooves. Successful recordings cannot be made unless the cutting head is correctly adjusted.

When placing the cutting head on a record, lift the head to a 45-degree position and move the head over the starting position on the record. Lower the head slowly to the record. If the stylus is not over the correct starting position, raise the head to 45-degrees before moving to a new position. Never move the cutting head until it is raised to a 45-degree position.

MODELS B-17137, B-17138

ALLIED RADIO CORP.



DIAG NO	PART NO	DESCRIPTION
R1	N-1260	50,000 OHM .5W. 20 %
R2	N-1627	20,000 OHM .5W. 20 %
R3	N-1262	1 MEGOHM .5W. 20 %
R4	N-1653	300000 OHM .5W. 20 %
R5	N-1696	400,000 OHM .5W. 20 %
R6	N-2876	.5 MEGOHM VOL.CONT.
R7	N-1263	.10 MEGOHM .5W. 20 %
R8	N-1377	200,000 OHM .5W. 20 %
R9	N-1264	500,000 OHM .5W. 20 %
R10	N-1616	250 OHM .5W. 10 %
R11	N-1517	2500 OHM .5W. 20 %
R12	N-1614	50 OHM .5 W. 20 %
R13	N-1618	80 OHM 2 W. 10 %
C1	N-1344	.01 MFD. 400 V.
C2	N-1345	.05 MFD. 200 V.
C3	N-1345	.05 MFD. 200 V.
C4	N-1374	.0001 MFD. MICA
C5	N-1344	.01 MFD. 400 V.
C6	N-1447	.0005 MFD. 400 V.
C7	N-1344	.01 MFD. 400 V.
C8	N-1376	.02 MFD. 400 V.

DIAG NO	PART NO	DESCRIPTION
C9	N-2915	35 MFD. 150 V.
C10		20 MFD. 150 V. ELECTRO.
C11	N-1346	.05 MFD. 400 V.
C12	N-1447	.0005 MFD. 400 V.
1	N-2745	ANTENNA COIL LOOP
2	N-1432	OSCILLATOR COIL
3	N-2936	1ST I.F. TRANSFORMER
4	N-2890	2ND I.F. TRANSFORMER
5	N-2914	4" P.M. SPEAKER
6	N-2962	OUTPUT TRANSFORMER
E	N-2649	2ND I.F. TRIMMING COND.
	N-2875	2 GANG CONDENSER
	N-2694	MOTOR ON-OFF SWITCH
	N-2577	RADIO-PHONO SWITCH
	N-2921	PHONO MOTOR & TURNTABLE
	N-2832	CRYSTAL PICK-UP

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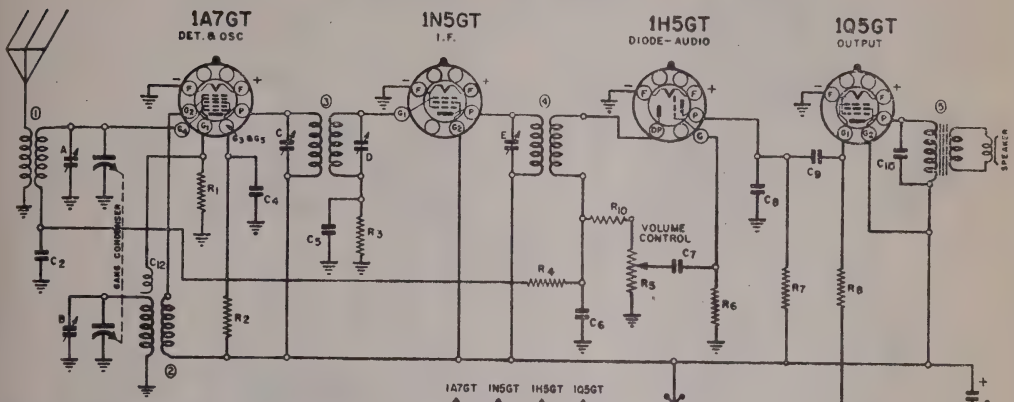
MODELS B-17141, B-17142
MODEL B-17145

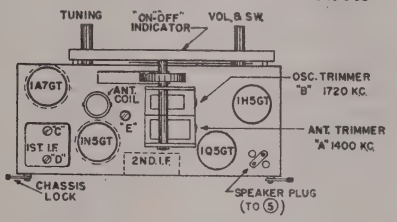
ALLIED RADIO CORP.

MODELS B-17141, B-17142



DIAG NO	PART NO	DESCRIPTION	DIAG NO	PART NO	DESCRIPTION
R1	N-1377	200,000ohm 20%	1	N-3408	ANTENNA COIL
R2	N-3323	60,000 ohm 10%	2	N-3409	OSCILLATOR COIL
R3	N-1263	10MEGOHM 20%	3	N-3410	I.S.T. I.F. TRANS.
R4	N-1378	2 MEGOHM 20%	4	N-2648	2ND. I.F. TRANS.
R5	N-3411	1 MEG. VOL. CONT.	5	N-3406	6" P.M. SPKR. &
R6	N-1378	2 MEGOHM 20%			OUTPUT TRANS.
R7	N-1268	1 MEGOHM 20%	6		BATTERY SW.
R8	N-1378	2 MEGOHM 20%			ON VOL. CONT.
R9	N-2590	420 ohm 10%		N-3407	GANG CONDENSER
R10	N-1260	50,000 ohm 20%			
		(all resistors are .5 watt size.)		N-1525	BATTERY CABLE
C2	N-1345	.05 MFD. 200V.			
C4	N-1345	.05 MFD. 200V.			
C5	N-1376	.02 MFD. 400V.			
C6	N-1342	50 MMFD. 20%.			
C7	N-2712	.004MFD. 400V.			
C8	N-1342	50 MMFD. 20%			
C9	N-1344	.01 MFD. 400V.			
C10	N-2712	.004 MFD. 400V.			
C11	N-1367				
C12	——	CAPACITY IN OSCILLATOR COIL			

TUBE & TRIMMER LOCATIONS

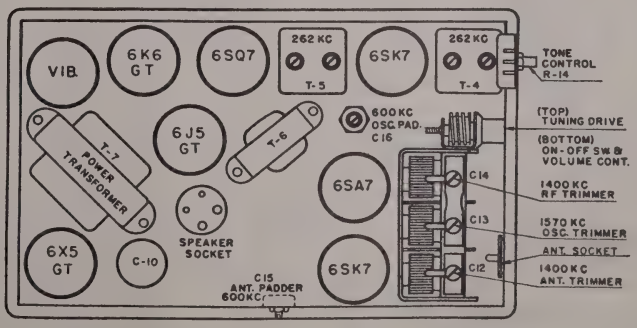


I.F. 456 K.C.

NOTE: TUBE SOCKETS SHOWN FROM WIRING SIDE.

4 TUBE - 1½ VOLT
SUPERHETERODYNE
SINGLE BAND

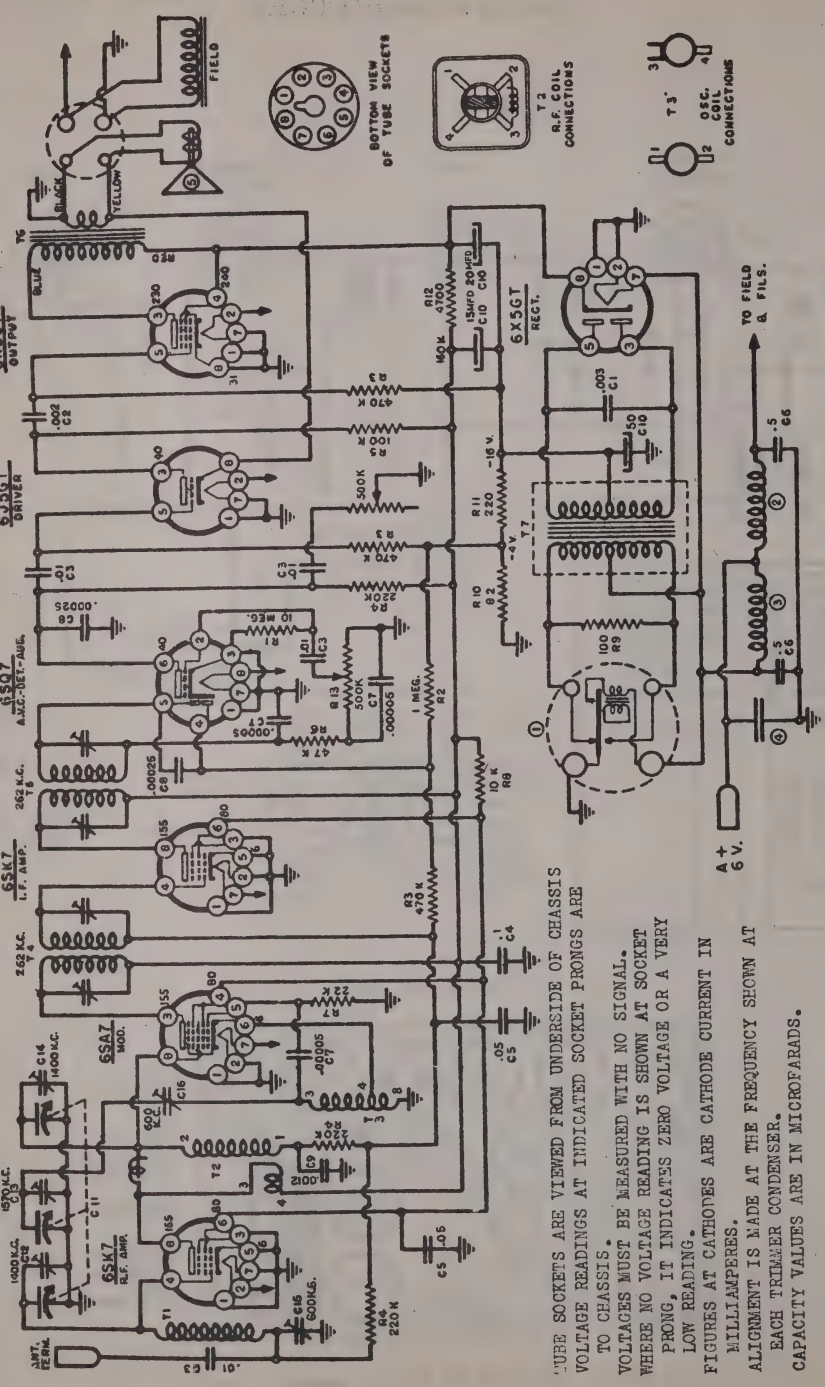
MODEL B-17145



LOCATION OF PARTS ON TOP OF CHASSIS FIG. 6

MODEL B-17145

ALLIED RADIO CORP.



TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
ALIGNMENT IS MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER.
CAPACITY VALUES ARE IN MICROFARADS.

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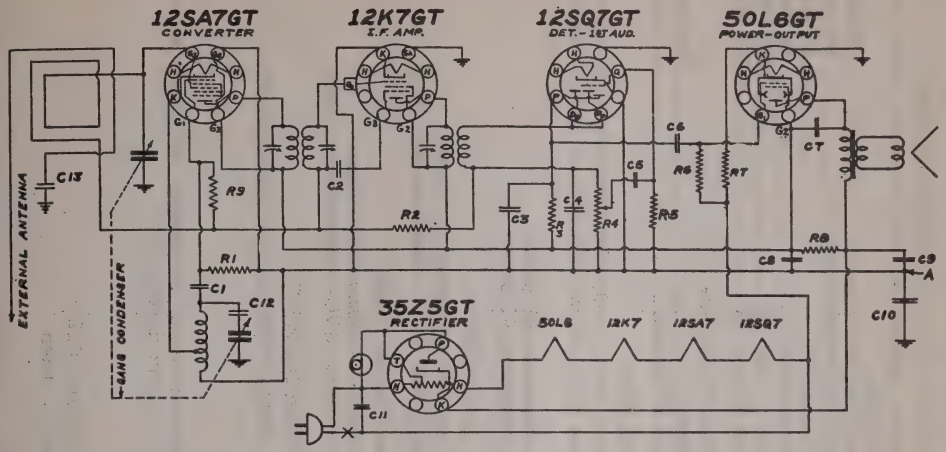
ALLIED RADIO CORP.

MODEL B-17150



RESISTORS

NO	OHMS	WATTS	NO	OHMS	WATTS
R1	20,000	½	R6	500,000	½
R2	2 MEG.	½	R7	150 ± 10%	½
R3	250,000	½	R8	1,000	1
R4	500,000	V.C	R9	15 MEG.	½
R5	5 MEG.	½			

CAPACITORS

NO	MFD.	VOLTS	NO	MFD.	VOLTS
C1	.0001	MICA	C7	.01	400
C2	.02	400	C8	20.0	150
C3	.0025	MICA	C9	30.0	150
C4	.00025	MICA	C10	.25	200
C5	.01	400	C11	.05	400
C6	.002	600	C12	.02	400
			C13	.001	600

I.F. 455 K.C.

TUBES SHOWN BOTTOM VIEW

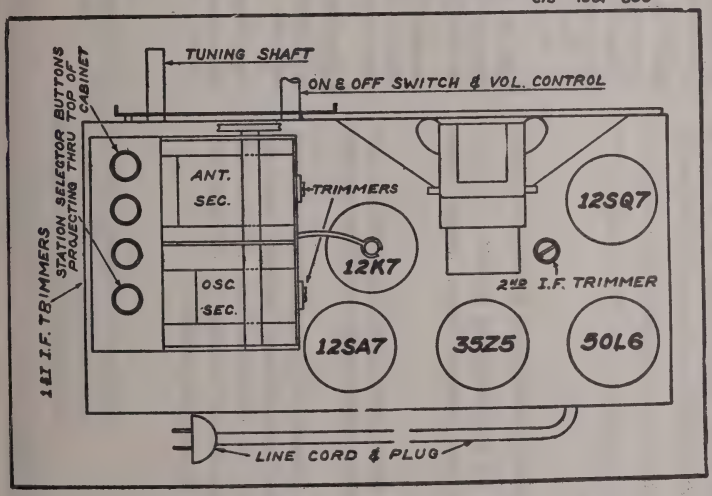


Fig. 1—Top View

BROADCAST BAND ALIGNMENT

Adjust the signal generator to 1730 KC and connect the output to the antenna lead, through a .0001 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the oscillator trimmer to receive this signal. After this has been carefully done, the next step is to set the signal generator to 1400KC and after tuning in the signal adjust the antenna trimmer to peak. This is all that is necessary for the alignment unless the plates of the gang condenser have been bent out of shape. In case of bent plates, set the signal generator and the receiver to 600 KC and bend the plates into the position for maximum output.

ALIGNMENT

If possible, all alignments should be made with the volume control on maximum and the signal generator output as low as possible, to prevent the AVC from operating and giving false readings.

I-F ALIGNMENT. Adjust the signal generator to 455 kc and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. Connect ground of signal generator to chassis ground through a .1 mfd. condenser. On models which include condenser C10, connect ground of signal generator to floating ground or point "A" on schematic thru a .1 mfd. condenser. Align all i-f trimmers to peak or maximum reading on output meter.

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PROCEDURE FOR SETTING UP PUSH BUTTONS

There are four push buttons located on the top by means of which four stations may be selected (See Fig. 1). Make a list of four stations tuned in regularly. Loosen one of the push buttons by turning the push button knob counter clockwise a turn or less and push it in; while holding the button in, tune in a desired station by means of the station selector. Turn the selector very slowly back and forth until the signal is clearest. Now while holding the push button in, tighten it by turning clockwise. Release the push button and turn the station selector to one end of the dial; then check the button by pushing it in and if the station is tuned to the center of the area on the dial covered by the station the adjustment is correct.

Release the push button and loosen another push button and repeat the above procedure, doing this for the remaining buttons.

If it is desired to change a button to a different station simply loosen the push button and re-set.

The dial is now set up for quick tuning and all that is necessary is to push the button of the desired station all the way in and then release.

PILOT LIGHT The intensity of the pilot light will vary slightly with different stations; strong stations will cause it to dim slightly, but when the radio is set at high volume the pilot light will become slightly brighter. If the pilot light burns out, it should be replaced as soon as possible.

SERVICE INFORMATION

Voltages—Line 115 Volts AC—Power Consumption 30 Watts.

Volume Control maximum. Antenna shorted to ground. Meter 1000 ohms per volt, 150 volt scale.

Plate (P) of 12SA7 and 12K7 tubes to point "A"	80 volts
Screen (G2) of 12SA7 and 12K7 tubes to point "A"	82 volts
Plate (P) of 50L6 tube to point "A"	97 volts
Screen (G2) of 50L6 tube to point "A"	82 volts
Cathode (K) of 50L6 tube to point "A"	5.5 volts
Cathode (K) of 35Z5 tube to point "A"	102 volts

Speaker (Part No. P3553) 5" PM Type

D.C. voice coil resistance	3.4 ohms
Voice coil impedance at 400 cycles	3.8 ohms

Oscillator Coil (Part No. P3347)

Looking at the connection end in a clockwise direction starting at the chassis the terminals are No. 1, end of winding; No. 2, start of winding; No. 3, tap.

No. 2 and No. 1—Resistance 4.8 ohms.
No. 3 and No. 1—Resistance 4.2 ohms.

First I.F. Transformer (Part No. P3345)

Primary—Blue, plate; red, B+—Resistance 32.1 ohms.
Secondary—White, grid; black, AVC—Resistance 33.2 ohms.

Second I.F. Transformer (Part No. P3364)

Primary—Blue, plate; red B+—Resistance 24.2 ohms.
Secondary—White, grid; black, AVC—Resistance 24.1 ohms.

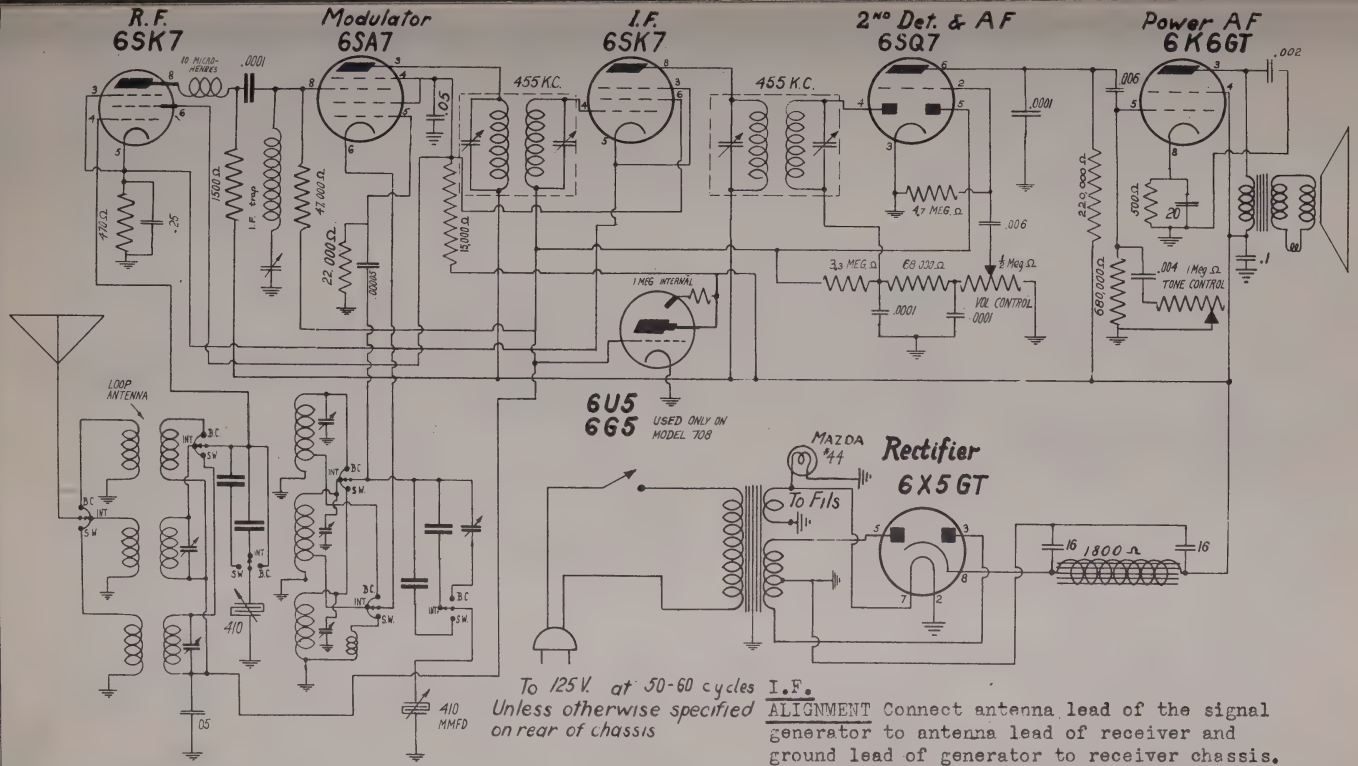
Electrolytic Condenser (Part No. P3355)

Red, 30 mfd., 150 volt; green, 20 mfd., 150 volt; black, negative for both sections.

Loop Antenna

Since the loop antenna acts also as the antenna coil the set will not operate with the loop antenna disconnected.

In some of these receivers the condensers C10 and C12 are omitted. The point "A" on the schematic is then connected to the chassis.



To 125 V. at 50-60 cycles
Unless otherwise specified
on rear of chassis

SHORT WAVE
ALIGNMENT For 4.7-10 mc. Turn wave band switch knob to this band. Adjust the generator and receiver to 10 mc. and peak the trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated padder. For 11.5 - 24 mc. Turn wave band switch knob to this band. Adjust the generator and receiver to 22 mc. Peak trimmers for maximum signal. The low frequency is automatically adjusted by a fixed calibrated padder.

I.F.
ALIGNMENT Connect antenna lead of the signal generator to antenna lead of receiver and ground lead of generator to receiver chassis. Short circuit front section of variable condenser. Adjust generator to 455 kc. and peak I.F. trimmers for maximum signal.

BROADCAST
ALIGNMENT Remove short from variable condenser. Have the wave band switch on broadcast position. Adjust the generator and receiver to 1500 kc. Peak trimmers for maximum signal. Adjust generator and receiver to 600 kc and peak the broadcast padder for maximum signal. The variable condenser should be "rocked" during this operation.

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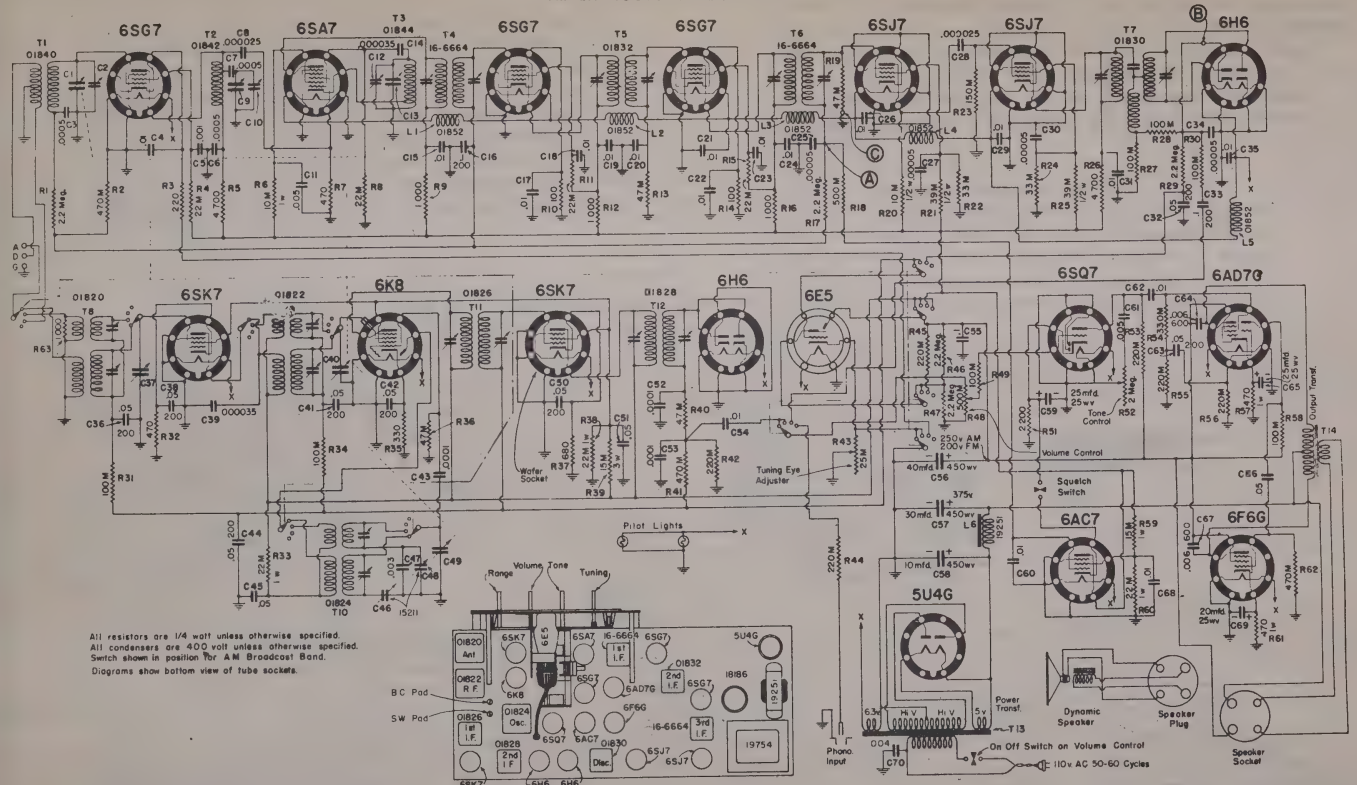
AM 540 To 1600 kc–5.9 To 18.5 mc–FM 41 To 51 mc
AM I.F. = 456 kc - FM I.F. = 4.3 mc



TUNING INDICATOR ADJUSTMENT

A control is provided on the back of the chassis for this adjustment. It is the short shaft with the screw-driver slot. To make the necessary adjustment, first turn the band switch to the F-M position. Remove the 6SJ7 second-limiter tube from its socket and turn the control shaft on the rear of the chassis until the eye is just closed, but is not overlapped. The receiver should, of course, be turned on for this adjustment. This completes the adjustment and the 6SJ7 tube may be replaced in its socket. This adjustment once properly set will retain its correct setting for long periods of time, but should be checked periodically to insure the best operation of the eye.

ANTENNA SYSTEM

This receiver is designed to use the same antenna on all three bands, and may be used with either a dipole (doublet) antenna or with a regular broadcast antenna having a single lead-in wire.

The dipole antenna lead-in (consisting of two wires) should be connected to the terminals marked "A" and "D" on the terminal strip on the back of the chassis.

If a regular broadcast antenna with a single lead-in wire is used, this wire should be connected to the terminal marked "A"; The terminal marked "D" is then left unconnected.

A satisfactory dipole antenna can be made as follows: Take 12 feet of No. 12 or No. 14 bare copper wire, either solid or stranded, cut in the middle and connect to a low-loss twisted lead-in. This lead-in should be 65 to 75 feet long for proper impedance matching.

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ALIGNMENT PROCEDURE

The minimum of equipment required for correctly aligning this receiver is listed below.

A modulated service oscillator or signal generator capable of generating the frequencies 456 KC, 600 KC, 1400 KC, 6.0 MC, 16.0 MC and 46.0 MC.

An output meter.

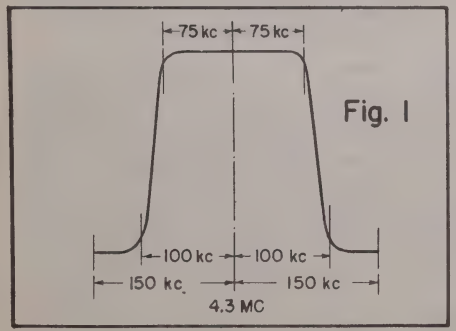
A 0-200 or a 0-100 microampere meter.

An oscilloscope with vertical and horizontal amplifiers.

A wide-band frequency-modulated generator or "wobbulator" covering the intermediate frequency of 4.3 MC and with either 400-cycle or 60-cycle modulation. It must be capable of producing a deviation frequency of 150 KC. (Total frequency swing of 300 KC.)

While this instruction sheet describes the use of a generator for F-M alignment which has 400-cycle modulation and which has provision for bringing out the 400-cycle voltage for application to the horizontal plates of the oscilloscope, it is also possible to use a generator with 60-cycle modulation, and to use the 60-cycle sweep which is built into the oscilloscope, instead of obtaining the synchronizing voltage from the generator. If the service man has been using such a generator for A-M visual alignment he will be familiar with his instrument and will be able to adapt it to this alignment procedure.

Although it is possible to align this receiver wtih a generator or wobbulator not having quite as great a total frequency swing as 300 KC, it will be difficult to get satisfactory results. Note that the I-F response curve in Figure 1 is flat over a region about 150 KC wide. An unsymmetrical response curve in an F-M receiver quite seriously affects its performance at low signal levels. It is therefore essential to have proper equipment for alignment in order to get the best results.



A-M ALIGNMENT

The alignment of the A-M portion of this receiver is conventional and should be carried out as follows:

Connect the output meter to the receiver by any of the usual methods.

Connect the A-M signal generator between the chassis and the grid of the 6K8 tube, using a .0005-mfd. to .25-mfd. condenser between the grid and the high side of the generator output. Do not remove the grid clip for this operation. The range switch should be turned to the Broadcast band and the dial pointer set near 600 KC. Tune the signal generator to 456 KC and proceed to align the four I-F trimmers for maximum output. On this and on all following adjustments turn the audio control on full and use as weak a signal from the generator as will give a satisfactory indication on the output meter.

The generator should now be connected to the antenna-and-ground terminal strip. Leave "D" unconnected. Use a proper dummy antenna in series with the high side of the generator output (200-mmf. for Broadcast; 400-ohms for Short-Wave).

SHORT-WAVE BAND

Turn the range switch to the Short-Wave position and set the tuning dial and the signal generator to 16.0 MC. Adjust the oscillator trimmer (top trimmer in oscillator coil) to maximum response. If two responses of nearly equal intensity are found, adjust for the one with the trimmer farthest open. Now adjust the top trimmers in the Antenna and R-F coils for maximum response. Since, at this frequency, the R-F tuning slightly affects the oscillator frequency, it will be necessary to rock the tuning condenser slightly while adjusting the R-F trimmer in order to keep the signal tuned in.

Set the signal generator to 6.0 MC and tune in this signal with the receiver dial. Now, while rocking the tuning condenser back and forth, adjust the S-W oscillator padding condenser. (The rear section of the dual padder located in the top of the chassis over the range switch) for maximum output. This adjustment is not critical and the tuning of the S-W padder will be found to be quite broad.

BROADCAST BAND

Turn the range switch to the Broadcast position and substitute the 200-mmf. dummy antenna for the 400 ohms. Set the dial and the generator to 1400 KC and adjust the oscillator trimmer (bottom trimmer on oscillator coil) to maximum response. Next adjust the bottom trimmers of the Antenna and R-F coils for maximum response.

Now set the generator to 600 KC and tune in the signal with the dial. Rocking the gang condenser slightly, adjust the oscillator padder (front section of the dual padder) for maximum response. This adjustment will be much sharper than the padding adjustment on the short-wave band.

This completes the alignment of the A.M. portion of the receiver.

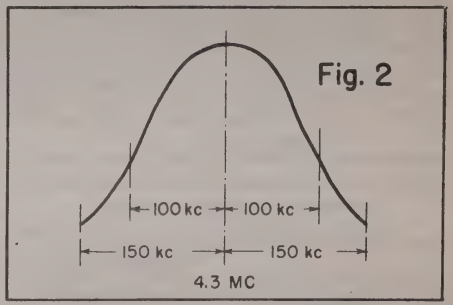
F-M ALIGNMENT

The F-M alignment is made in three major steps: namely, I-F alignment, discriminator alignment and R-F alignment.

For the first operation, I-F alignment, connect the output of the frequency-modulated generator between the grid of the 6SG7 2nd IF stage and chassis, using an .05-mfd. condenser in series with the high side of the generator output and connecting this condenser to the 6SG7 grid. Leave the grid lead of the 6SG7 tube connected. Now connect the synchronizing voltage output from the generator to the input of the horizontal amplifier of the oscilloscope. Note: The ground lead from the generator should always be connected to the chassis near the tube to whose grid the generator is connected to avoid spurious regeneration phenomena which change the shape of the IF curve.

Now connect the input to the oscilloscope vertical amplifier between chassis and the low potential end of the last I-F transformer (point "A" in circuit diagram) using a 100,000-ohm resistor in series with the high side. This resistor should be located at the receiver end of the connecting wires and should be connected with a short lead to the Point "A".

Having made the set-up, turn on the oscilloscope and the frequency-modulated generator. Turn down the receiver volume control. Set the generator to 4.3 MC and the deviation frequency (if calibrated on the generator) to 150 KC. Turn the vertical gain control of the oscilloscope well up and the horizontal gain control just high enough to give almost full-screen deflection of the horizontal pattern. Using just enough output from the generator to give good deflection on the screen adjust the trimmers of the last I-F transformer for the greatest gain and to give a pattern that is centered in the screen and that is symmetrical. This pattern should be similar to the one shown in Figure 2



Now without changing the generator frequency, remove the generator connection from the grid of the 6SG7 2nd I.F. amplifier and place it on the grid of the 6SG7 1st I.F. amplifier, using the .05-mfd. condenser as before, and changing the position of the ground lead as described above. Again use only enough output from the generator to give good vertical deflecton on the screen, and adjust the trimmers of the second I-F transformer in the same manner as before. The curve shape should remain practically the same as it was before.

Now remove the generator connections (ground as well as "hot") from the 6SG7 first I-F amplifier and place them on the signal grid and ground of the 6SA7, again using the .05-mfd. condenser. Proceed as before, turning down the output from the generator until there is just enough for good vertical deflection on the oscilloscope screen. Adjust the trimmers of the first I-F transformer for the greatest gain and to give a pattern similar to the one shown in Figure 2.

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FM ALIGNMENT - continued

In all of the foregoing adjustments note that the oscilloscope vertical amplifier gain control has been turned well toward maximum gain, and that a low input from the generator has been used. The reason for this is that, as higher signal-input levels are used, the response curve of the I-F amplifier stages will change shape. If the symmetry of the response curve is kept good at low input levels, then any dissymmetry occurring at high input levels will be unimportant, since at high input levels the limiter tube will level out the response before the signal reaches the discriminator.

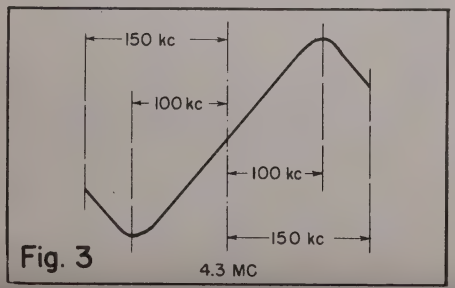
Should the I-F circuits for any reason be badly misaligned, the first 6SG7 I-F stage may oscillate when the input from the generator is placed on the grid of the 6SG7 second I-F tube, making it difficult to get a readable pattern on the oscilloscope screen. Should this condition occur, the remedy is to remove the 6SG7 first I-F tube from its socket until the last I-F stage has been aligned.

This completes the alignment of the I-F stages and the alignment of the discriminator comes next. Before proceeding with the discriminator alignment, however, it will be necessary to balance the tuning-eye circuit. With the 6SJ7 second-limiter tube removed from its socket, adjust the eye balance control, which is the short shaft with the screw driver slot on the back of the chassis, until the eye just closes but does not overlap. Now replace the 6SJ7 second-limiter tube.

DISCRIMINATOR ALIGNMENT

Leaving the set up as it was when the I-F alignment was completed, adjust the generator frequency until the I-F response pattern on the oscilloscope screen is centered and is symmetrical.

Now remove the connection to the low-potential side of the 1st I-F coil, which is the lead containing the 100,-000-ohm resistor, and move this connection to the 6H6 discriminator cathode marked "B" in the circuit diagram. The pattern on the oscilloscope screen will go off scale and the input from the generator will have to be decreased. If the generator leakage is bad and its output cannot be turned down to a sufficiently low level, the oscilloscope vertical amplifier gain control may be turned down. With the set up made as described and with the generator deviation frequency still set at 150 KC, adjust the trimmer on th primary side of the discriminator coil (The red Trimme Screw) for greatest vertical deflection on the oscilloscope screen.



Next adjust the trimmer on the secondary side of this coil until a pattern similar to the one shown in Figure 3 is obtained. This adjustment is quite critical and should be made so that the pattern is as near symmetrical as possible. If the portion of the pattern in Figure 3 which appears straight, is not quite straight on the oscilloscope screen it may be made so by a slight readjustment of the trimmer on the primary side of the coil. Before leaving the adjustment of the discriminator coil a further refinement in the adjustment of the secondary trimmer should be made as follows: Decrease the frequency deviation of the generator from 150 KC to about 100 KC, or until the pattern on the oscilloscope screen just takes in the straight portion of the curve. Now, watching the action of the tuning eye, make a very slight readjustment of the secondary trimmer of the discriminator coil until the eye just closes but does not overlap. This completes two steps in the I-F alignment and the connections to the frequency-modulated generator and the oscilloscope may now be removed.

ANTENNA, R-F AND OSCILLATOR

In order to align the R-F Antenna and Oscillator circuits, an amplitude-modulated signal generator covering the range of 42-50 MC and a 0-200 microampere meter may be used. The signal generator need not be modulated.

Connect the meter in series with the ground end of the grid resistor of the 6SJ7 first-limiter tube, with the positive side of the meter to ground. This point is marked "C" in the circuit diagram. Now apply the output of the signal generator to the antenna and ground posts of the terminal strip on the back of the chassis which are marked "A" and "G". Leave "D" unconnected. Set the receiver dial and the signal generator to 46 MC and adjust the oscillator trimmer, which is the air trimmer mounted on top of the middle section of the tuning condenser, for maximum deflection on the 0-200 microampere meter. If two positions of the oscillator trimmer give almost equal deflection on the meter, select the point with the trimmer farthest in mesh, since the oscillator on this band operates below the signal frequency. Keep the generator output adjusted to such a value that about one quarter of full scale deflection is obtained on the meter. Next adjust the R-F trimmer, mounted on the front section of the tuning condenser, for maximum deflection of the meter; then perform the same operation for the antenna trimmer, which is mounted on the back section of the tuning condenser. The adjustment of the R-F trimmer affects the oscillator frequency slightly and the tuning condenser should be rocked back and forth when making this adjustment in order to keep the oscillator tuned to the signal frequency. If two points of response are found on the R-F or antenna trimmers, the point which requires the least amount of capacity in these trimmers should be selected.

As a final check of antenna, R-F and oscillator adjustment, signals from the generator should be tuned in at various points on the band to see that the sensitivity is equal over the band

SERVICE DATA FOR PROFESSIONAL SERVICE MEN

Power Supply: 110-125 Volts, 50-60 Cycles.

Intermediate Frequency: A-M, 456 KC. F-M, 4.3 MC.

The socket voltages are given in the voltage chart at the right. Variations of line voltage, variations, between tubes, and tolerances allowed on components will cause these voltages to vary somewhat. The chart is given only as a guide, and should be recognized as such.

In replacing parts or in making adjustments, care should be exercised to see that all connections are made to the same points from which they were removed, and that components and leads occupy the same original positions. Lead lengths, and ground return paths are quite critical in some parts of this receiver, and trouble will be avoided by adhering strictly to the original layout.

NOTES ON VOLTAGE CHART

* These voltages are AC and should not be measured with a DC Voltmeter.

a These points show a slight voltage indication due to the thermal noise of the receiver unless one of the limiter tubes is removed from its socket.

b This voltage must be measured with the Interstation Noise Silencer Switch in the "on" position.

N A varying negative voltage of 15 to 20 volts may be measured at this point, depending upon the setting of the tuning condenser.

All voltages indicated above are measured with a 1000-ohms-per-volt meter with a line voltage of 117 volts.

NORMAL OPERATING VOLTAGES

On Tube Socket Terminals Designated by RMA Number

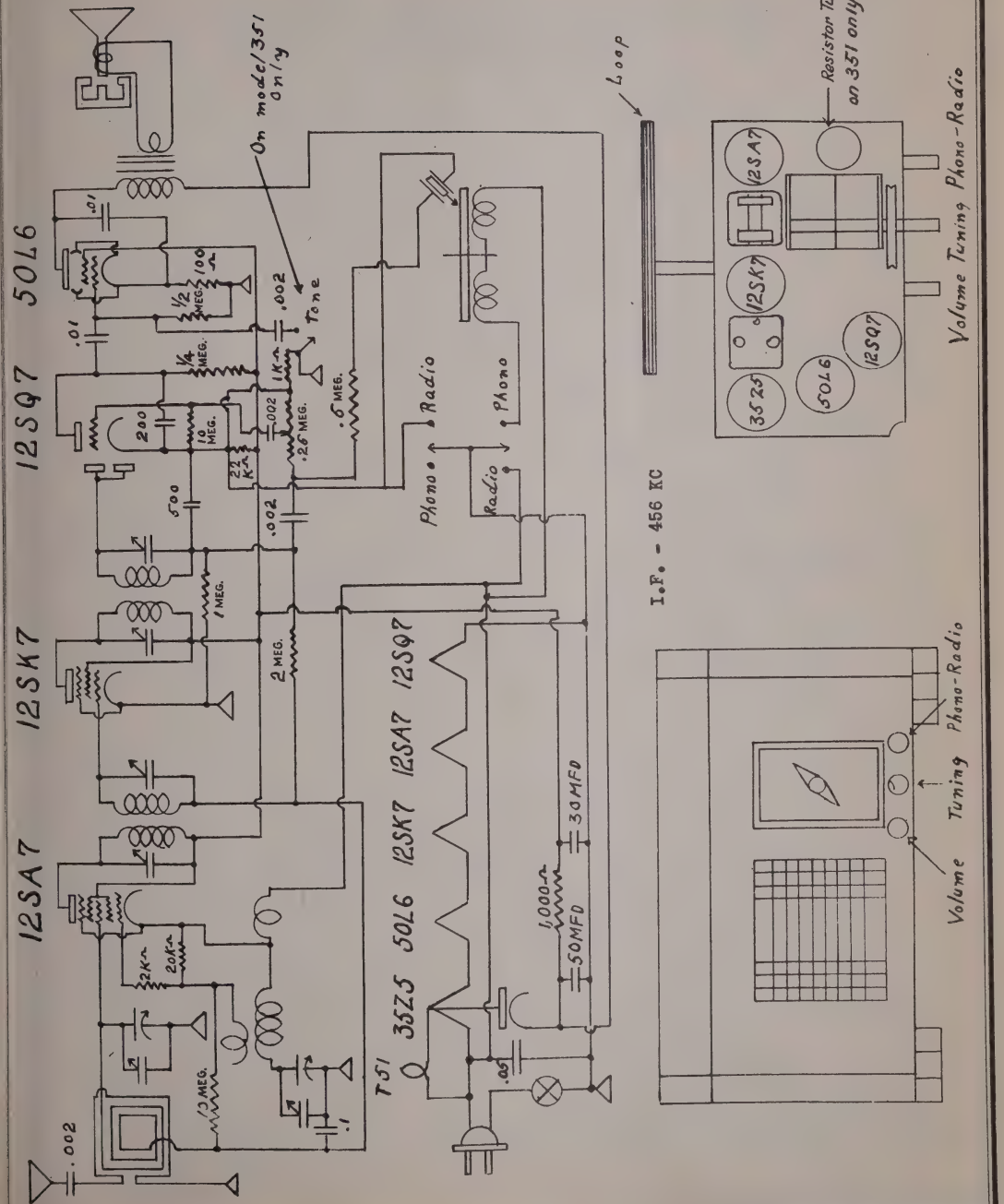
Voltages shown below are measured with Range Switch turned to F-M Position.

Tube	Use	1	2	3	4	5	6	7	8
6SG7	FM RF Amp.	0	0	2.1	0	2.1	120	6.3*	145
6SA7	FM Converter	0	6.3*	185	95	0	0	0	0
6SG7	FM 1st I-F	0	0	1.3	0	1.3	105	6.3*	175
6SG7	FM 2nd I-F	0	0	1.2	0	1.2	105	6.3*	175
6SJ7	FM 1st Lim.	0	6.3*	0	0	0	65	0	135
6SJ7	FM 2nd Lim.	0	6.3*	0	0	0	65	0	165
6H6	FM Discrim.	0	6.3*	0a	0a	0a	0	0	0
6AC7	Silencer	0	0	0	0	3b	110	6.3*	185

Voltages shown below are measured with Range Switch turned to Broadcast Position.

Tube	Use	1	2	3	4	5	6	7	8
6SK7	AM RF Ampl.	0	6.3*	0	0	3.5	90	0	250
6K8	AM Converter	0	0	250	90	N	150	6.3*	2.7
6SK7	AM I-F Ampl.	0	0	0	0	3.5	90	6.3*	2.7
6H6	AM Detector	0	0	0	0	0	0	6.3*	0
6SQ7	Audio Ampl.	0	0	1.0	0	0	90	6.3*	0
6AD7G	Audio Ampl.	0	6.3*	350	250	0	85	0	16.5
6F6G	Power Ampl.	0	0	350	250	0	0	6.3*	16.5
5U4G	Rectifier	0	400	0	380*	0	380*	0	400
6E5	Tuning Ind.	–	–	–	–	–	–	–	–

AUTOMATIC RADIO & TELEV. CO., INC.



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MODEL 4B16, Series A
MODEL 6A27, Series A

BELMONT RADIO CORP.

TECHNICAL DATA MODEL 4B16, SERIES A

Power Consumption - - - A—250 Amp. B .014 Amps.
Power Output - - - - - - 160 Milliwatts Undistorted
Sensitivity for 50 Milliwatt Output: 45 Microvolts Average
Selectivity - 48 KC at 1000 Times Signal at 1000 KC
Tuning Frequency Range - - - - - 540 to 1700 KC

ALIGNMENT PROCEDURE

The following equipment is required for aligning.

- Dummy antenna, 1 mfd. and 200 mmf.
- Volume control—Maximum all adjustments.
- Connect ground lead of radio chassis to ground post of signal generator.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
455 Kc. I. F.	455 Kc.	.1 MFD.	Connect to Grid of 1A7	Iron Cores All the way out	Two trimmers on top of output I. F. can	Output I. F.	maximum output
	455 Kc.	.1 MFD.	Connect to Grid of 1A7	Iron Cores All the way out	Two trimmers on top of input I. F. can	Input I. F.	maximum output
BROAD-CAST BAND	1700 Kc.	.1 MFD.	Connect to Grid of 1A7	Iron Cores All the way out	Trimmer (C7) (See chassis view)	Oscillator	maximum output
	1700 Kc.	200 MMF.	Connect to Antenna Clip	Iron Cores All the way out	Trimmer (C4) (See chassis view)	Antenna	maximum output
	1400 Kc.	200 MMF.	Connect to Antenna Clip	Turn Dial to 1400 Kc.	Adjust position of antenna coil (See coil assembly view)	Antenna Coil Adjustment	maximum output (See Note "A")
	1700 Kc.	200 MMF.	Connect to Antenna Clip	Turn Dial to 1700 Kc.	Adjust trimmer (C4) (See chassis view)	Antenna	Check for tracking (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

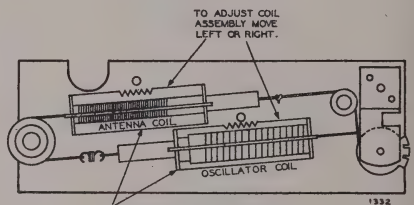
NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C4) adjustment again at 1700 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1700 Kc.

MODEL 4B16, SERIES A

TECHNICAL DATA—Model No. 6A27

SERIES A

Power Consumption Radio Only - - - - - 70 Watts
Motor Only - - - - - 20 Watts
Power Output - - - - - - - - 2.1 Watts Undistorted
Sensitivity for 500 Milliwatt Output: 15 Microvolts Average
Selectivity - 51 KC Broad at 1000 Times Signal at 1000 KC
Tuning Frequency Range Broadcast Band - 530 to 1600 KC
Shortwave Band - 5.46 to 18.3 MC
Intermediate Frequency - - - - - - - - - 455 KC
Speaker - - - - - - - - - 10 in. Electro Dynamic



NOTE: THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE MOVE COIL ASSEMBLY VERY SLOWLY

COIL ASSEMBLY VIEW

ALIGNMENT PROCEDURE MODEL 6A27, SERIES A

- Volume control—Maximum all adjustments.
- Connect radio ground to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1—mf., 200 mmf., 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Trimmers on top (See Top View)	Input and Output I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C4	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C1	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C7	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROAD-CAST BAND (See Note A)	1600 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C5	Broadcast oscillator	Adjust to maximum output
	530 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full closed	Trimmer C6	Broadcast oscillator series pad	Adjust to maximum output
LOOP ALIGN-MENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C2 (See Top View)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer C6 (See Top View)	Broadcast oscillator series pad	Adjust to maximum output

NOTE "A"—The signal generator is connected to the "ANT." and "GND" leads when aligning the Short Wave Band and to the grid of the 6SA7 tube and ground terminal when setting the Broadcast Band oscillator end frequencies, (1600 and 530 K. C.).

The loop antenna should be connected to the radio when making these adjustments.

NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected. The signal generator is connected to the "ANT." and "GND." leads.

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

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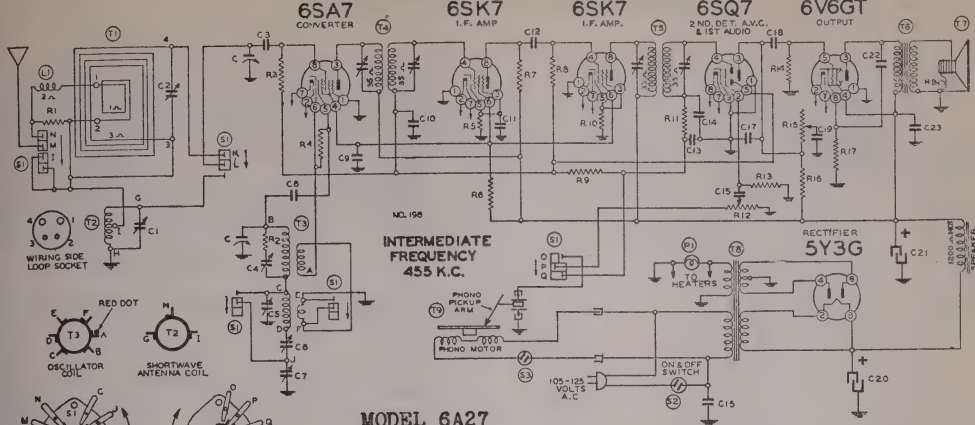
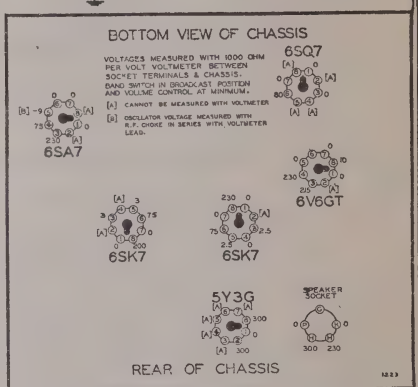
MODEL 6A27, Series A



MODEL 6A27 Series A

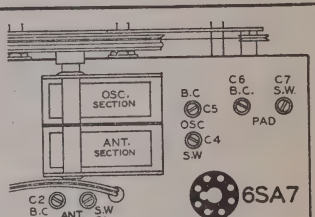

BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS.
BAND SWITCH IN BROADCAST POSITION AND VOLUME CONTROL AT MINIMUM.
[A] CANNOT BE MEASURED WITH VOLTMETER
[B] OSCILLATOR VOLTAGE MEASURED WITH R.F. CHOKE IN SERIES WITH VOLTMETER LEAD.
6SA7
6SQ7
6V6GT
6SK7
6SK7
5Y3G
SPEAKER SOCKET
REAR OF CHASSIS

Code No.	Part No.	Description
		RESISTORS
R1	13071	4000 ohm—½ w.
R2	130128	20 ohm—½ w.
R3	13019	1 megohm—½ w.
R4	130236	30M ohm—½ w.
R5	130283	750 ohm—½ w.
R6	130324	18M ohm—1 watt
R7	130218	5M ohm—½ w.
R8	13020	100M ohm—½ w.
R9	130170	3 megohm—½ w.
R10	130222	350 ohm—½ w.
R11	13012	50M ohm—½ w.
R12	101232	1 megohm volume control
R13	130223	10 megohm—½ w.
R14	1303	500M ohm—½ w.
R15	101231	1 megohm tone control
R16	130172	250M ohm—½ w.
R17	130323	270 ohm—1 watt

CONDENSERS

C	102137	Two gang variable condenser
C1	124149	S. W. Antenna trimmer
C2	124149	B. C. Antenna trimmer
C3	1292	.0005 mica
C4	124142	S. W. Oscillator trimmer
C5	124142	B. C. Oscillator trimmer
C6	124146	B. C. Padding Condenser
C7	124146	S. W. Padding Condenser
C8	12960	150 mmfd. mica
C9	10013	.05 x 400 v.
C10	10022	.05 x 200 v.
C11	1009	.05 x 200 v.
C12	1292	.0005 mica
C13	129161	.0001 mica
C14	129161	.0001 mica
C15	10061	.02 x 600 v.
C16	10025	.002 x 600 v.
C17	12912	.00025 mica
C18	10026	.02 x 400 v.
C19	10071	.004 x 600 v.
C20	119115	16 mfd. x 400 w. v. lytic
C21	119115	16 mfd. x 400 w. v. lytic
C22	10019	.006 x 600 v.
C23	1001	.1 x 400 v.

C1 and C2 are in same unit C4 and C5 in same unit
C6 and C7 are in same unit C13 and C14 in same unit
C20 and C21 are in same unit



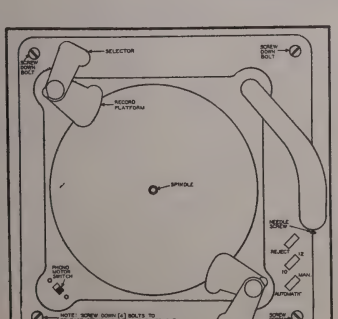
TRIMMER VIEW

PARTS

T1	111208	Loop antenna assembly
T2	111184	S. W. Antenna Coil
T3	110154	B. C. and S. W. Oscillator Coil
T4	108169E	Input I. F. Coil—455 kc.
T5	108106U	Output I.F. Coil—455 kc.
T6	105118	Output Transformer
T7	114222	10" Electro Dynamic Speaker
T8	104225B and 104238B	60 cycle power transformer 25 cycle power transformer
T9	104306	60 cycle Record Changer and Phono Assembly
S1	125132	Phono-band switch
S2		Switch on volume control
S3		Switch on record changer
L1	12312	R. F. Choke coil
P1	10794	Pilot light bulb No. T-44

MODEL 6A27 Series A; MODEL 671, SERIES C

Automatic Record Changer--Operating Instructions



Setting for Record Size

This mechanism plays up to twelve 10" or ten 12" records at one set-up. All records must be of the same size for each set-up. To set for record size it is necessary to move the 10"-12" button so that it will indicate correct size record and the auto-manual button to indicate automatic

Loading

See that both lower shelf plates are turned toward center of turntable. If they are not, grasp the post just below the shelf plate and rotate post until it falls into proper position, with both shelf plates correctly turned toward center of turntable. Place the stack of records over center pin so they will rest on the two shelf plates.

To Turn The Phonograph On

Push the motor switch to "on" position. Motor will then start.

Push the button marked "Reject." This will release the first record and start the record changing mechanism.

Rejecting A Record

Press the button marked "Reject." This can be done any time after the needle has come in contact with the record. The mechanism will immediately start the change cycle.

Removing Played Records

First switch off motor. Then take hold of both posts, just below the shelf plates, and turn them out of the way. Place pick-up in position on arm rest. Lift the played records from the turntable. Taking hold of posts as before move plates until post again falls into playing position. The changer may then be loaded with a new stack of records; see directions above for loading.

Manual Operation and Tone Arm

The tone arm should not be handled while in automatic position. If it is desired to remove the tone arm from a record, the Automatic and Manual button should be placed in the Manual position.

If Changer is Left Running

No damage will be done if you forget to turn off Changer after it has played its entire load of records. It will simply repeat the last record until stopped or reloaded.

Oiling

Normally, this mechanism should require no additional lubrication. However, a drop of any good machine oil on all friction surfaces, and to the oil wicks on both ends of the motor shaft, may be applied about once a year, or more often if used extensively.

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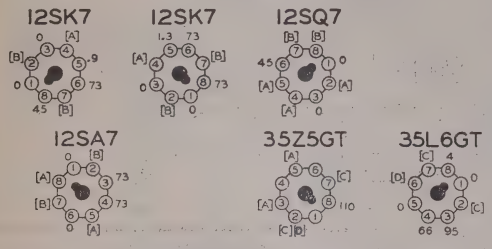
MODELS 6D18, 6D19
Series A

BELMONT RADIO CORP.

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B— WITH A LINE VOLTAGE OF 117 VOLTS.

[A] CANNOT BE READ WITH VOLTMETER.
[B] 12 VOLTS A.C. BETWEEN PINS 5 & 8.
[C] 32 VOLTS A.C. BETWEEN PINS 2 & 7.
[D] 117 VOLTS A.C. BETWEEN PINS D & D.



To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

It is important during alignment that the same distance between the loop antenna and the chassis be maintained as when the chassis is installed in the cabinet.

Slight adjustments to the oscillator and antenna circuits can be made without removing the chassis from the cabinet through two holes which are provided on the bottom of the cabinet

The two adjustments on the variable gang condenser can be reached with a long insulated type screw driver through these two holes.

ALIGNMENT PROCEDURE

IMPORTANT:—See alignment instructions

- Volume control—Maximum all adjustments.
- Connect B— of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver
- Dummy antennas—.1 Mfd

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Four Trimmers on Top (See Fig. 1)	Output and Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1650 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Trimmer bottom of rear section of gang. (See bottom of radio)	Broadcast Oscillator	Adjust to maximum output
	1400 Kc.	See Note "A"		Set dial at 1400 Kc.	Trimmer bottom of front section of gang. (See bottom of radio.	Broadcast Antenna	Adjust to maximum output

NOTE "A" Lay the output lead from the generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the generator.

FREQUENCY RANGE
538 to 1650 K.C.

Power Consumption ..... 35 Watts
Power Output ..... 1 Watt Undistorted, 1.7 Watts Maximum
Intermediate Frequency ..... 455 K.C.

PROCEDURE FOR SETTING THE AUTOMATIC TUNER PUSH BUTTONS

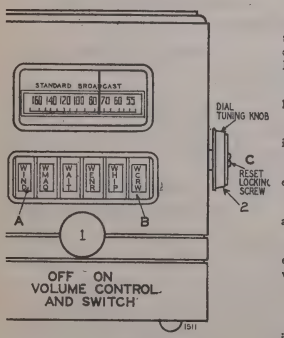


FIG. 2

1. Make a list of six stations you tune in regularly. There are six push buttons on the front of the radio by means of which six stations may be tuned automatically. (See "B," Fig. 2.)

2. Punch out the call letters of the stations you have selected from the set of station call letter tabs supplied.

On the front of each automatic tuner button an opening is provided for inserting the call letter tabs, (See "A" Fig. 2).

Insert the call letter tabs in the rectangular openings in each of the automatic tuner push buttons.

3. Stations may be set up in any sequence desired. Press any one of the automatic tuner push buttons down all the way.

4. Hold the push button down firmly, and tune set very carefully to station desired, until station is heard clearly and with maximum volume

Release the push button.

5. Press down another automatic tuner push button. Hold it down FIRMLY and carefully tune in next station desired. Release this push button.

Follow this procedure until you have selected all of your favorite stations.

6. Now rotate the tuning knob to the right (clockwise) as far as it will turn, and with a coin (quarter), tighten the special locking screw ("C") in the center of the tuning knob, (See Fig. 2).

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner push buttons. (Note: Locking screw "C" is loose when radio is shipped from factory.)

CHANGING STATIONS:

If you should desire to change any station you have selected to another, hold the tuning knob securely and with a coin loosen the locking screw "C" one or two turns. Hold down push button on which the station is to be changed and tune in new station desired. Release the push button.

Be sure to retighten the locking screw, otherwise the stations you have previously selected will not stay adjusted to the push buttons.

The set is now set up for automatic tuning.

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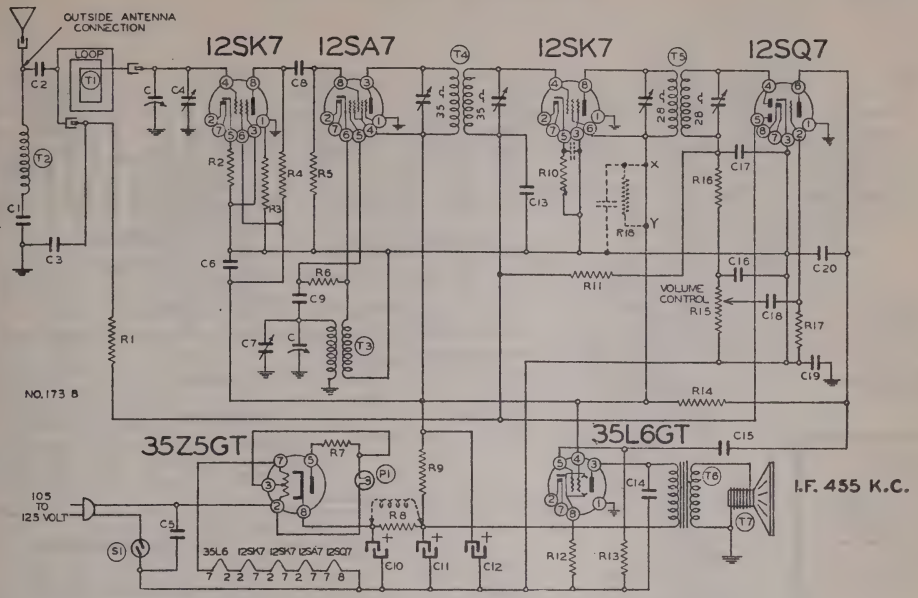
MODELS 6D18, 6D19,
Series A



Circuit Diagram Ref.	Part No.	Description
		RESISTORS
R1	130100	150M ohms—½ w.
R2	130168	100 ohms—½ w.
R3	130100	150M ohms—½ w.
R4	130218	5M ohms—½ w.
R5	13020	100M ohms—½ w.
R6	13094	50M ohms—½ w.
R7	130215	25 ohms—½ w.
R8	130296	200 ohms—1 w.
R9	130287	1200 ohms—1 w.
R10	130166	150 ohms—½ w.
R11	1304	3 megohm—½ w.
R12	130166	150 ohm—½ w.
R13	1303	500M ohm—½ w.
R14	1309	200M ohm—½ w.
R15	101211	1 megohm—volume control and switch
R16	13012	50M ohm—½ w.
R17	130257	5 megohm—½ w.
R18	13064	3500 Ohm—½ w.
		CONDENSERS
C	102116	Two gang variable condenser
C1	10011	.01 x 400 v.
C2	129132	.000125 mica
C3	10026	.02 x 400 v.
C4		B.C. antenna trimmer
C5	1001	.1 x 400 v.
C6	1006	.25 x 200 v.
C7		B.C. Oscillator Trimmer
C8	1295	.0001 mica
C9	1295	.0001 mica
C10	11994	40 mfd.—150 w.v. lytic
C11	11994	20 mfd.—150 w.v. lytic
C12	11994	20 mfd.—150 w.v. lytic
C13	1009	.05 x 200 v.
C14	10026	.02 x 400 v.
C15	100106	.004 x 600 v.
C16	12939	.00005 mica
C17	1295	.0001 mica
C18	10025	.002 x 600 v.
C19	100110	.2 x 400 v.
C20	1295	.0001 mica
C21	10020	.1 x 200 Volt
C22	10020	.1 x 200 Volt
		C10, C11, C12 are in same unit
		PARTS
T1	111145	Loop Antenna Assembly
T2	1237	Loading Coil
T3	110128	Oscillator Coil
T4	108140G	Input I.F. Coil—455 kc.
T5	108145C	Output I.F. Coil—455 kc.
T6	10595B	Output Transformer
T7	114191	5" P.M. Speaker
		or
T7	114265	5" Electrodynamic Speaker
S1		On-off switch
P1	107249	T-47 Pilot light

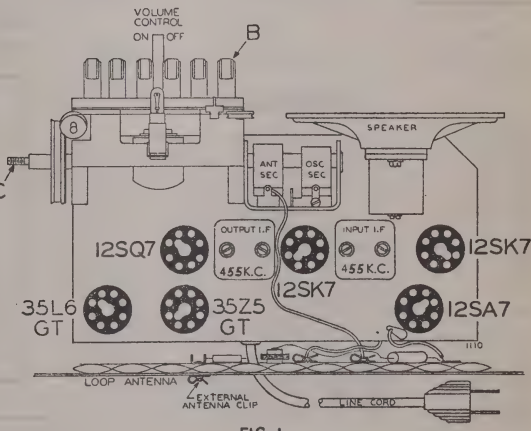


FIG. 1

NOTE: Some sets of this model were made for glass tubes only. Where glass tubes were used items C21—C22—R18 shown in dotted lines, were added to the circuit and the B + Line was opened between points X + 4.

On some sets R8 is replaced by a speaker field; R9 is also eliminated and C11 and C12 are connected in parallel.

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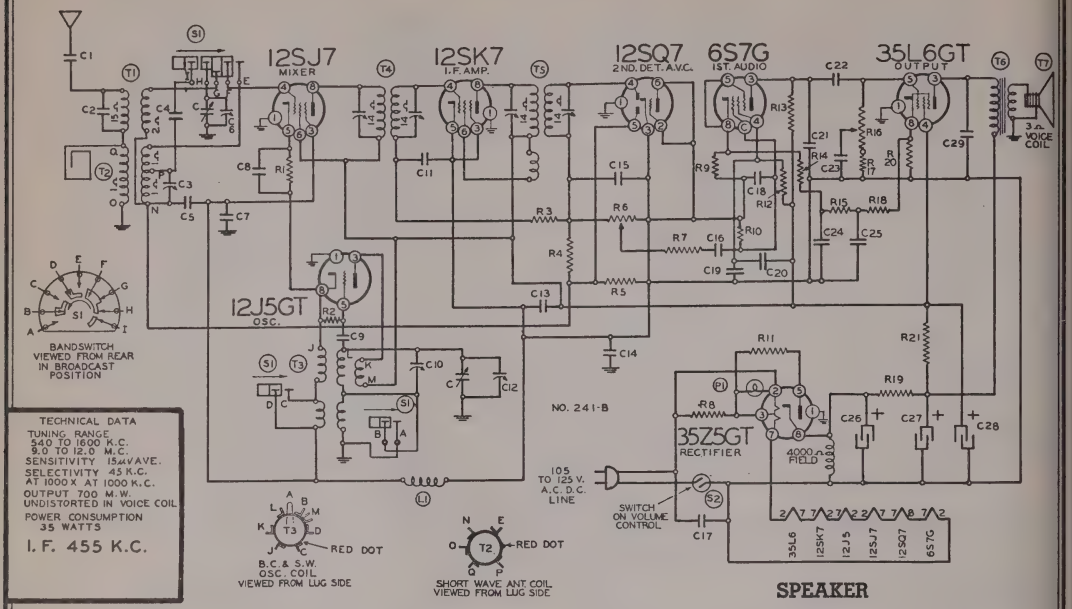
MODEL 7D22, Series B

BELMONT RADIO CORP.



Part No.	Schematic Diagram Reference	Description	No. Used In Set

CONDENSERS

100128	C5	.05 x 120 Volt Tubular Condenser	1
100119	C7, C14	.1 x 400 Volt Tubular Condenser	2
100127	C8	.01 x 120 Volt Tubular Condenser	1
10020	C13, C19, C24, C25	.1 x 200 Volt Tubular Condenser	4
1009	C11	.05 x 200 Volt Tubular Condenser	1
100138	C17	.03 x 400 Volt Tubular Condenser	1
10019	C16, C23	.006 x 600 Volt Tubular Condenser	2
10037	C1	.003 x 600 Volt Tubular Condenser	1
100142	C20	.04 x 200 Volt Tubular Condenser	1
100130	C21, C22	Dual Condenser—.00025 x .02 x 400 Volt	1
10011	C29	.01 x 400 Volt Tubular Condenser	1
119129		Electrolytic Filter Cond. Added for 25 Cycle Only. 40 Mfd. x 150 Volts Across C22 and 20 Mfd. x 150 Volts Across C23	1
119128	C26, C27, C28	Electrolytic Filter Condenser. 40 Mfd.—20 Mfd. x 150 Volts, 50-60 Cycles	1
124139	C3, C10	S.W. Antenna and Oscillator Trimmer Condenser	2
129181	C4	.000445 Mica Type Condenser—3%	1
12921	C15	.0002 Mica Type Condenser—20%	1
1295	C9, C18	.0001 Mica Type Condenser—20%	2
12960	C2	.00015 Mica Type Condenser—20%	1
12912	C19	.00025 Mica Type Condenser—20%	1

RESISTORS

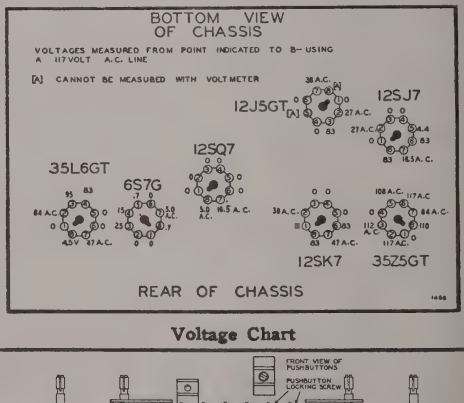
130218	R1	5M Ohm—½ Watt Resistor—10%	1
130166	R8, R20	150 Ohm—½ Watt Resistor—10%	2
13084	R19	200 Ohm—½ Watt Resistor—20%	1
130128	R11	20 Ohm—½ Watt Resistor—20%	1
13012	R2, R7	50M Ohm—½ Watt Resistor—20%	2
130287	R21	1200 Ohm—1 Watt Resistor—10%	1
130350	R3, R5	3.2 Megohm—½ Watt Resistor—20%	2
13038	R4	2 Megohm—½ Watt Resistor—20%	1
130257	R10	5 Megohm—½ Watt Resistor—25%	1
13092	R9	1M Ohm—½ Watt Resistor	1
130354	R12	525M Ohm—½ Watt Resistor	1
130103	R13	100M Ohm—½ Watt Resistor	1
130193	R14, R18	3M Ohm—½ Watt Resistor	2
130355	R15	8M Ohm—½ Watt Resistor	1
130100	R17	150M Ohm—½ Watt Resistor	1

COILS

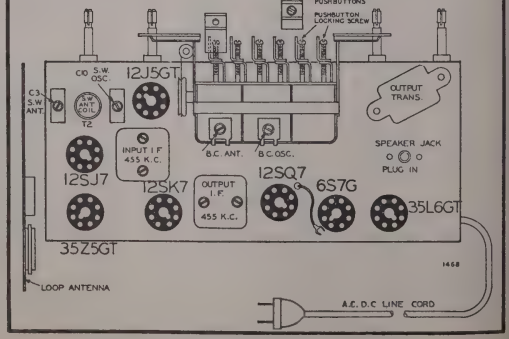
108206	T4	Input I.F. Coil Complete in Can	1
108205	T5	Output I.F. Coil Complete in Can	1
110184	T3	B.C.-S.W.—Oscillator Coil	1
111249	T2	S.W. Antenna Coil Complete	1
111251	T1	Loop Antenna Assembly	1
12316	L1	Choke Coil	

SPEAKER

114262	T7	Six Inch Electro Dynamic Speaker (Less Output Transformer)	1
105134	T6	Output Transformer for Speaker	1



Voltage Chart



FOR ALIGNMENT, SEE INDEX

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ALIGNMENT PROCEDURE MODEL 507, SERIES B

- Volume control—Maximum all adjustments.
- Connect generator ground to negative "B" at plug terminal (grey wire).
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mfd., 200 Mmf.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 1A7GT Tube	Rotor full open (Plates out of mesh)	Four trimmers on top (See Fig. 2)	Output and input I. F.	(See Note "A") Adjust to maximum output
BROAD-CAST BAND	1550 Kc.	.1 MFD.	Grid of 1A7GT Tube	Rotor full open (Plates out of mesh)	Trimmer Rear section of gang (See Fig. 2)	Oscillator	(See Note "A") Adjust to maximum output
	1400 Kc.	200 Mmf.	Antenna and Ground Terminals of Loop	Set dial at 1400 Kc.	Trimmer C16 (See Fig. 1)	Antenna	(See Note "B") Adjust to maximum output

NOTE "A"—The loop antenna need not be connected to the radio when making these adjustments. The ground of the signal generator is connected to the negative "B" wire of the radio and the other lead from the signal generator in series with .1 MFD. dummy to the grid of the 1A7GT tube.

NOTE "B"—This adjustment should be made with the ground lead of the signal generator connected to the ground terminal of the loop assembly. The other lead of the signal generator is connected in series with a 200 Mmf. dummy to the antenna terminal of the loop assembly.

It is important when making this adjustment that the same distance between the loop antenna and the chassis be maintained as when the chassis and loop are installed in the cabinet.

It is important during alignment that the same distance between the loop antenna and the chassis be maintained as when the chassis is installed in the cabinet.

FREQUENCY RANGE
540 to 1550 KC.

Power Consumption.....(On A.C. or D.C.) 35 Watts

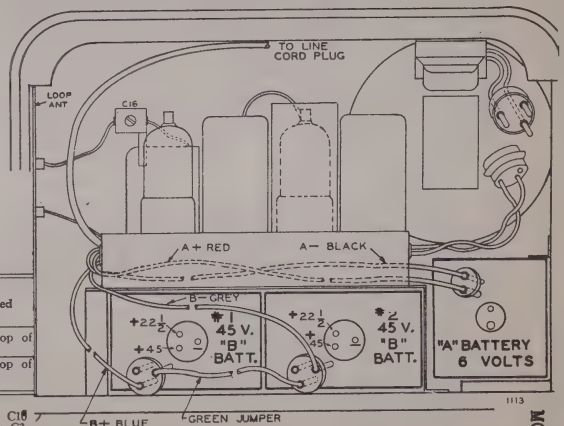
Power Output.....100 Milliwatts Undistorted, 200 Milliwatts Maximum

Intermediate Frequency.....465 KC.

MODEL 7D22, SERIES B
Setting the Pushbuttons

Make a list of your 6 favorite stations—push out the call letters of these stations from the call letter sheets supplied. Next insert a long slim screw driver into the hole in front of one of the pushbuttons and unscrew the pushbutton locking screw (to the left) several turns. Now with the screw driver still engaged in the locking screw slot push it all the way in. Hold it in this position and tune in the station you want with the tuning knob. Now tighten up the pushbutton locking screw by turning it to the right. Tighten firmly. Continue setting each button in the same way. When you have set your stations insert the call letter of each station in the front of the proper button and put one of the celluloid tabs over the station call letter.

To change stations simply repeat the above procedure.



ALIGNMENT PROCEDURE MODEL 7D22, SERIES B

- Volume control—Maximum all adjustments.
- Connect B—of radio chassis to ground post of signal generator through .1 Mfd. condenser.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Maximum
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 12SJ7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
SHORT WAVE BAND	12 Mc.	400 Ohms	External Antenna and B—	Short Wave	Set Dial at 12 Mc.	S.W. Osc. trimmer C18 S.W. Ant. trimmer C3
BROAD-CAST BAND	1600 Kc.	.1 mmf.	Grid of 12SJ7	Broadcast	Rotor full open (Plates out of mesh)	B.C. Osc. trimmer C12 on Gang
	1400 Kc.	200 mmf.	External Antenna and B—	Broadcast	Set Dial at 1400 Kc.	B.C. Ant. trimmer C6

NOTE: The Oscillator Frequency is lower than the signal frequency and should be aligned accordingly.

The loop antenna should be connected to the radio when making all adjustments.

MODEL 11A25, Series B
MODEL 11A25, Series C

BELMONT RADIO CORP.

Technical Data

Power Consumption - - - Chassis Only 120 Watts Record Changer 20 Watts

Power Output - - - - - 5 Watts Undistorted

Sensitivity for 500 Milliwatt Output: 6 Microvolts Average

Selectivity - 36 KC Broad at 1000 Times Signal at 1000 KC

Tuning Frequency Range Broadcast Band - 540 to 1580 KC

Short Wave Band - - 5.5 to 18.5 MC

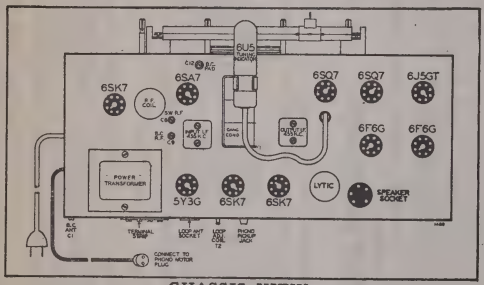
Alignment Procedure

- Volume control—Maximum all adjustments.
- Connect dummy antenna value in series with generator output lead.

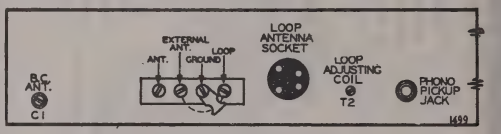
BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Maximum (in Order Shown)
I. F.	455 Kc	.1 MFD.	Grid of 6SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top Output I. F.
	455 Kc	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top Input I. F.
SHORT WAVE BAND	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	C13, S.W. Osc.
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	C8, S.W. R.F., C2 S.W. Antenna
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	C11 S.W. Osc Series Pad See Note "A"
BROAD-CAST BAND	1580 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Rotor full open (Plates out of mesh)	C14 B.C. Osc.
	540 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Set Dial at 540 Kc. (Plates in Mesh)	C12 B.C. Osc. Series Pad
	1400 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Set Dial at 1400 Kc.	C9 B.C R.F.
LOOP ALIGN-MENT	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	C1 B.C. Ant.
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	T2 Iron Core Tracking Coil

NOTE "A"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained

After each band is completed, repeat the procedure as a final check.



CHASSIS VIEW

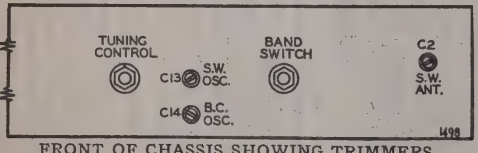


REAR OF CHASSIS

ANTENNA AND GROUND TERMINALS

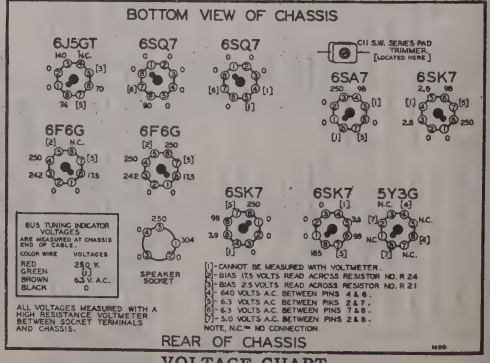
When using an external antenna and ground, move the metal strap (connector bar) from terminal marked LOOP and connect it to terminal marked EXTERNAL ANT.

The antenna and ground wires should then be connected to the terminals marked "Ant."—"Gnd."



FRONT OF CHASSIS SHOWING TRIMMERS

THE SERIES B IS EQUIPPED WITH A SEEBURG TYPE C RECORD CHANGER, SERIES C WITH AN OAK. SERVICE DATA ON THIS EQUIPMENT IS FOUND IN RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".


BOTTOM VIEW OF CHASSIS
6J5GT
6SQ7
6SQ7
C11 S.W. SERIES PAD TRIMMER. (LOCATED HERE)
6SA7
6SK7
6F6G
6F6G
6SK7
6SK7
5Y3G
6U5 TUNING INDICATOR VOLTAGES
ARE MEASURED AT CHASSIS END OF CABLE.
COLOR WIRE VOLTAGES
RED 250 V.
GREEN [I]
BROWN 6.3 V. A.C.
BLACK 0
SPEAKER SOCKET
ALL VOLTAGES MEASURED WITH A HIGH RESISTANCE VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
[1]-CANNOT BE MEASURED WITH VOLTMETER
[2]-BIAS 17.5 VOLTS READ ACROSS RESISTOR NO. R 24
[3]-BIAS 2.5 VOLTS READ ACROSS RESISTOR NO. R 21
[4]-640 VOLTS A.C. BETWEEN PINS 4 & 8.
[5]-6.3 VOLTS A.C. BETWEEN PINS 2 & 7.
[6]-6.3 VOLTS A.C. BETWEEN PINS 7 & 8.
[7]-5.0 VOLTS A.C. BETWEEN PINS 2 & 8.
NOTE, N.C.= NO CONNECTION.
1499

REAR OF CHASSIS

VOLTAGE CHART

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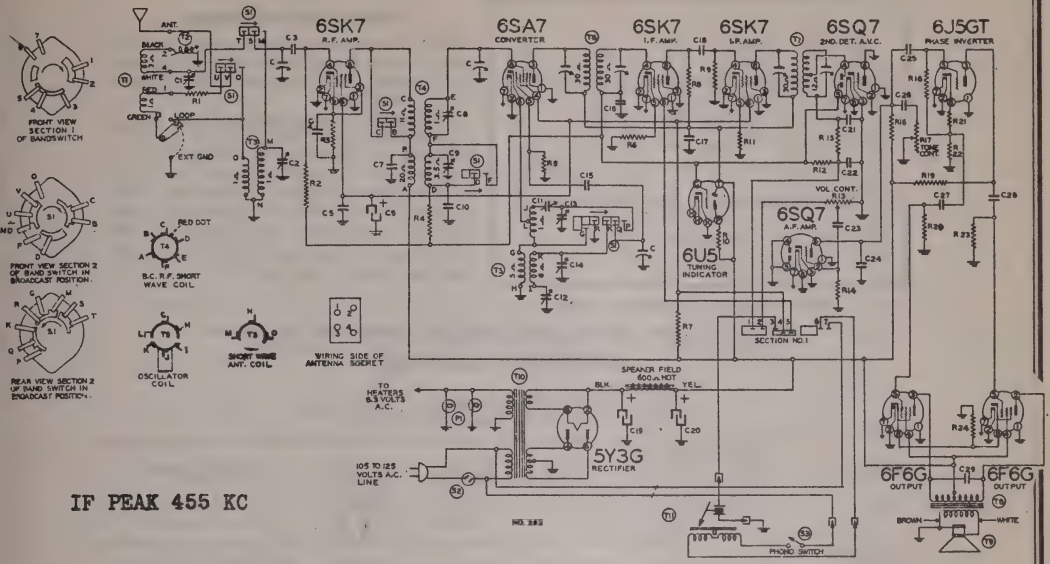
BELMONT RADIO CORP.

MODEL 11A25, Series B
MODEL 11A25, Series C



IF PEAK 455 KC

Part No.	Schematic Diagram Reference	Description	No Used In Set
		CONDENSERS	
102129B	C	Three Gang Variable Condenser	1
10020	C4	.1 x 200 Volt Tubular Condenser	1
10026	C10, C16, C25	.02 x 400 Volt Tubular Condenser	3
10025	C23	.002 x 600 Volt Tubular Condenser	1
1009	C27	.05 x 200 Volt Tubular Condenser	1
10013	C28	.05 x 400 Volt Tubular Condenser	1
10011	C26	.01 x 400 Volt Tubular Condenser	1
10071	C29	.004 x 600 Volt Tubular Condenser	1
100117	C5, C17	.25 x 400 Volt Tubular Condenser	2
119124	C6, C19, C20	Electrolytic Filter Condenser—10 Mfd. x 350 V.; 25 Mfd. x 450 V.; 25 Mfd. x 450 V.	1
124117	C2	S.W. Antenna Trimmer	1
124131	C8, C9	S.W. and B.C. R.F. Trimmer—Dual	1
124130	C13, C14	S.W. and B.C. Osc. Trimmer—Dual	1
124132	C1	B.C. Antenna Trimmer	1
129157	C12	.000525 Compression Cond.—B.C. Pad	1
1292	C3, C18	.0005 Mica Type Condenser—20%	2
129160	C7	.0004 Mica Type Condenser—20%	1
12939	C15	.00005 Mica Type Condenser—20%	1
1295	C21, C22	.0001 Mica Type Condenser—20%	2
129156	C11	.0024 Compression Mica Condenser	1
12912	C24	.00025 Mica Type Condenser—20%	1
		RESISTORS	
101278	R13, S2	Volume Control and Switch (500M Ohms) Less Shaft	1
101279	R17	Tone Control (1 Megohm) Less Shaft	1
115834		Shaft Only for Volume and Tone Controls	2
13019	R2, R18	1 Megohm—½ Watt Resistor—20%	2
1305	R4	300M Ohm—½ Watt Resistor—20%	1
130208	R5	40M Ohm—½ Watt Resistor—20%	1
13054	R6, R11	500 Ohm—½ Watt Resistor—20%	2
130263	R8	12M Ohm—½ Watt Resistor—20%	1
13020	R9, R19, R22	100M Ohm—½ Watt Resistor—20%	3
130304	R7	12M Ohm—2 Watt Resistor—10%	1
13012	R15	50M Ohm—½ Watt Resistor—20%	1
130170	R12	3 Megohm—½ Watt Resistor—25%	1
130257	R14	5 Megohm—½ Watt Resistor—30%	1
13043	R21	2500 Ohm—½ Watt Resistor—20%	1
1303	R20, R23	500M Ohm—½ Watt Resistor—20%	2
13011	R16	250M Ohm—½ Watt Resistor—20%	1
130311	R24	300 Ohm—1 Watt Resistor—20%	1
13099	R3	300 Ohm—½ Watt Resistor—20%	1
13024	R1	400 Ohm—½ Watt Resistor—20%	1
	R10	1 Megohm—In Eye Socket	1
		COILS	
108169K	T6	Input I.F. Coil Complete in Can	1
108130G	T7	Output I.F. Coil Complete in Can	1
10957	T4	B.C.—S.W. R.F. Coil Complete in Can	1
110149	T5	B.C.—S.W. Oscillator Coil	1
111176	T3	S.W. Antenna Coil	1
111153	T2	Loop Adjusting Coil With Iron Slug	1
111257	T1	Loop Antenna Assembly	1

Part No.	Schematic Diagram Reference	Description	No Used In Set
		SPEAKER	
114275	T9	Ten Inch Electrodynamic Speaker (Less Output Transformer)	1
		TRANSFORMERS	
10554B	T8	Output Transformer for Speaker	1
104202C	T10	Power Transformer, 50 to 60 Cycles 105-125 Volt Primary	1
104203C		Power Transformer 25 to 60 Cycles 105-125 Volt Primary	
		BANDSWITCH	
125186	S1	Radio-Phono-Band Switch Complete	1
		MISCELLANEOUS	
107266		Line Cord and Plug	1
13447		Rubber Cushions to Float Chassis	4
121308		Eight Prong Octal Molded Socket for Speaker	1
121210		Eight Prong Octal Molded Socket	10
107169		Socket and Cable Assembly for Tuning Eye	1
10794	P1	6-8 Volt Pilot Lite Bulb Type T-44	2
107403		Socket Assembly for Pilot Lite	2
11757A		Bracket for Tuning Eye	1
11757B		Clamp for Tuning Eye	1
11757C		Wing Bolt for Above	1
		DIAL AND TUNING PARTS	
1121042		Dial Scale	1
1121040-14		Escutcheon for Dial	2
1121036		Pointer	1
128787-14		Knob—"Tuning"	4
117930		Tuning Shaft	1
112954		Pulley with Bushing	1
1209		String for Dial	Yd.
120197		Coiled Tension Spring for Dial String	1
		RECORD CHANGER COMPARTMENT	
104301	S2	Automatic Record Changer Complete Seeburg "C" 115 Volts A.C. 60 Cycles N1 Cartridge	1
10794	P2	Indicator Light Bulb	1
107388		Socket Assembly for Pilot Lite	1

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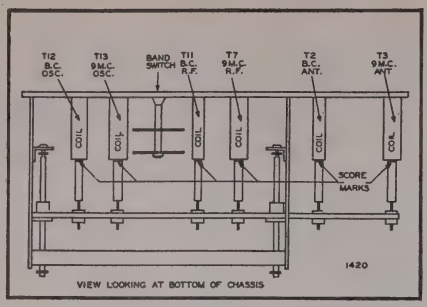
MODEL 11A55, Series A

BELMONT RADIO CORP.



IRON CORE ADJUSTMENT VIEW

Setting the Pushbuttons

Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the slot on top of each pushbutton.

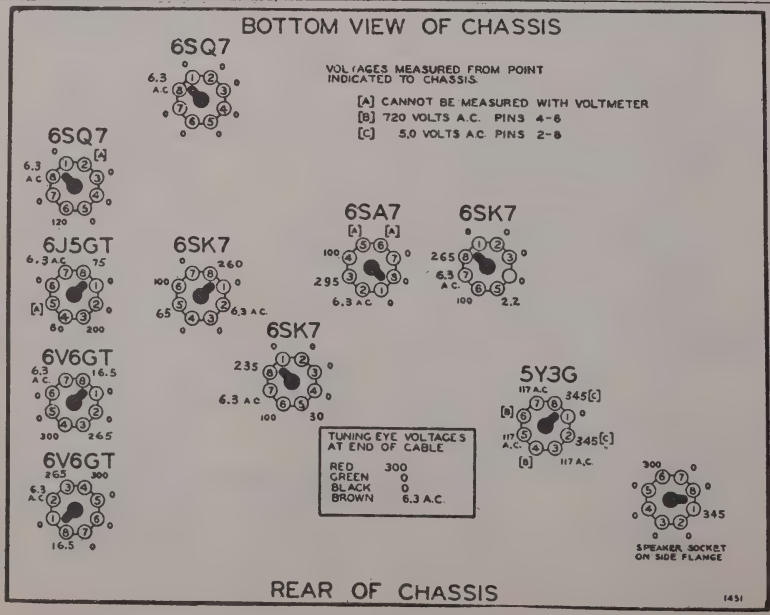
Next pull one of the pushbuttons all the way out as far as it will come. Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button **hard** all the way in to lock the station in place. Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock it in place when setting up the station.

IMPORTANT: Before removing chassis, remove the escutcheon and dial scale and then the pointer which is fastened to the pointer carriage by a small screw.

ALIGNMENT PROCEDURE

- Tone control—Treble.
- Volume control—Maximum all adjustments.
- Use an all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted To Maximum
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	On Top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	On Top of Input I.F.
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C21—Osc. (See Trimmer View) C12—R.F. (See Chassis View) C4—Ant.
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14—Osc. (See Trimmer View) T8—R.F. (See Trimmer View) T4—Ant.
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15—Osc. (See Trimmer View) T9—R.F. (See Trimmer View) T5—Ant.
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16—Osc. (See Trimmer View) T10—R.F. (See Trimmer View) T6—Ant.
BROAD CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C18—Osc. (See Trimmer View) C13—R.F. (See Chassis View) C3—Ant.
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11—R.F Rotate Core T2—Ant. (See Iron Core Adjustment View)



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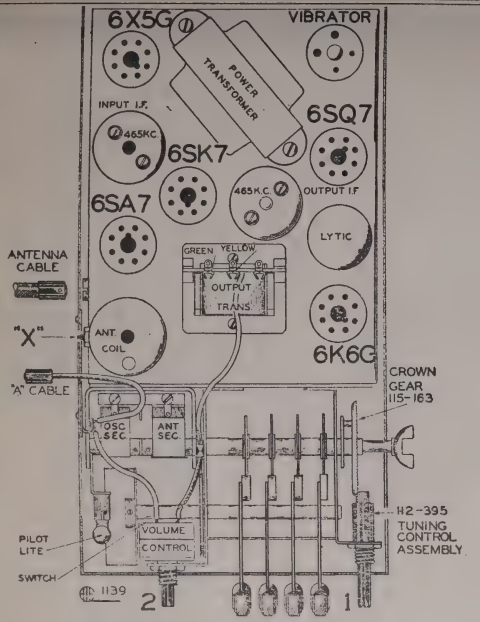


FIG. 3—TOP VIEW

ADJUST ANTENNA TRIMMER

Tune in a weak signal at approximately 600 K.C. with volume control about three-fourths on. Adjust trimmer screw "X" until maximum output is obtained. (See Fig. 1, Adjustment "X" on right side of radio).

I.F. ALIGNMENT: (465 K.C.)

1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 465 K.C. in series with I.F. dummy antenna, to grid of 6SK7 I.F. tube.
2. Adjust trimmer condensers of output I.F. transformer No. 108121 to resonance with oscillator.
3. Move test oscillator connection to grid of 6SA7 tube and adjust trimmer condensers of input I.F. transformer No. 108139 to resonance with oscillator. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver. (See Fig. 3.

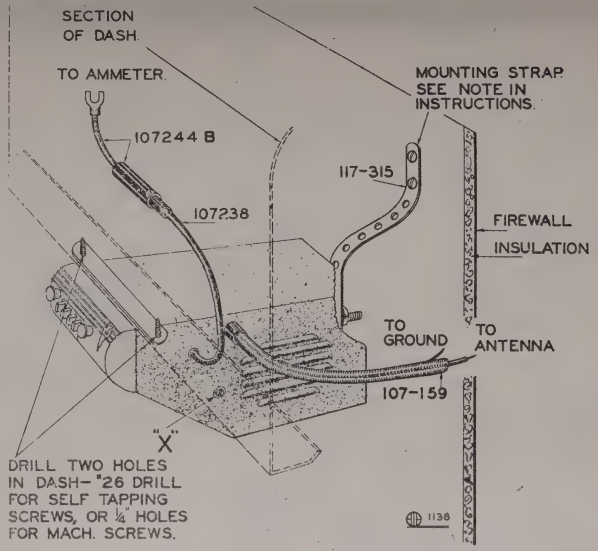


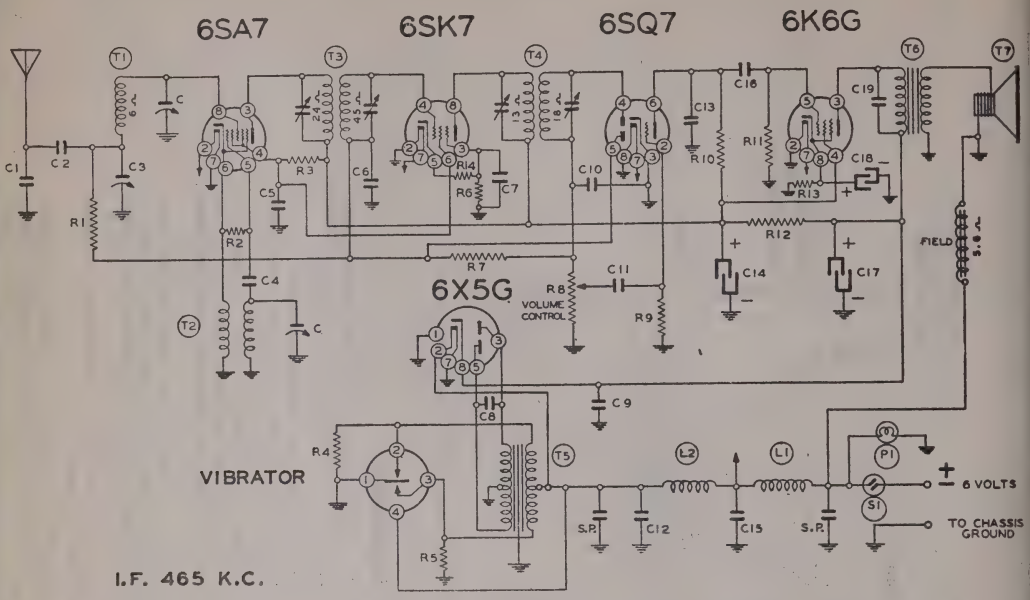
FIG. 1—GENERAL INSTALLATION VIEW

BROADCAST ALIGNMENT

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. in series with broadcast dummy to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance. (This adjustment is the rear section of the two-gang condenser—see top view, Fig. 3).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust antenna trimmer (front section of gang condenser) to resonance (see top view, Fig. 3).
4. Re-set test oscillator to 600 K.C. and rotate variable condenser to 600 K.C. Adjust series pad in the antenna circuit for maximum gain. This pad is mounted on the side of the antenna can, adjustment "X."
5. Go back and check 1400 K.C. If adjustment is made here, check 600 K.C. again.
6. Check for sensitivity at 1000 K.C. by setting test oscillator to this frequency and picking up the signal by rotating variable condenser. Under no circumstances bend plates of variable condenser sections to correct tracking.

MODEL 579, Series A
Ser. No. 225040 up

BELMONT RADIO CORP.



Circuit Diagram Ref. No.	Part No.	Description
		RESISTORS
R1	13011	250M ohm—½ w.
R2	130236	30M ohm—½ w.
R3	130307	15M ohm—1 watt
R4	13060	100 ohm—½ w.
R5	13060	100 ohm—½ w.
R6	13070	500 ohm—½ w.
R7	1304	3 megohm—½ w.
R8	101110	1 megohm volume control
R9	130257	5 megohm—½ w.
R10	13011	250M ohm—½ w.
R11	1303	500M ohm—½ w.
R12	130199	1500 ohm—1 watt
R13	130101	600 ohm—½ w.
R14	130174	50 ohm—½ w.
		CONDENSERS
C	10269	2 gang variable condenser
C1	1293	.00002 mica
C2	10055	.01 x 400 volts
C3	12434	Adj. Antenna Trimmer
C4	12921	.0002 mica
C5	100115	.05 x 400 v.
C6	1009	.05 x 200 v.
C7	10020	.1 x 200 v.
C8	10034	.005 x 1200 v.
C9	12912	.00025 mica
C10	1295	.0001 mica
C11	10025	.002 x 600 v.
C12	10031	.5 x 120 v.
C13	1292	.0005 mica
C14	119105	15 ufd. lytic x 350 w. v.
C15	10031	.5 x 120 v.
C16	10078	.01 x 200 v.
C17	119105	15 ufd. lytic x 350 w. v.
C18	119105	20 ufd. lytic x 25 w. v.
C19	10087	.01 x 600 v.
		C14, C17 and C18 in same unit

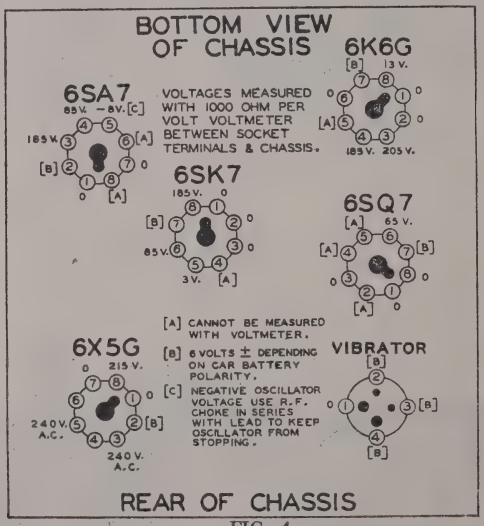

BOTTOM VIEW OF CHASSIS
6K6G
6SA7
6SK7
6SQ7
6X5G
VIBRATOR
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS.
[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] 6 VOLTS ± DEPENDING ON CAR BATTERY POLARITY.
[C] NEGATIVE OSCILLATOR VOLTAGE USE R.F. CHOKE IN SERIES WITH LEAD TO KEEP OSCILLATOR FROM STOPPING.
REAR OF CHASSIS

FIG. 4

PARTS

T1	11195B	Antenna Coil
T2	110146	Oscillator Coil
T3	108139	Input I. F. Coil—465 kc.
T4	108121B	Output I. F. Coil—465 kc.
T5	104131	Power Transformer
T6	10567	Output Transformer
T7	114114-R	5" Dynamic Speaker (5.6 ohm field)
L1	10568	"A" Choke
L2	10566	"A" Choke
S1		Switch on volume control
P1	10797	Pilot light (T51) 6-8 volts
S.P.	11749	(2) Spark Plates

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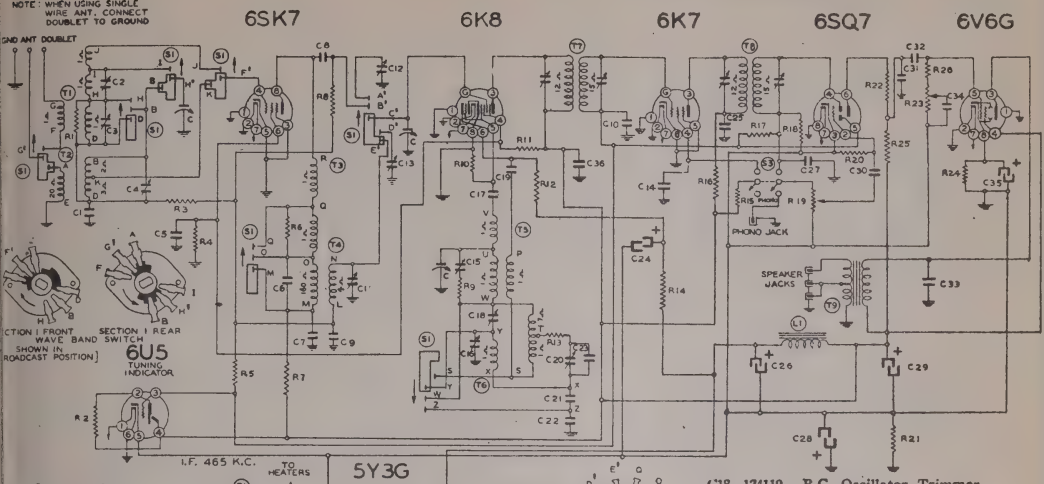
BELMONT RADIO CORP. MODELS 708-391, 708-398, 708-378 etc
Chassis 708, Series C
Ser. No. 0C375300 up



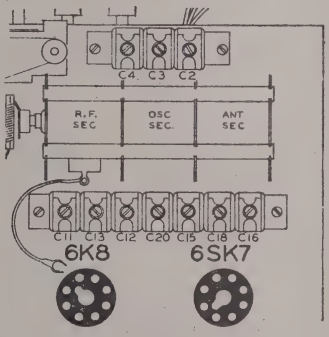


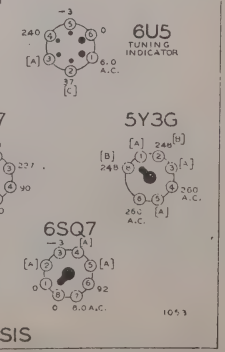
FIG. 3—TOP OF CHASSIS

Circuit Diagram Ref. No.	Part No.	Description
		RESISTORS
R1	13094	50M ohm—½ w.—10%
R2	1303	500M ohm—½ w.
R3	13020	100M ohm
R4	13012	50M ohm—½ w.
R5	13026	1000 ohm—½ w.
R6	130232	25M ohm—½ w.
R7	13026	1000 ohm—½ w.
R8	13019	1 megohm—½ w.
R9	13097	200 ohm—½ w.
R10	13012	50M ohm—½ w.
R11	130304	12M ohm—2 watt
R12	13017	10M ohm—½ w.
R13	130299	10 ohm—½ w.
R14	13017	10M ohm—½ w.
R15	13020	100M ohm—½ w.
R16	13023	2M ohm—½ w.
R17	1304	3 megohm—½ w.
R18	1304	3 megohm—½ w.
R19	101205	1 megohm volume control
R20	130225	15 megohm—½ w.
R21	130303	35 ohm—½ w.
R22	13012	50M ohm—½ w.
R23	101206	150M ohm tone control
R24	130227	250 ohm—1 watt
R25	1302	75M ohm—½ w.
R26	13017	10M ohm—½ w.
		CONDENSERS
C1	102121	3 gang variable condenser
C2	10090	.02 x 400 v.
C3	124118	S.W. Antenna Trimmer
C4	124118	M.W. Antenna Trimmer
C5	124118	B.C. Antenna Trimmer
C6	10013	.05 x 400 v.
C7	12938	.00005 mica
C8	10090	.02 x 400 v.
C9	10090	.02 x 400 v.
C10	10090	.02 x 400 v.
C11	1009	.05 x 200 v.
C12	124119	B.C. R.F. Trimmer
C13	124119	S.W. R.F. Trimmer
C14	124119	M.W. R.F. Trimmer
C15	10013	.05 x 400 v.
C16	124119	S.W. Oscillator Trimmer
C17	124119	M.W. Oscillator Trimmer
C18	12962	.00003 Mica
C18	124119	B.C. Oscillator Trimmer
C19	10025	.002 x 600 v.
C20	124119	B.C. Padding Condenser
C21	129149	.0028 Compression M.W. Pad
C22	129105	.0035 Compression S.W. Pad
C23	12959	.0003 mica
C24	11981	16 uf. lytic x 400 w. v.
C25	1001	.1 x 400 v.
C26	119100	30 uf. lytic x 450 w. v.
C27	1295	.0001 mica
C28	11991	40 uf. lytic x 25 w. v.
C29	119100	30 uf. lytic x 450 w. v.
C30	10025	.002 x 600 v.
C31	12912	.00025 mica
C32	10026	.02 x 400 v.
C33	10097	.02 x 600 v.
C34	10078	.01 x 200 v.
C35	119100	40 uf. lytic—25 w. v.
C36	10013	.05 x 400 v. C26, C29, and C35 in same unit.
T1	111156	S.W. M.W. Ant. Coil
T2	111158	B.C. Antenna Coil
T3	10955	S.W. M.W. R. F. Coil
T4	10956	B.C. R.F. Coil
T5	110140	B.C. S.W. Osc. Coil
T6	110138	M.W. Oscillator Coil
T7	108165	1st I. F. Input Coil
T8	108119	2nd I. F. Output Coil
T9	10598	Output Transformer
T10	104181	Universal Transformer
	114179	8" P. M. Speaker or
	114186	12" P. M. Speaker
L1	10597B	"B" Filter Choke
S1	12595	Wave Band Switch
S2		On & Off Switch
S3	12570	Radio Phono Switch
P1	10794	(2) Pilot Lights - T44

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.

[A] CANNOT BE READ WITH VOLTMETER.
[B] 5 VOLTS A.C. BETWEEN PINS 2 & 8
[C] USING 250 VOLT SCALE ON VOLTMETER



MODELS 708-391, 708-398, 708-378 etc BELMONT RADIO CORP.
Chassis 708, Series C
Ser. No. 0C375300 up
MODEL 716, Series A

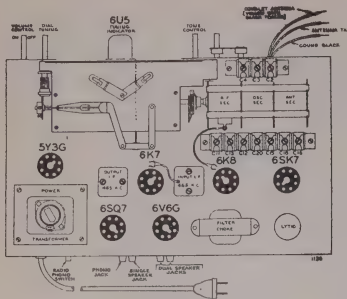


FIG. 1—TOP VIEW

MODEL 708, Series C

Serial No. 0C375300

and up.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

ALIGNMENT PROCEDURE

- Tone control—in treble position.
- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accuratelp calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6K7 I. F. Tube	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6K8	Broadcast (Extreme Left Rotation)	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND	23 Mc.	400 ohms	Antenna lead	Short Wave (Extreme Right Rotation)	Set Dial at 23 MC	Trimmer (C15) (See Fig. 3)	Short wave oscillator	See Note "A" Adjust to maximum output
	23 Mc.	400 oh	Antenna lead	Short Wave (Extreme Right Rotation)	Dial Set at 23 MC	Trimmer (C2, C12) (See Fig. 3)	Short wave antenna and R. F.	See Note "B" Adjust to maximum output
MEDIUM WAVE BAND	6.5 Mc.	400 ohms	Antenna lead	Medium Wave	Set Dial at 6.5 MC	Trimmer (C16) (See Fig. 3)	Medium wave oscillator	Adjust to maximum output
	6.5 Mc.	400 ohms	Antenna lead	Medium Wave	Set Dial at 6.5 MC	Trimmer (C3, C13) (See Fig. 3)	Medium wave antenna and R. F.	Adjust to maximum output
BROAD-CAST BAND	2000 Kc.	200 mmf.	Antenna lead	Broadcast (Extreme Left Rotation)	Rotor full open (Plates out of mesh)	Trimmer (C18) (See Fig. 3)	Broadcast oscillator	Adjust to maximum output
	1800 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1800 Kc.	Trimmer (C4, C11) (See Fig. 3)	Broadcast antenna and R. F.	Adjust to maximum output
	550 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 550 Kc.	Trimmer (C20) (See Fig. 3)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "C")

NOTE "A"—It is extremely necessary when making this adjustment that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. As an example of this a fundamental 23 megacycle signal can be tuned in not only at 23 on the dial, but also at approximately 22 megacycles.

NOTE "B"—When adjusting the antenna and R.F. trimmers be sure and "follow" the signal to exact resonance by slight readjustment of the gang condenser as trimmer reaction on oscillator frequency is quite noticeable at high frequencies.

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

Test Frequencies Used.	Kilocycles	Meters
I. F.	465	645.1
Short Wave	23000	13
Medium Wave	6500	46.1
Broadcast	2000	150
	1800	166.6
	550	545.4

BAND	FREQUENCY RANGE
Broadcast	500—2,000 Kc. (600—150 Meters)
Medium	1.95—7.0 Mc. (153.8—42.8 Meters)
Short Wave	6.9—24.0 Mc. (43.4—12.5 Meters)
Power Consumption	65 Watts at 117 Volts
Power Output	4 Watts Undistorted, 6.5 Watt Maximum

MODEL 716, Series A

ALIGNMENT PROCEDURE

CAUTION: A—D.C. reading vacuum tube voltmeter must be used to make some of the following adjustments.

- Volume control—Minimum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Vacuum tube voltmeter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Dial Pointer Setting	Trimmers Adjusted in Order Shown	Trimmer Function	Adjustment
I. F.	4.3 Mc.	.1 MFD.	Grid of 6SK7 No. 2	45 Mc.	Two trimmers on top of T3	Limiter I. F.	Adjust to maximum voltage (See Note "A")
	4.3 Mc.	.1 MFD.	Grid of 6SA7	45 Mc.	Two trimmers on top of T3	Input I. F.	Adjust to maximum voltage (See Notes "A" and "B")
	4.3 Mc.	.1 MFD.	Grid of 6SK7 No. 1	45 Mc.	Two trimmers on top of T4	2nd I. F.	Adjust to maximum voltage (See Notes "A" and "C")
	4.3 Mc.	.1 MFD.	Grid of 6B8	45 Mc.	Trimmer with red dot on top of T6	Disc. I. F.	Adjust to zero signal (See Note "D")
	4225 Kc. and 4375 Kc.	.1 MFD.	Grid of 6B8	45 Mc.	Trimmer without red dot on top of T6	Disc. I. F.	See Notes "D" and "E"
R. F.	50.5 Mc.	400 Ohms	Antenna Lead	50.5 Mc.	C5 C4	Osc. Ant.	Adjust to maximum voltage (See Note "A")

NOTE "A". Connect a D.C. reading vacuum tube voltmeter in parallel with C24. Use only enough signal to obtain a medium scale deflection. Use an unmodulated signal.

NOTE "B". Before aligning this stage one trimmer of T4 must be adjusted to maximum capacity and the other adjusted to minimum capacity.

NOTE "C". Do not realign or "Go Over" the I.F. adjustments after the above procedure has been followed or unsymmetrical wave shape will result.

NOTE "D". Connect an output meter across the speaker voice coil. Use a modulated signal.

NOTE "E". Adjust trimmer so that the same output reading will be obtained with the signal generator set at both 4225 K.C. and 4375 K.C., that is, 75 K.C. each side of the I.F. frequency. Check adjustment of trimmer with red dot after this adjustment.

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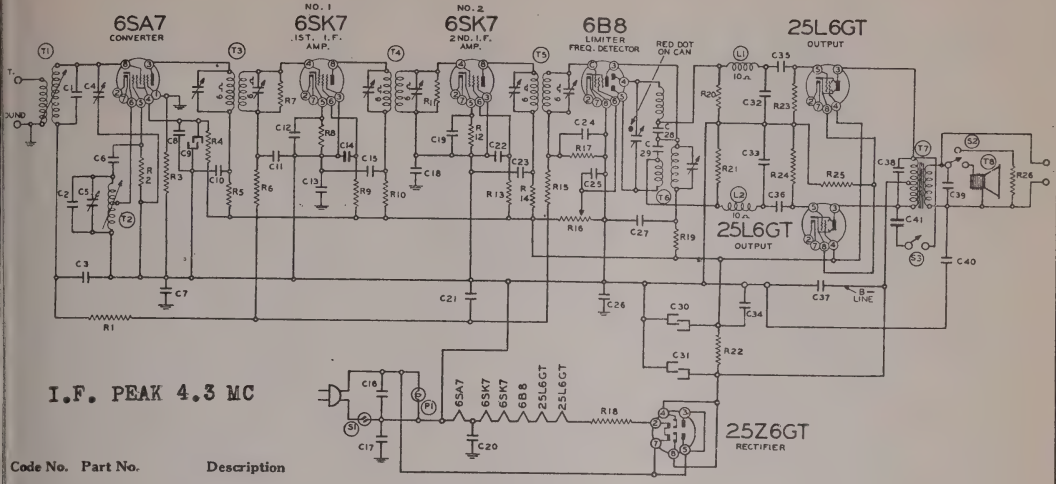
MODEL 716, Series A

BELMONT RADIO CORP.



I.F. PEAK 4.3 MC

Code No. Part No. Description

RESISTORS

R1	BE13020	100M ohm—½ w.
R2	BE1301	25M ohm—½ w.
R3	BE130100	150M ohm—½ w.
R4	BE13023	2M ohm—½ w.
R5	BE13023	2M ohm—½ w.
R6	BE13020	100M ohm—½ w.
R7	BE130337	110M ohm—½ w.
R8	BE130239	250 ohm—½ w.
R9	BE13023	2M ohm—½ w.
R10	BE13023	2M ohm—½ w.
R11	BE130338	175M ohm—½ w.
R12	BE130239	250 ohm—½ w.
R13	BE13023	2M ohm—½ w.
R14	BE13023	2M ohm—½ w.
R15	BE13019	1 megohm—½ w.
R16	BE101247	50M ohm—Volume control
R17	BE130341	200M ohm—½ w.
R18	BE10664	60 ohm—6 watt
R19	BE13023	2M ohm—½ w.
R20	BE130102	500M ohm—½ w.
R21	BE130102	500M ohm—½ w.
R22	BE130335	350 ohm—1 watt
R23	BE130102	500M ohm—½ w.
R24	BE130102	500M ohm—½ w.
R25	BE130336	75 ohm—1 watt
R26	BE10665	3 ohm—1 watt

CONDENSERS

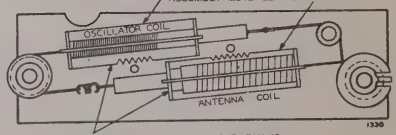
C1	BE129174	.00001 ceramicon
C2	BE129173	.000035 ceramicon
C3	BE10078	.01 x 200 v.
C4	BE124164	Antenna trimmer
C5	BE124164	Oscillator trimmer
C6	BE1295	.0001 mica
C7	BE10093	.05 x 200 v.
C8	BE10078	.01 x 200 v.
C9	BE119122	10 mfd. x 150 w. v. lytic
C10	BE10078	.01 x 200 v.
C11	BE10078	.01 x 200 v.
C12	BE10078	.01 x 200 v.
C13	BE10093	.05 x 200 v.
C14	BE10078	.01 x 200 v.
C15	BE10078	.01 x 200 v.
C16	BE1001	.1 x 400 v.
C17	BE10093	.05 x 200 v.
C18	BE10093	.05 x 200 v.
C19	BE10078	.01 x 200 v.
C20	BE10093	.05 x 200 v.
C21	BE10020	.1 x 200 v.
C22	BE10078	.01 x 200 v.
C23	BE10078	.01 x 200 v.
C24	BE1295	.0001 mica
C25	BE10020	.1 x 200 v.
C26	BE10093	.05 x 200 v.
C27	BE10078	.01 x 200 v.
C28	BE12921	.0002 mica
C29	BE12921	.0002 mica
C30	BE119121	60 mfd. x 150 w. v. lytic
C31	BE119121	40 mfd. x 150 w. v. lytic
C32	BE1295	.0001 mica
C33	BE1295	.0001 mica
C34	BE10078	.01 x 200 v.
C35	BE10078	.01 x 200 v.
C36	BE10078	.01 x 200 v.
C37	BE10093	.05 x 200 v.
C38	BE10011	.0. x 400 v.
C39	BE10078	.01 x 200 v.
C40	BE10078	.01 x 200 v.
C41	BE10026	.02 x 400 v.

C4 and C5 in same unit
C30 and C31 in same unit

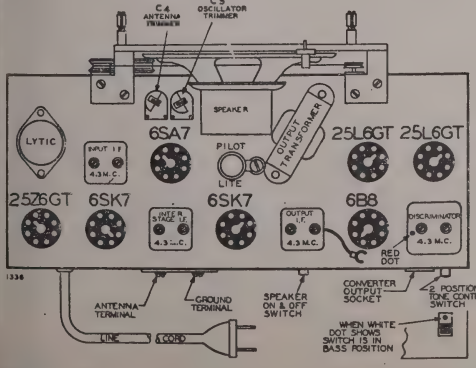
PARTS

T1	BE1365	Antenna coil Permeability tuning Assembly complete
T2		Oscillator coil
T3	BE108189	Input I.F. coil
T4	BE108190	Interstage I.F. coil
T5	BE108191	Output I.F. coil
T6	BE108192	Discriminator coil
T7	BE105126	Output transformer
T8	BE114235	5" P.M. speaker
L1	BE12312	R.F. choke coil
L2	BE12312	R.F. choke coil
S1		On-off switch on volume control
S2	BE12561	On-off speaker switch
P1	BE107290	Pilot lite 110 v.—7½ watt
S3	BE12588B	Tone control switch

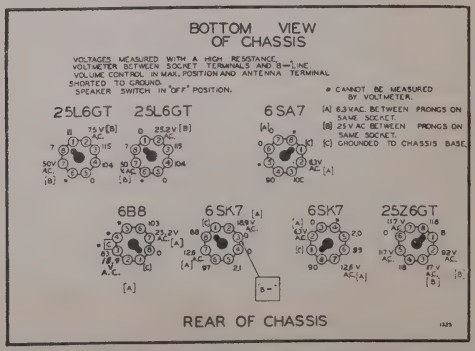
VIEW LOOKING AT BOTTOM OF CHASSIS



NOTE "A" THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE MOVE THE COIL ASSEMBLY VERY SLOWLY.

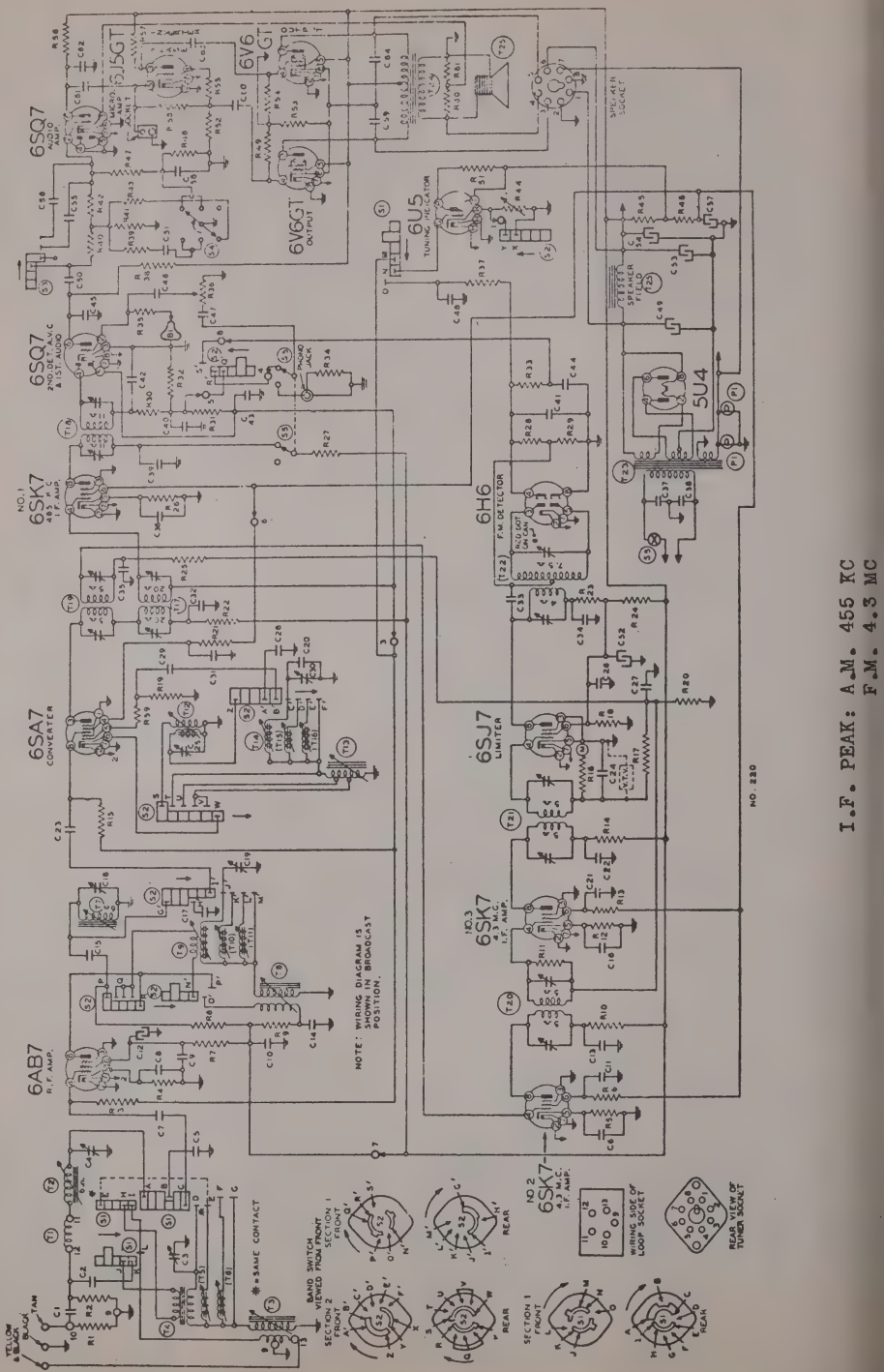


COIL ASSEMBLY VIEW



MODEL 1401, Series A
MODEL 1401, Series B

BELMONT RADIO CORP.



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MODEL 1401, Series A
MODEL 1401, Series B

BELMONT RADIO CORP.

Code No.	Part No.	Description
		PARTS
T1	BE111236	Loop antenna assembly
T2	BE111195	B.C. antenna coil
T3	BE111232	F.M. antenna coil
T4	BE111233	9 mc. antenna coil
T5	BE111234	12 mc. antenna coil
T6	BE111235	15 mc. antenna coil
T7	BE10962	B.C. R.F. coil
T8	BE10967	F.M. R.F. coil
T9	BE10964	9 mc. R.F. coil
T10	BE10966	12 mc. R.F. coil
T11	BE10965	15 mc. R.F. coil
T12	BE110161	B.C. oscillator coil
T13	BE110178	F.M. oscillator coil
T14	BE110175	9 mc. oscillator coil
T15	BE110177	12 mc. oscillator coil
T16	BE110176	15 mc. oscillator coil
T17	BE108177	455 kc. input I.F. transformer
T18	BE108176	455 kc. output I.F. transformer
T19	BE108197	1st F.M. I.F. transformer
T20	BE108198	2nd F.M. I. F. transformer
T21	BE108197B	Limiter I.F. transformer
T22	BE108199	Detector I.F. transformer
T23	BE104262	Power transformer
T24	BE105115	Output transformer
T25	BE114237	12" dynamic speaker
S1	BE125148	Antenna bandswitch
S2	BE125147	R.F., oscillator, audio bandswitch
S3	BE125149	Treble switch
S4	BE125123	Bass switch
S5	BE125125	Off-radio-phono switch
P1	BE10794	2 6-8 volts pilot light T44
B1	BE11622	Bias cell 1-252

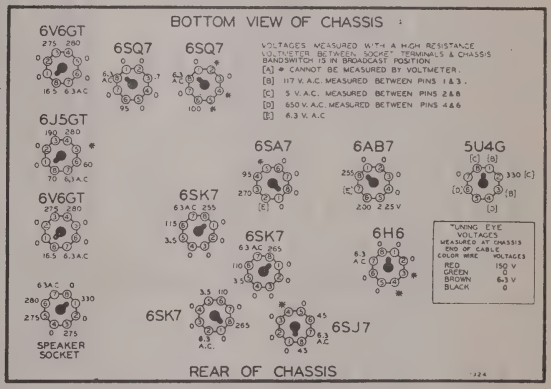
RESISTORS

R1	BE130232	25M ohm—½ w.
R2	BE130232	25M ohm—½ w.
R3	BE13019	1 megohm—½ w.
R4	BE13084	700 ohm—½ w.
R5	BE130339	350 ohm—½ w.
R6	BE13023	2M ohm—½ w.
R7	BE13076	30M ohm—½ w.
R8	BE130235	1500 ohm—½ w.
R9	BE13023	2M ohm—½ w.
R10	BE13023	2M ohm—½ w.
R11	BE130342	350M ohm—½ w.
R12	BE130339	350M ohm—½ w.
R13	BE13023	2M ohm—½ w.
R14	BE13023	2M ohm—½ w.
R15	BE13019	1 megohm—½ w.
R16	BE130172	250M ohm—½ w.
R17	BE13019	1 megohm—½ w.
R18	BE130149	15M ohm—½ w.
R19	BE130232	25M ohm—½ w.
R20	BE13020	100M ohm—½ w.
R21	BE13023	2M ohm—½ w.
R22	BE13023	2M ohm—½ w.
R23	BE13026	1M ohm—½ w.
R24	BE130291	50M ohm—1 w.
R25	BE130172	250M ohm—½ w.
R26	BE13081	250 ohm—½ w.
R27	BE13023	2M ohm—½ w.
R28	BE130163	400M ohm—½ w.
R29	BE130163	400M ohm—½ w.
R30	BE13094	50M ohm—½ w.
R31	BE13019	1 megohm—½ w.
R32	BE130172	250M ohm—½ w.
R33	BE13019	1 megohm—½ w.
R34	BE1303	500M ohm—½ w.
R35	BE13019	1 megohm—½ w.
R36	BE101249	1 megohm—volume control
R37	BE1304	3 megohm—½ w.
R38	BE130172	250M ohm—½ w.
R39	BE130232	25M ohm—½ w.
R40	BE13080	150M ohm—½ w.
R41	BE130172	250M ohm—½ w.
R42	BE130309	350M ohm—½ w.
R43	BE13066	75M ohm—½ w.
R44	BE101248	25M ohm—tuning eye control
R45	BE130319	10M ohm—2 w.
R46	BE130199	1500 ohm—1 w.
R47	BE13080	150M ohm—½ w.
R48	BE130146	2 megohm—½ w.
R49	BE1303	500M ohm—½ w.
R51		500M ohm—in tuning eye cable
R52	BE13094	50M ohm—½ w.
R53	BE130317	250 ohm—2 w.
R54	BE1303	500M ohm—½ w.
R55	BE130218	5M ohm—½ w.
R56	BE130172	250M ohm—½ w.
R57	BE13094	50M ohm—½ w.
R58	BE1303	500M ohm—½ w.
R59	BE130215	25 ohm—½ w.
R60	BE13082	10M ohm—½ w.
R61	BE130235	1500 ohm—½ w.

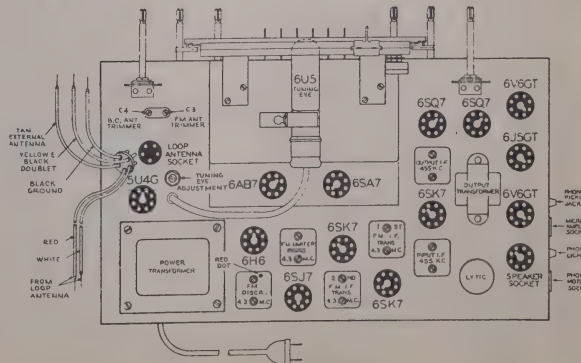
CONDENSERS

C1	BE1292	.0005 mica
C2	BE10047	.002-600 v.
C3	BE124163	F.M. antenna trimmer
C4	BE124163	B.C. antenna trimmer
C5	BE129167	.0002 silver mica
C6	BE10078	.01-200 v.
C7	BE1292	.0005 mica
C8	BE10020	.1-200 v.
C9	BE1001	.1-400 v.
C10	BE10074	.1-400 v.
C11	BE100-11	.01-400 v.
C12	BE119-69	16-350 v. lytic
C13	BE100-11	.01-400 v.
C14	BE100-26	.02-400 v.
C15	BE129168	.00001 mica
C16	BE10078	.01-200 v.
C17	BE129167	.0002 silver mica
C18	BE124139	B.C. R.F. trimmer
C19	BE124162	F.M. R.F. trimmer
C20	BE129168	.00001 mica
C21	BE10011	.01-400 v.
C22	BE10011	.01-400 v.
C23	BE1292	.0005 mica
C24	BE12938	.00005 mica
C25	BE124161	B.C. oscillator trimmer
C26	BE10020	.1-200 v.
C27	BE100-9	.05-200 v.
C28	BE129175	.000135 silver mica
C29	BE1295	.0001 mica
C30	BE124145	F.M. oscillator trimmer
C31	BE10074	.1-400 v.
C32	BE100-11	.01-400 v.
C33	BE1295	.0001 mica
C34	BE100123	.02-200 v.
C35	BE100123	.02-200 v.
C36	BE100-20	.1-200 v.
C37	BE10061	.02-600 v.
C38	BE10061	.02-600 v.
C39	BE1001	.1-400 v.
C40	BE129161	.0001 mica
C41	BE1295	.0001 mica
C42	BE129161	.0001 mica
C43	BE10020	.1-200 v.
C44	BE1295	.0001 mica
C45	BE12912	.00025 mica
C46	BE10019	.006-600 v.
C47	BE10020	.1-200 v.
C48	BE1009	.05-200 v.
C49	BE119112	30 mfd. x 450 w.v. lytic
C50	BE1001	.1-400 v.
C51	BE100118	.008-600 v.
C52	BE119112	10 mfd. x 350 w.v. lytic
C53	BE119-112	30 mfd. x 450 w.v. lytic
C54	BE119-73B	16 mfd. x 400 w.v. lytic
C55	BE12938	.00005 mica
C56	BE129166	.000125 mica
C57	BE119-69	16 mfd. x 350 w.v. lytic
C58	BE100-12	.003-600 v.
C59	BE100-65	.015-600 v.
C60	BE1009	.05-200 v.
C61	BE10013	.05-400 v.
C62	BE12912	.00025 mica
C63	BE10013	.05-400 v.
C64	BE10065	.015-600 v.

C12 and C57 are in same unit.
C49 and C52 and C53 are in same unit.



VOLTAGE CHART



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SETTING PUSHBUTTONS

Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the slot on top of each pushbutton.

Next pull one of the pushbuttons all the way out as far as it will come (pull, with fingers on top and bottom of button). Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button hard all the way in to lock the station in place. (push directly on front of button) Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock in place when setting up the station.

To change stations simply repeat the procedure above.

FOR DATA ON SEEBURG TYPE B AUTOMATIC RECORD CHANGER, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".

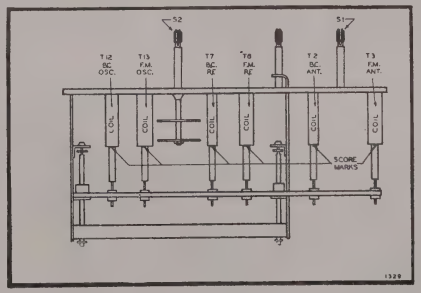
ALIGNING INSTRUCTIONS

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltage, defective tubes, condensers and resistors. In order to properly align this radio, the chassis should be removed from the cabinet. Although the short wave bands on this radio are of the band spread type the Alignment Procedure is not difficult. However because each short wave scale covers only a small portion of the short wave spectrum you must do the work carefully and your oscillator must be accurate.

Do not realign the band spread scales unless you are positive they are out of adjustment. When adjustment is necessary proceed as follows.

Rotate each iron core until the fine score marks are even with the edge of the coil forms.

You are now ready to continue with the trimmer adjustments as shown on the alignment chart.



IRON CORE ADJUSTMENT VIEW

- Volume control—Minimum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:
- An all wave signal generator which will provide an accurately calibrated unmodulated signal at the test frequencies as listed.
- Vacuum Tube Voltmeter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf. and 100 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted in Order Shown	Trimmer Function	Adjustment
F. M. I. F.	4.3 Mc.	.1 MFD.	Grid of 6SK7 No. 3	F.M.	45 Mc.	Two Trimmers on Top of T21	Limiter I. F. Coil	Adjust to Maximum Voltage (See Note "A")
	4.3 Mc.	.1 MFD.	Grid of 6SA7	F.M.	45 Mc.	Two Trimmers on Top of T19	Input I. F. Coil	Adjust to Maximum Voltage (See Note "A" and "B")
	4.3 Mc.	.1 MFD.	Grid of 6SK7 No. 2	F.M.	45 Mc.	Two Trimmers on Top of T20	2nd I. F. Coil	Adjust to Maximum Voltage (See Note "A" and "C")
	4.3 Mc.	.1 MFD.	Grid of 6SJ7	F.M.	45 Mc.	Trimmer with red dot on top of T22	Disc. I. F. Coil	Adjust to zero voltage (See Note "D")
	4225 and 4375 K.C.	.1 MFD.	Grid of 6SJ7	F.M.	45 Mc.	Trimmer without red dot on top of T22	Disc. I. F. Coil	See Notes "D" and "E"
F. M. R. F.	50.5 Mc.	100 ohms	Doublet Antenna Lead	F.M.	50.5 Mc.	(See Trimmer View) C30 (See Trimmer View) C19 (See Trimmer View) C3	Osc. R. F. Ant.	Adjust to Maximum Voltage (See Note "A")

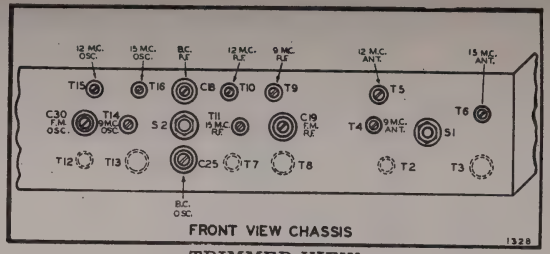
NOTE "A". Connect a D.C. reading vacuum tube voltmeter in parallel with C24. Use only enough signal to get a medium scale deflection.

NOTE "B". Before aligning this stage, one trimmer of T20 must be adjusted to maximum capacity and the other adjusted to minimum capacity.

NOTE "C". Do not realign or "Go over" the I.F. adjustments after the above procedure has been followed or an unsymmetrical wave shape will result.

NOTE "D". Connect across prongs 4 and 8 of 6H6 socket, a D.C. reading vacuum tube voltmeter.

NOTE "E". Adjust trimmer so that the same voltage reading will be obtained with the signal generator set at both 4225 K.C. and 4375 K.C. One of these frequencies will produce a negative voltage and the voltmeter leads must be reversed if a zero-center meter is not available.



TRIMMER VIEW

I. F.—R. F.—Alignment

CAUTION: A D.C. reading vacuum tube voltmeter must be used to make the following adjustments.

- Tone control—Treble
- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted in Order Shown	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 No. 1	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top of T18	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top of T17	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C25 (See Trimmer View) C18 (See Trimmer on Top) C4	Osc. R. F. Ant.	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T7 Rotate Core T2 (See Iron Core Adjustment View)	R. F. Ant.	Adjust to maximum output

NOTE: The F. M., I. F. and R. F. band **MUST** be aligned before the three standard short wave bands can be properly aligned. The osc. and R. F. adjustments must be done simultaneously for each of the standard short wave bands.

31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) T14 (See Trimmer View) T9 (See Trimmer on Top) T4	Osc. R. F. Ant.	Adjust to maximum output
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15 (See Trimmer View) T10 (See Trimmer View) T5	Osc. R. F. Ant.	Adjust to maximum output
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16 (See Trimmer View) T11 (See Trimmer View) T6	Osc. R. F. Ant.	Adjust to maximum output

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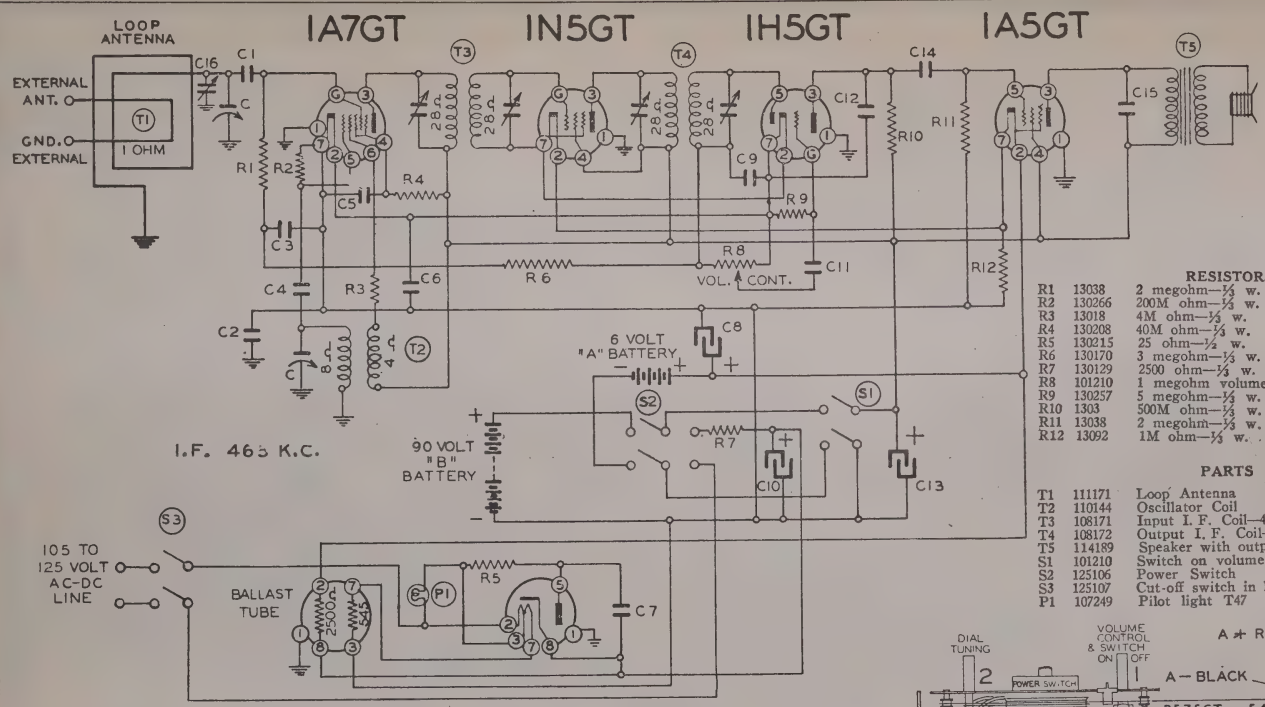


RESISTORS

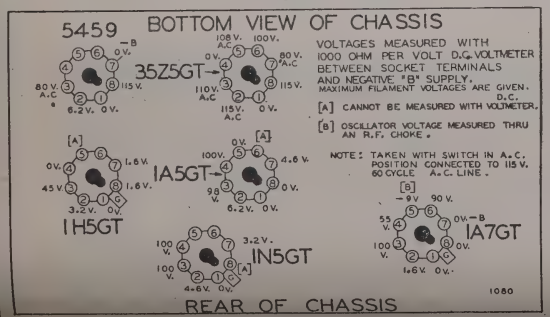
R1	13038	2 megohm—⅓ w.
R2	130266	200M ohm—⅓ w.
R3	13018	4M ohm—⅓ w.
R4	130208	40M ohm—⅓ w.
R5	130215	25 ohm—½ w.
R6	130170	3 megohm—⅓ w.
R7	130129	2500 ohm—⅓ w.
R8	101210	1 megohm volume control
R9	130257	5 megohm—⅓ w.
R10	1303	500M ohm—⅓ w.
R11	13038	2 megohm—⅓ w.
R12	13092	1M ohm—⅓ w.

PARTS

T1	111171	Loop Antenna
T2	110144	Oscillator Coil
T3	108171	Input I. F. Coil—465 kc.
T4	108172	Output I. F. Coil—465 kc.
T5	114189	Speaker with output transformer
S1	101210	Switch on volume control
S2	125106	Power Switch
S3	125107	Cut-off switch in line cord
P1	107249	Pilot light T47

CONDENSERS

C	102125	2 gang variable condenser
C1	12912	.00025
C2	100110	.2 mfd. x 400 v.
C3	1009	.05 x 200 v.
C4	12912	.00 25
C5	1009	.05 x 200 v.
C6	10020	.1 x 200 v.
C7	10011	.01 x 400 v.
C8	119104	Lytic 200 mfd. x 6 w. v.
C9	1295	.0001 mfd.
C10	119104	Lytic 40 mfd. x 150 w. v.
C11	10025	.002 x 600 v.
C12	1292	.0005 mfd.
C13	119104	Lytic 20 mfd. x 150 w. v.
C14	10011	.01 x 400 v.
C15	10025	.002 x 600 v.
C16	124116	Adjustable antenna trimmer C8, C10 and C13 in same unit


5459 BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT D.C. VOLTMETER BETWEEN SOCKET TERMINALS AND NEGATIVE "B" SUPPLY. MAXIMUM FILAMENT VOLTAGES ARE GIVEN.
[A] CANNOT BE MEASURED WITH VOLMETER.
[B] OSCILLATOR VOLTAGE MEASURED THRU AN R.F. CHOKE.
NOTE: TAKEN WITH SWITCH IN A.C. POSITION CONNECTED TO 115 V. 60 CYCLE A.C. LINE.
35Z5GT
1A5GT
1H5GT
1N5GT
1A7GT
REAR OF CHASSIS
1080

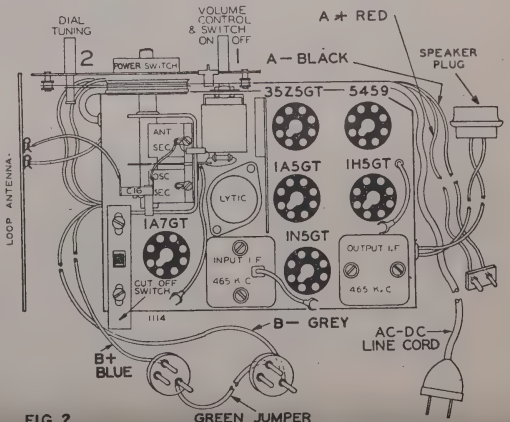


FIG. 2

BRUNSWICK RADIO DIV.—
RADIO & TELEVISION, INC.

MODELS 295, 298
MODEL 300 Amp.-Phono

TRIMMER ADJUSTMENTS					
Trimmers:	Osc.	Inter.	Ant.	Pad.	
S.W.	C_4		C_5		
Pol.	C_6		C_7		
B.C.	C_8	C_9	C_{10}	C_{11}	C_{12}

BAND SWITCH FROM LEFT TO RIGHT
Band Sw. shown in No.1 position.
1. P.B. 2. B.C 3. Police 4. S.W 5. Phono
Sw. sects. marked A to G in
order, Sect. A being closest to
knob.

MODELS 295, 298

BRUNSWICK RADIO DIV.— RADIO & TELEVISION, INC.

ALIGNMENT INSTRUCTIONS

Re-alignment of this receiver should not be attempted unless all other possible causes of faulty operation have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave bands, and an output meter for indicating the effect of adjustments are required.
During the alignment procedure all adjustments should be made under the following conditions:

1) Line Voltage as indicated on instruction sheet.
2) Volume & Treble controls at maximum volume positions, Bass at Minimum.
3) Minimum Input from signal generator.

I. F. Adjustment - The signal generator is set at 455KC and is connected to the grid of the converter tube (6SA7) through a .5 MFD condenser. Be sure to connect a resistor of approximately 25,000 Ohms between the converter grid and ground so that the grid circuit is at ground potential for D.C. It is necessary to disconnect the grid from the rest of the circuit.

The Input I. F. Transformer trimmers-are both adjusted for maximum output as indicated by the output meter connected across either the voice coil or the primary coil of the loud speaker.

The Output I. F. Transformer trimmers-are adjusted for maximum output as indicated on the output meter. The Input I.F. should now be rechecked for maximum response.

Short Wave - Set the band switch to the short wave band. Connect the signal generator thru a standard dummy antenna to the antenna and ground leads of the receiver. Set the generator at 17MC; turn the condenser until a response is indicated. The pointer should coincide with the 17MC mark on the dial. Adjust the short wave antenna trimmer (#5, see diagram) for maximum output while rocking the condenser gang from left to right.

POLICE BAND
With signal generator set at 6 megacycles, tune in the signal. The pointer setting should correspond with the 6MC marking on the dial. If this is not so, adjust the police oscillator trimmer (C-6, see diagram) till it does. Now adjust the police antenna trimmer (C7) for maximum output.

BROADCAST BAND
It is desirable to align this band on the loop. The signal generator is coupled to the receiver by means of a 2 or 3 turn loop. Set the band switch in the broadcast position and condenser plates completely out of mesh. Set the signal generator at 1630KC and adjust the broadcast oscillator trimmer (#8, see diagram) until a response is indicated on the output meter. The generator is now set at 1400KC. Turn the variable condenser until a response is indicated. The dial pointer should now coincide with the 1400KC mark on the dial. Now adjust the broadcast inter-stage trimmer (#9) for maximum. Set the generator at 600KC and rotate the variable condenser until a response is indicated. Adjust the broadcast oscillator padder condenser (#11) for maximum response while "Rocking" the gang condenser. The antenna loading coil (#12) is now checked for maximum response. The High Frequency adjustment should then be re-checked.

Push Button Alignment
Looking into the back of the cabinet directly behind the buttons, above the dial will be seen two rows of screws. These are painted in various colors. Viewed from the rear these are; from left to right, YELLOW, BLUE, BLUE, ORANGE, and ORANGE. Each of these may be adjusted to cover a band of frequencies as tabulated below:

Yellow - 1130 to 1600 kilocycles
Blue - 690 to 1180 kilocycles
Orange - 540 to 950 kilocylces

The bottom row of adjusting screws are the oscillators which determine the frequency of the station to be received. The upper row is for the antenna adjustment.

The simplest procedure, when a suitable oscillator is available, is to feed the desired frequency into the antenna, depress the button; turn the oscillator screw till the signal is picked up, then reduce the output from the oscillator so that it is just audible. Now adjust the antenna trimmer for maximum. Proceed to the next button and repeat the operation.
In the absence of such equipment, turn the Band Switch for dial tuning of broadcast stations. Start at the low frequency end of the band and tune in the program of the station it is desired to receive. Note the frequency of this station. Without touching the tuning, throw the Band Switch over to the Push Button position. Depress the first button, corresponding to the orange screws. Slowly rotate the lower (oscillator) orange screw till the same program is received. Check this by switching back to dial tuning. (Broadcast position on the band switch). When this has been determined, the signal may now be clarified by carefully adjusting the trimmer of the same color (orange) directly above it. Now repeat the operation by tuning in, on the dial, the next station, of a higher frequency that it is desired to set up; and so on until all five have been aligned. Note that there are two BLUE and two ORANGE SETS of screws. Each button will cover only a range of frequencies as noted above, and therefore a group of stations falling within these limits must be selected. The antenna trimmer in each case is directly over the corresponding oscillator.

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MODELS 296FM, 299FM

BRUNSWICK RADIO DIV.— RADIO & TELEVISION, INC.

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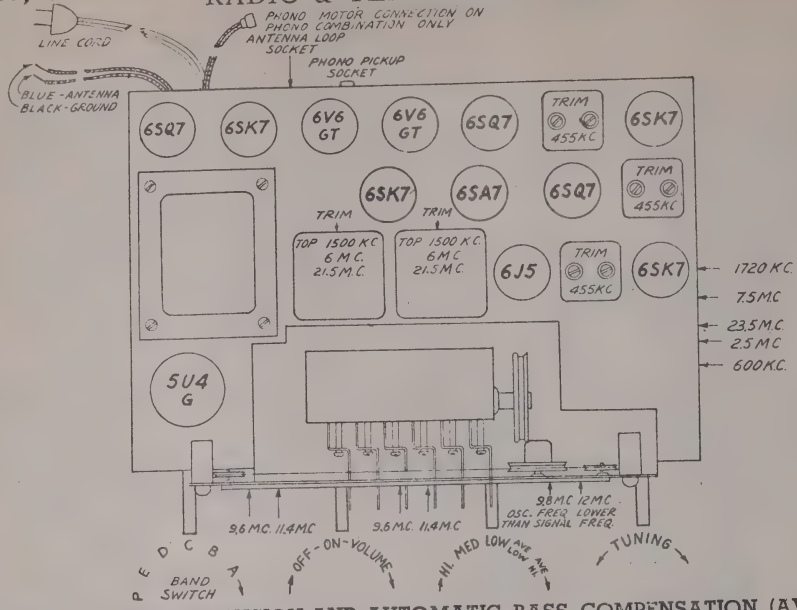
MODELS 400, 400 1/2, 500, 600

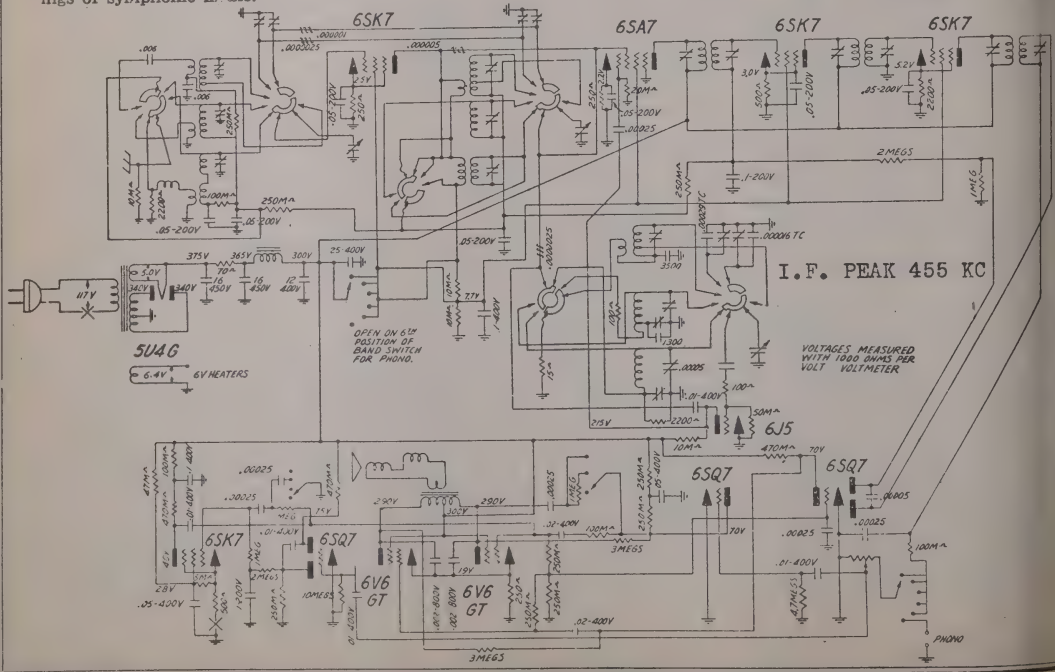
BRUNSWICK RADIO DIV.— RADIO & TELEVISION, INC.



AUTOMATIC VOLUME EXPANSION AND AUTOMATIC BASS COMPENSATION (AVE-ABC):

These two devices are incorporated in one, and their function is entirely automatic. They function by turning the third knob from the left to the fourth and fifth positions from the left. The fourth position corresponds to a maximum of bass, a minimum of treble, and a minimum of needle scratch on phonograph records. The fifth position corresponds to a maximum of treble.

This device can be used on organ, chamber, or symphonic music. IT SHOULD NOT BE USED ON VOICE OR SHORT WAVES, and is not desirable on popular orchestrations. It is especially effective on phonograph recordings of symphonic music.



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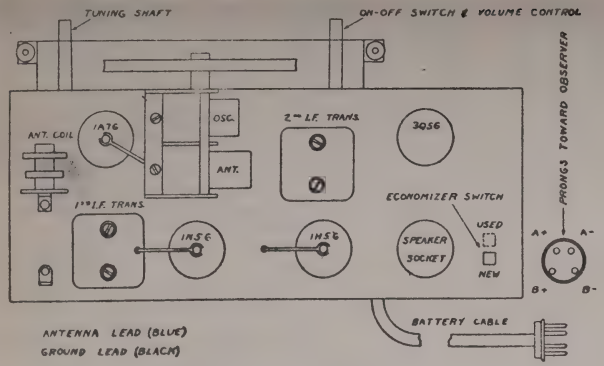


Fig. 1—Top View

POWER SUPPLY

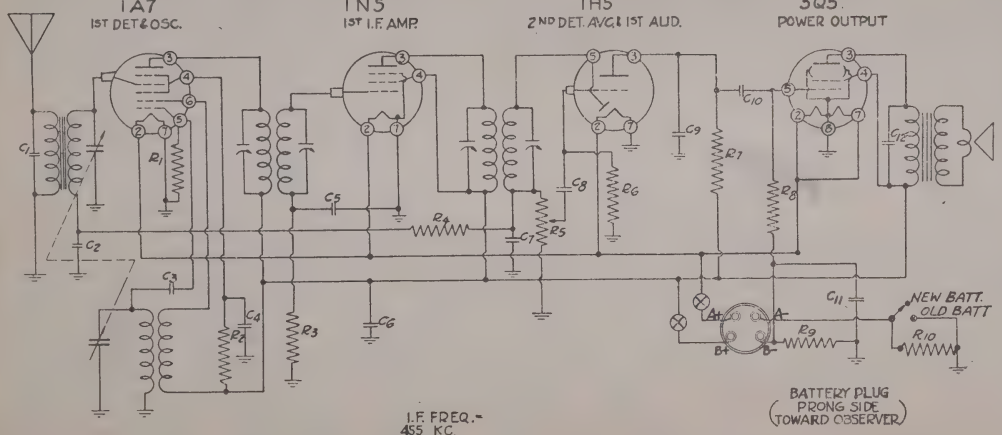
This receiver is designed to operate on a single unit Ray-O-Vac No. AB-82, Burgess 17G-D60, Eveready 748, Bond 0528 or General 60DL-11L Battery. No other batteries are required as this battery is a combination 90 volt "B" battery and a 1½ volt "A" battery. To use separate batteries a P2863 battery adapter cable is required.

Antenna Coil (Part No. G-5724)

Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, AVC; No. 2, grid; No. 3, Ant.; No. 4, ground. No. 4 is grounded to the mounting bracket.

Oscillator Coil (Part No. 2412) (Red Dot)

Looking at the connection end (with dot) starting at the chassis in a clockwise direction the terminals are: No. 1, grid; No. 2, plate; No. 3 B+; No. 4, ground.



RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	200,000	½	R6	5 Meg.	¼
R2	30,000	½	R7	1 Meg.	¼
R3	5 Meg.	¼	R8	1 Meg.	¼
R4	1 Meg.	¼	R9	440 10%	¼
R5	500,000	V.C.			

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.00005	Mica	C7	.00025	Mica
C2	.05	200	C8	.01	400
C3	.00005	Mica	C9	.00025	Mica
C4	.1	200	C10	.01	400
C5	.002	400	C11	20 (Elect.)	25
C6	.001	200	C12	.005	400

ALIGNMENT

REMOVE CHASSIS FROM CABINET. SET SIGNAL GENERATOR TO 455 KC. AND CONNECT OUTPUT TO GRID OF 1A7 THRU A .05 MFD. CONDENSER. ALIGN ALL I.F. TRIMMERS TO PEAK.

CONNECT SIGNAL GENERATOR THROUGH A .0002 CONDENSER TO ANTENNA. WITH GANG CONDENSER AT MINIMUM CAPACITY, ADJUST OSCILLATOR TRIMMER AT 1730KC.

SET GENERATOR TO 1400KC. TUNE IN SIGNAL AND ADJUST ANTENNA TRIMMER TO PEAK.

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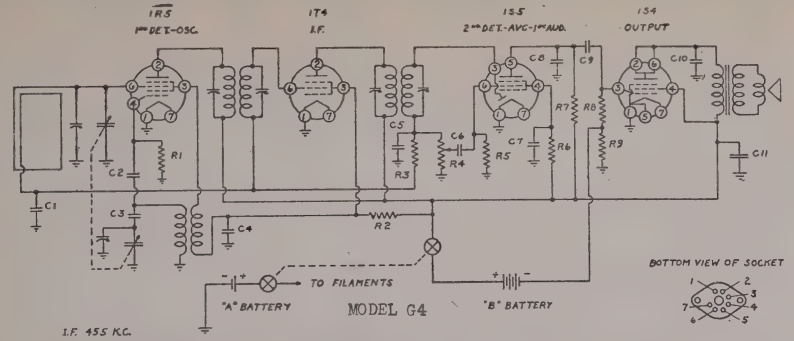
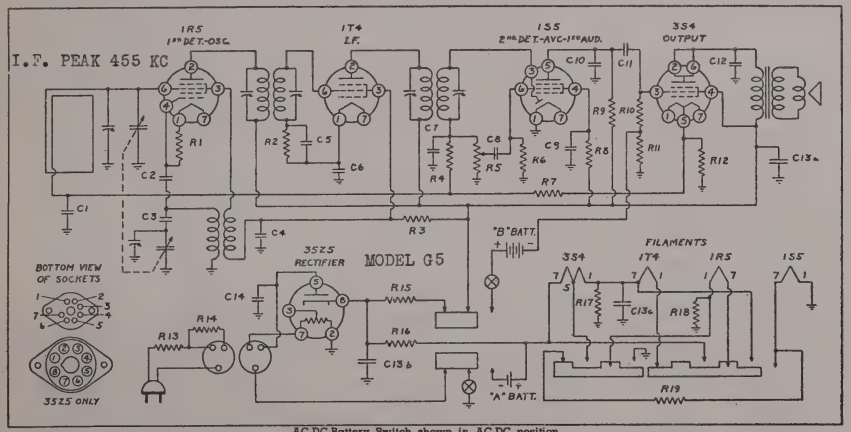


RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	100,000	¼	R6	4,000,000	¼
R2	5,000—10%	¼	R7	1,000,000	¼
R3	2,000,000—10%	¼	R8	2,000,000	¼
R4	1,000,000	V.C.	R9	750—10%	¼
R5	10,000,000	¼			

CONDENSERS

No.	Capacity (Mid.)	Volts	No.	Capacity (Mid.)	Volts
C1	.05	200	C7	.05	200
C2	.0001	Mica	C8	.00005	Mica
C3	.000485-2%	Mica	C9	.005	200
C4	.01	120	C10	.01	200
C5	.00025	Mica	C11	10.	60
C6	.01	200			



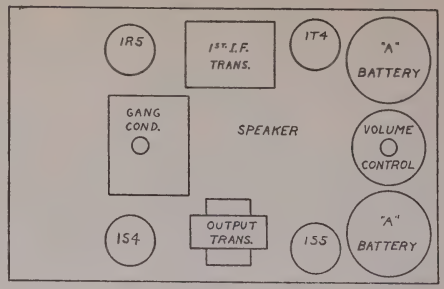
AC-DC-Battery Switch shown in AC-DC position.

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	100,000	¼	R11	750—10%	½
R2	5,000,000	¼	R12	3,000—10%	¼
R3	5,000—10%	¼	R13	80 } part of	
R4	2,000,000—10%	¼	R14	350 } line cord	
R5	1,000,000	V.C.	R15	2,000—10%	½
R6	10,000,000	¼	R16	1,750—10%	4
R7	3,000,000—10%	¼	R17	1,700—10%	¼
R8	4,000,000	¼	R18	1,000—10%	¼
R9	1,000,000	¼	R19	55—10%	½
R10	2,000,000	¼		(wire wound)	

CONDENSERS

No.	Capacity (Mid.)	Volts	No.	Capacity (Mid.)	Volts
C1	.05	200	C9	.05	200
C2	.0001	Mica	C10	.00005	Mica
C3	.000485-2%	Mica	C11	.005	200
C4	.01	120	C12	.01	200
C5	.01	120	C13a	20.	150
C6	.1	120	C13b	30.	150
C7	.00025	Mica	C13c	100.	12
C8	.01	200	C14	.05	400

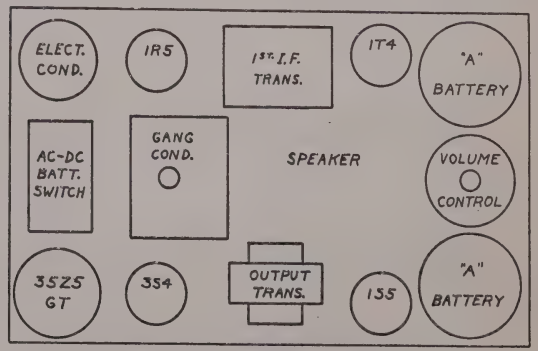


TOP VIEW OF MODEL G4

VOLTAGES MODELS G4 and G5

Volume control maximum and no signal tuned in. Meter 1000 ohms per volt, 150 volt scale.

Plate (2) of 1R5 tube to ground	66	volts
Screen (3) of 1R5 tube to ground	45	volts
Plate (2) of 1T4 tube to ground	66	volts
Screen (3) of 1T4 tube to ground	45	volts
Plate (2) and (6) of 1S4 tube to ground	66	volts
Screen (4) of 1S4 tube to ground	67½	volts



TOP VIEW OF MODEL G5

ALIGNMENT FOR 4,G5

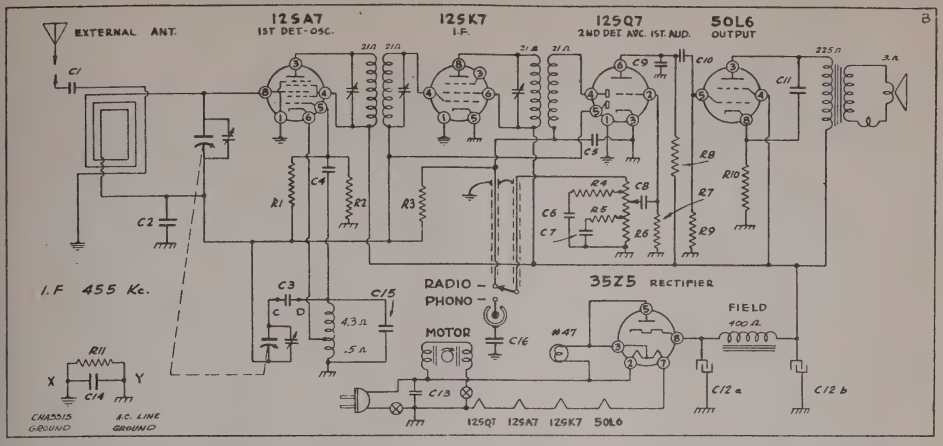
I.F. PEAK - 455 KC
TRIM OSC. - 1730 KC
TRIM ANT. - 1400 KC.

BATTERIES

1 EVEREADY 467 OR BURGESS "B" BATTERY AND TWO #2 FLASHLIGHT CELLS.

CONTINENTAL RADIO & TELEV. CORP.

MODELS L5 LATE, XL5



Volume control tapped at 100,000 ohms and 200,000 ohms from zero end.

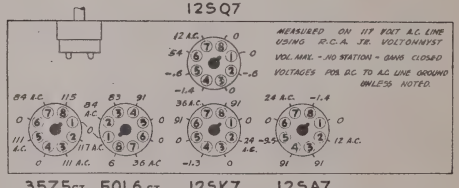
In model L5 only, X and Y are connected together. R11, C14, and C3 are not used. C is connected to D.

RESISTORS

Circuit	Ohms	Type
R1	10,000,000	½w
R2	25,000	½w
R3	1,000,000	½w
R4	50,000	½w
R5	30,000	½w
R6	50,000	V.C.
R7	5,000,000	½w
R8	250,000	½w
R9	500,000	½w
R10	150	½w
R11	150,000	½w

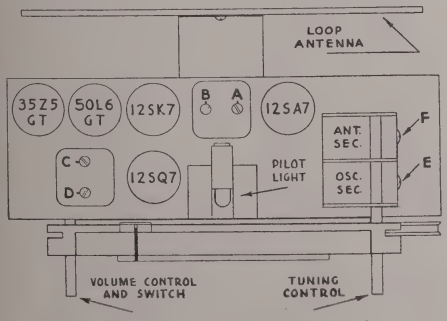
CONDENSERS

Circuit	Capacity	Type
C1	.005	600V
C2	.1	200V
C3	.02	400V
C4	.00005	Mica
C5	.00025	Mica
C6	.01	400V
C7	.01	400V
C8	.01	400V
C9	.0005	Mica
C10	.01	400V
C11	.02	400V
C12a	30. Elect	150V
C12b	50. Elect	150V
C13	.05	400V
C14	.2	200V
C14	.16 (XL5 only)	200V
C15	.00002-10%	Mica
C16	.2	200V

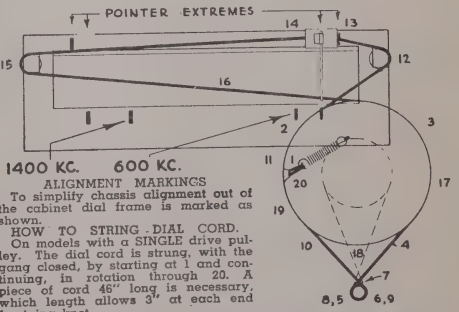


Voltages are positive D.C. unless noted. Measured from chassis with R.C.A. Jr. Volt Ohmyst. On XL5 Series use floating ground instead of chassis.

Set to be used on 110-120 volts A.C. (Alternating Current) 60 cycles, ONLY. Current consumption: Radio only, 25w. Phono. only, 15w.



Top View—Tube and Trimmer Location



ALIGNMENT MARKINGS

To simplify chassis alignment out of the cabinet dial frame is marked as shown.

HOW TO STRING DIAL CORD.

On models with a SINGLE drive pulley. The dial cord is strung, with the gang closed, by starting at 1 and continuing, in rotation through 20. A piece of cord 46" long is necessary, which length allows 3" at each end for tying knot.

On models with DOUBLE drive pulley the dial cord is in two pieces. The pointer cord is on the large pulley starting at 1 and continuing through 20 BUT in the following special order, 1, 2, 3, 4, 18, 19, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20. The drive cord is on the smaller dotted pulley, in the dotted position.

To clarify dial cord arrangement the dial frame is shown as transparent.

ALIGNMENT

1	Tuning Cond. Ant. Stator	.1 Mfd.	455 Kc.	A, B, C, D, I.F.	NOTE: IF ANT. TRIMMER IS ON LOOP, USE THREE-TURN LOOP 10" IN DIAMETER IN SERIES WITH 400 OHMS CONNECTED TO SIGNAL GENERATOR.
2	Tuning Cond. Ant. Stator	.1 Mfd.	1630 Kc.	E Osc.	
3	Loop Radiator	Two feet from Radio No Connection	1400 Kc.	F Ant. (See Note)	

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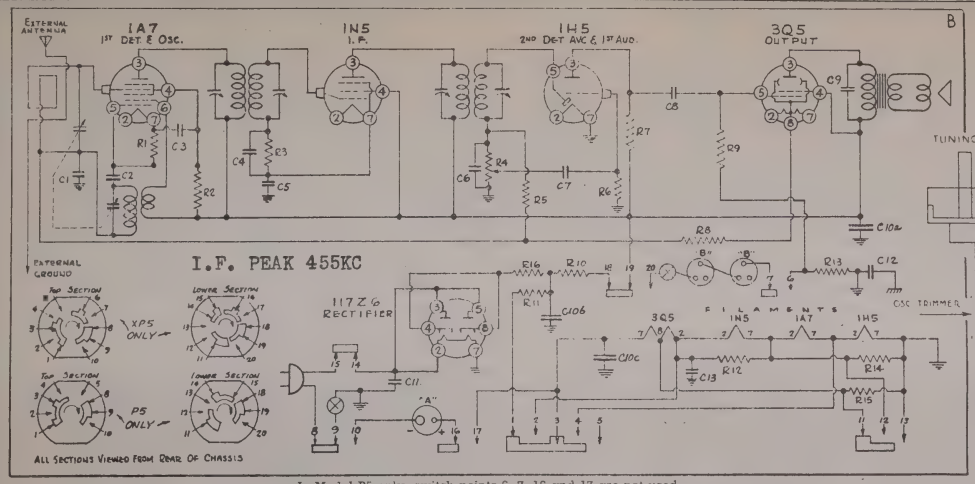
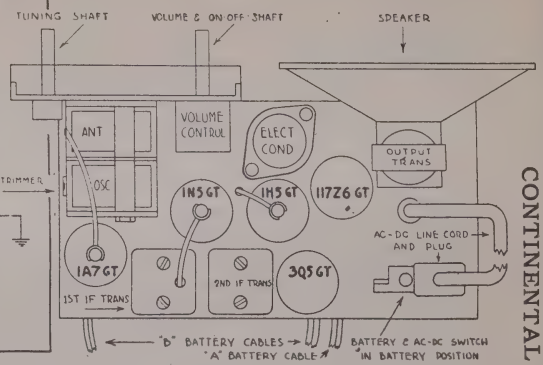




In Model P5 only, switch points 6, 7, 16 and 17 are not used.
Switch point 5 is not used in either model.

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	200,000	½	R9	2,000,000	½
R2	50,000	½	R10	3,500—10%	½
R3	5,000,000	½	R11	2,600—10%	5
R4	1,000,000	V.C.	R12	300—10%	½
R5	3,000,000	¼	R13	440—10%	½
R6	15,000,000	½	R14	300—10%	½
R7	1,000,000	½	R15	3,000—10%	½
R8	10,000,000	¼	R16	30	½

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.05	200	C9	.002	600
C2	.00005	Mica	C10a	50. Elect.	150
C3	.01	400	C10b	30. Elect.	150
C4	.001	Mica	C10c	100. Elect.	25
C5	.1	200	C11	.05	400
C6	.00025	Mica	C12	.05	400
C7	.001	200	C13	100. Elect.	10
C8	.001	400			

ALIGNMENT: I.F. PEAK - 455 KC
OSC. TRIMMER - 1600 KC
ANT. TRIMMER - 1400 KC

Oscillator Coil (Part No. P5020)

Looking at the connection end in a clockwise direction starting at the chassis the terminals are No. 1, grid; No. 2, plate; No. 3, B+; No. 4, ground.

Primary—No. 2 and No. 3—Resistance.....2.2 ohms
Secondary—No. 4 and No. 1—Resistance.....4.9 ohms

First I.F. Transformer (Part No. P4859)

Primary—Red white, B+; blue white, plate—Resistance..... 7.5 ohms
Secondary—White, grid; black white, AVC—Resistance.....17.3 ohms

Second I.F. Transformer (Part No. P4874)

Primary—Blue white, plate; red white B+—Resistance.....17.8 ohms
Secondary—White, grid; black white, AVC—Resistance.....13.1 ohms

Power Change Switch

The power change switch connects the tube filaments in series (7½ volts) on AC-DC operation and parallel (1½ volts) on battery operation.

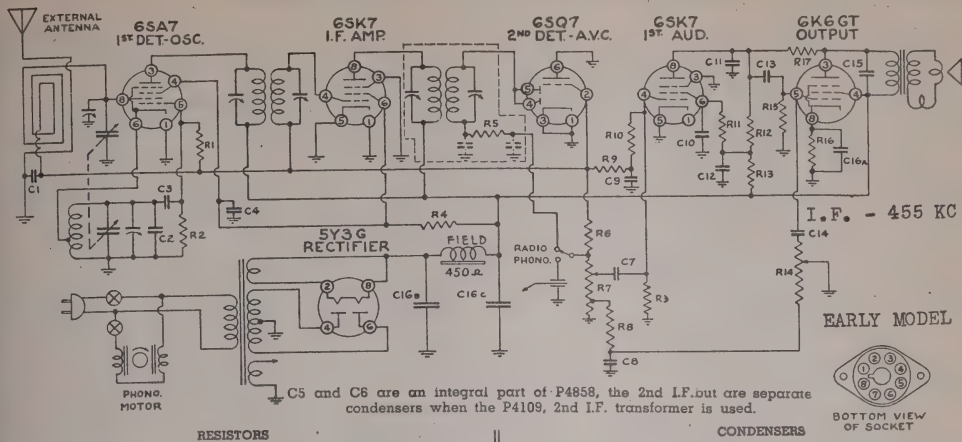
Voltages—Line 117.5 Volts AC—Power Consumption 25 Watts.

Volume control maximum and no signal tuned in. Meter 1000 ohms per volt, 150 volt scale.

Plate (3) of 1A7 tube to common ground	100	volts
Screen (4) of 1A7 tube to common ground	62	volts
Anode grid (6) of 1A7 tube to common ground	100	volts
Filament (2) to (7) of 1A7 tube	1.35	volts
Plate (3) of 1N5 tube to common ground	100	volts
Screen (4) of 1N5 tube to common ground	102	volts
Filament (2) to (7) of 1N5 tube	1.3	volts
Plate (3) of 1H5 tube to common ground	38	volts
Filament (2) to (7) of 1H5 tube	1.35	volts
Plate (3) of 3Q5 tube to common ground	98	volts
Screen (4) of 3Q5 to common ground	102	volts
Filament (7) to (8) of 3Q5 tube	1.3	volts
Filament (2) to (8) of 3Q5 tube	1.35	volts
Plate (3) or (5) of 117Z6 tube to common ground	117.5v.	(AC)
Cathode (4) or (8) of 117Z6 tube to common ground	128	volts
Filament (2) to (7) of 117Z6 tube	117.5v.	(AC)

CONTINENTAL RADIO & TELEV. CORP.

MODELS N6, early; N6, late



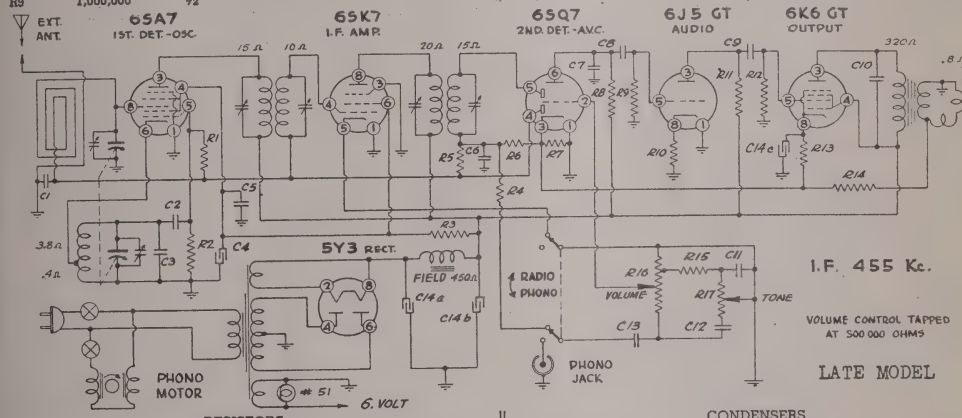
C5 and C6 are an integral part of P4858, the 2nd I.F.but are separate condensers when the P4109, 2nd I.F. transformer is used.

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	10,000,000	½	R10	5,000,000	½
R2	20,000	½	R11	1,000,000	½
R3	5,000,000	½	R12	250,000	½
R4	15,000—10%	2	R13	50,000	½
R5	70,000	½	R14	500,000	T.C.
R6	2,000,000	½	R15	500,000	½
R7	500,000	V.C.	R16	600—10%	½
R8	20,000	½	R17	3,000,000	½
R9	1,000,000	½			

CONDENSERS

No.	Capacity (Mid.)	Volts	No.	Capacity (Mid.)	Volts
C1	.05	200	C10	.05	400
C2	.000025—10%	Mica	C11	.00025	Mica
C3	.00005	Mica	C12	.1	400
C4	.05	400	C13	.01	400
C5	.0001	Mica	C14	.005	600
C6	.0001	Mica	C15	.002	600
C7	.01	400	C16a	20.	25
C8	.02	200	C16b	20.	350
C9	.05	200	C16c	20.	350

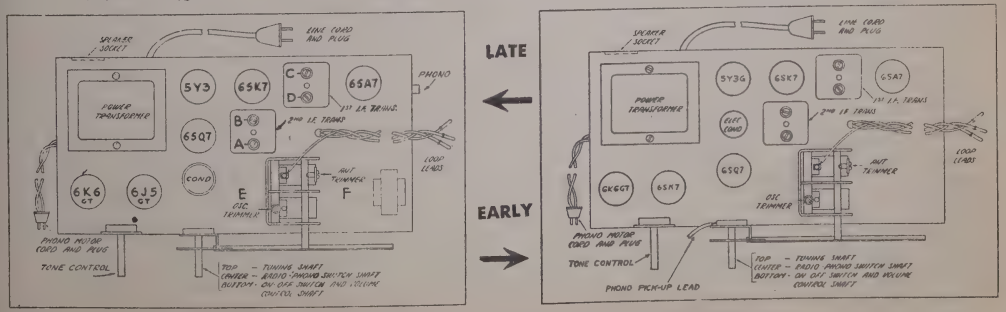


RESISTORS

Circuit	Ohms	Type			
R1	10,000,000	½w.	R9	500,000	½w.
R2	20,000	½w.	R10	3,000	½w.
R3	15,000	2w.	R11	50,000	½w.
R4	150,000	½w.	R12	250,000	½w.
R5	2,000,000	½w.	R13	600	½w.
R6	250,000	½w.	R14	350	½w.
R7	22	½w.	R15	30	½w.
R8	250,000	½w.	R16	1,000,000	V.C.
			R17	500,000	T.C.

CONDENSERS

Circuit	Capacity	Type			
C1	.05	200v.	C8	.01	400v.
C2	.00005	Mica	C9	.02	400v.
C3	.000025	Mica	C10	.02	400v.
C4	8.Elect	150v.	C11	.02	400v.
C5	.05	400v.	C12	.002	600v.
C6	.00025	Mica	C13	.002	600v.
C7	.00025	Mica	C14a	20.Elect.	350v.
			C14b	20.Elect.	350v.
			C14c	12.Elect.	25v.



ALIGNMENT: I.F. 455 KC, OSC. TRIM 1630 KC, ANT TRIM 1400

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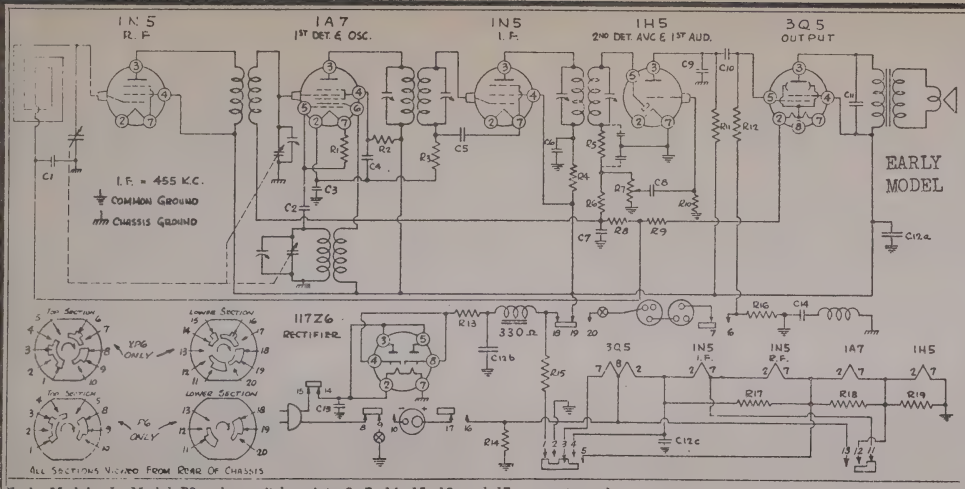
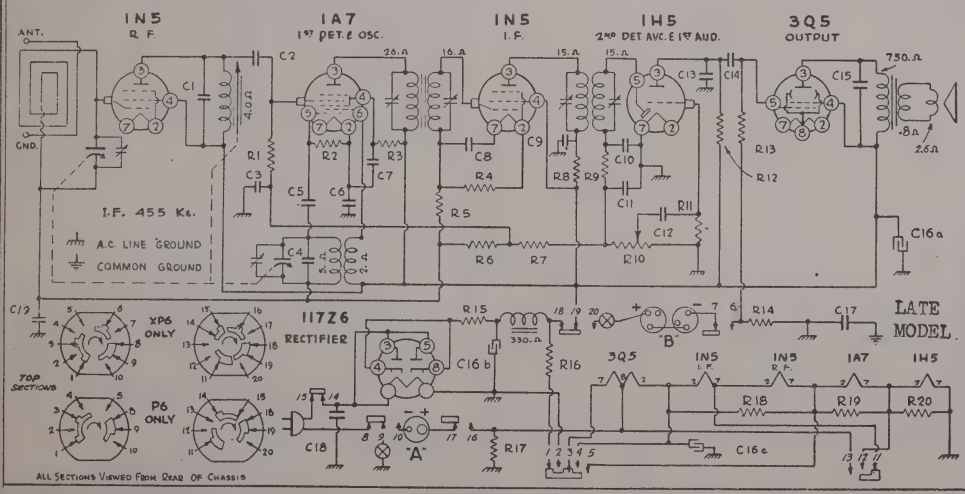


Early Model. In Model P6 only, switch points 6, 7, 14, 15, 16 and 17 are not used.



Late Model. In model P6 only, switch points 6, 7, 16, and 17 are not used. Power switch in line position. Common ground is chassis ground

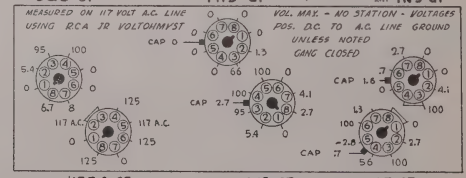
ALIGNMENT: SEE INDEX, SAME AS MODEL B6, XB6

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	200,000	½	R11	1,000,000	½
R2	50,000	½	R12	2,000,000	½
R3	5,000,000	½	R13	22—10%	½
R4	5,000	½	R14	1,000	½
R5	70,000	½	R15	2,150—10%	5
R6	3,000,000	¼	R16	400—10%	½
R7	1,000,000	V.C.	R17	500—10%	½
R8	5,000,000	½	R18	200—10%	½
R9	10,000,000	¼	R19	110—10%	½
R10	15,000,000	½			

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.05	200	C9	.00025	Mica
C2	.00005	Mica	C10	.001	600
C3	.25	200	C11	.002	600
C4	.01	400	C12a	50. Elect.	150
C5	.001	600	C12b	30. Elect.	150
C6	.05	400	C12c	100. Elect.	25
C7	.05	200	C13	.05	400
C8	.001	600	C14	.2	200


3Q5 GT
1H5 GT
1R5 GT
MEASURED ON 117 VOLT A.C. LINE USING RCA IR VOLTOHMYST
VOL. MAX. - NO STATION - VOLTAGES POS. D.C. TO A.C. LINE GROUND UNLESS NOTED GANG CLOSED
117 A.C.

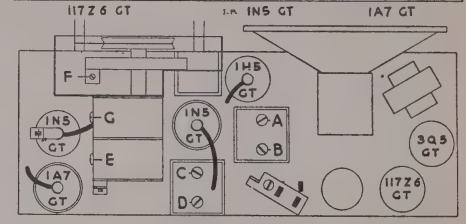


FIG. 1 TOP VIEW

RESISTORS

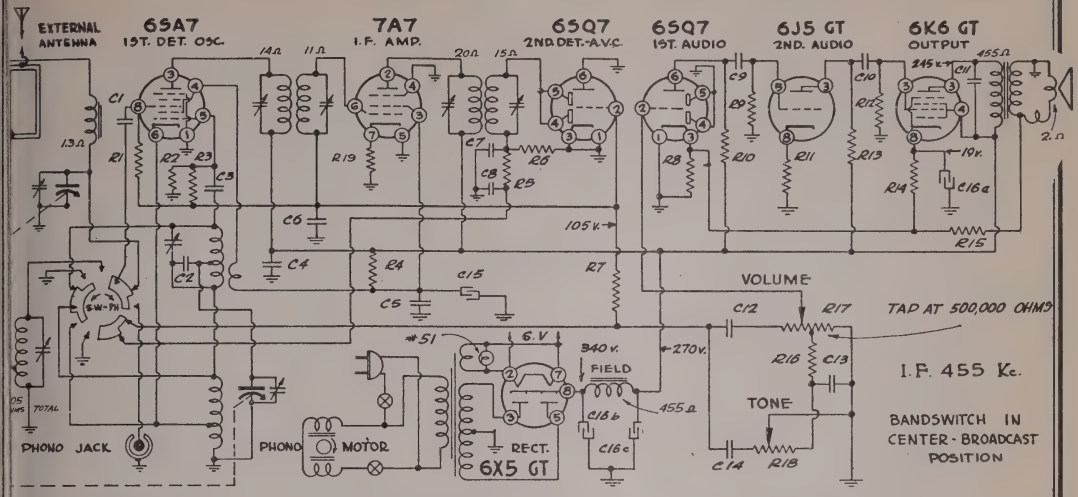
No.	Ohms	Watts	No.	Ohms	Watts
R1.	100,000	½	R11	15,000,000	½
R2	200,000	½	R12	1,000,000	½
R3	5,000,000	½	R13	2,000,000	½
R4	5,000,000	½	R14	400	½
R5	5,000,000	½	R15	22	½
R6	5,000,000	½	R16	2,150	5
R7	3,000,000	½	R17	3,000	½
R8	5,000	½	R18	500	½
R9	70,000	½	R19	200	½
R10	1,000,000	V.C.	R20	110	½

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.000367 Silver	Mica	C11	.0001	Mica
C2	.00025	Mica	C12	.01	400
C3	.01	400	C13	.00025	Mica
C4	.000015	Mica	C14	.01	400
C5	.00005	Mica	C15	.002	600
C6	.25	200	C16a	40.	150
C7	.01	400	C16b	30.	150
C8	.01	400	C16c	100.	25
C9	.05	400	C17	.1	400
C10	.00005 In I.F.	Can	C18	.05	400
			C19	.05	200

CONTINENTAL RADIO & TELEV. CORP.

MODEL C7



RESISTORS

Circuit	Ohms	Type
R1	100,000	½ w
R2	20,000	½ w
R3	10,000,000	½ w
R4	15,000	2 w
R5	150,000	½ w
R6	500,000	½ w
R7	1,000,000	½ w
R8	22-10%	½ w
R9	500,000	½ w
R10	250,000	½ w
R11	3,000	½ w
R12	250,000	½ w
R13	50,000	½ w
R14	600-10%	½ w
R15	300-10%	½ w
R16	30,000	½ w
R17	1,000,000	V.C.
R18	500,000	T.C.
R19	100	½ w

CONDENSERS

Circ't	Capacity	Type
C1	.0001	Mica
C2	.00025	Mica
C3	.00005	Mica
C4	.05	400V.
C5	.05	400V.
C6	.05	200V.
C7	.0001	Mica
C8	.0001	Mica
C9	.01	400V.
C10	.02	400V.
C11	.02	600V.
C12	.002	600V.
C13	.02	200V.
C14	.002	600V.
C15	8. Elect.	150V.
C16a	12. Elect.	25V.
C16b	20. Elect.	350V.
C16c	20. Elect.	350V.

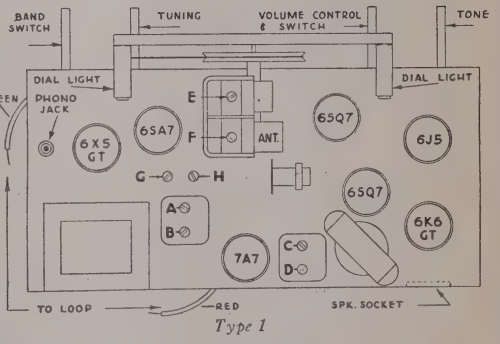
The C7 chassis has been made with either of two tube complements as shown in Type 1 and Type 2 Top Views. The only characteristics which change are tube socket connections due to variance between standard and loctal pin numberings.

Line—117 volts, 60 cycles, A.C.—Set volume control at max.

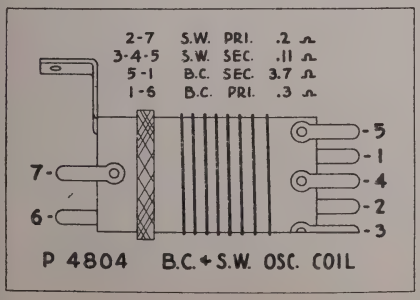
Wattage: Radio only, 60 watts; Record changer only, 15 watts.

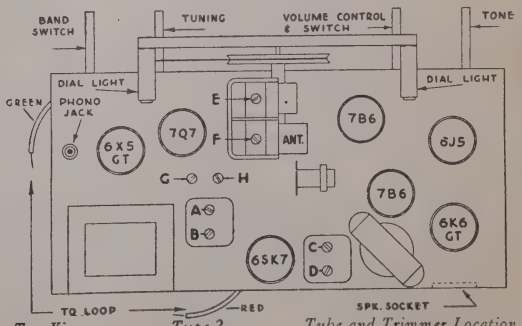
Voltages shown are positive D.C. from chassis to socket terminal unless noted.

R.C.A. Jr. Volt Ohmyst used. No station tuned in.



Type 1





Top View *Type 2* *Tube and Trimmer Location*

FOR ALIGNMENT, SEE INDEX FOR MODEL C6

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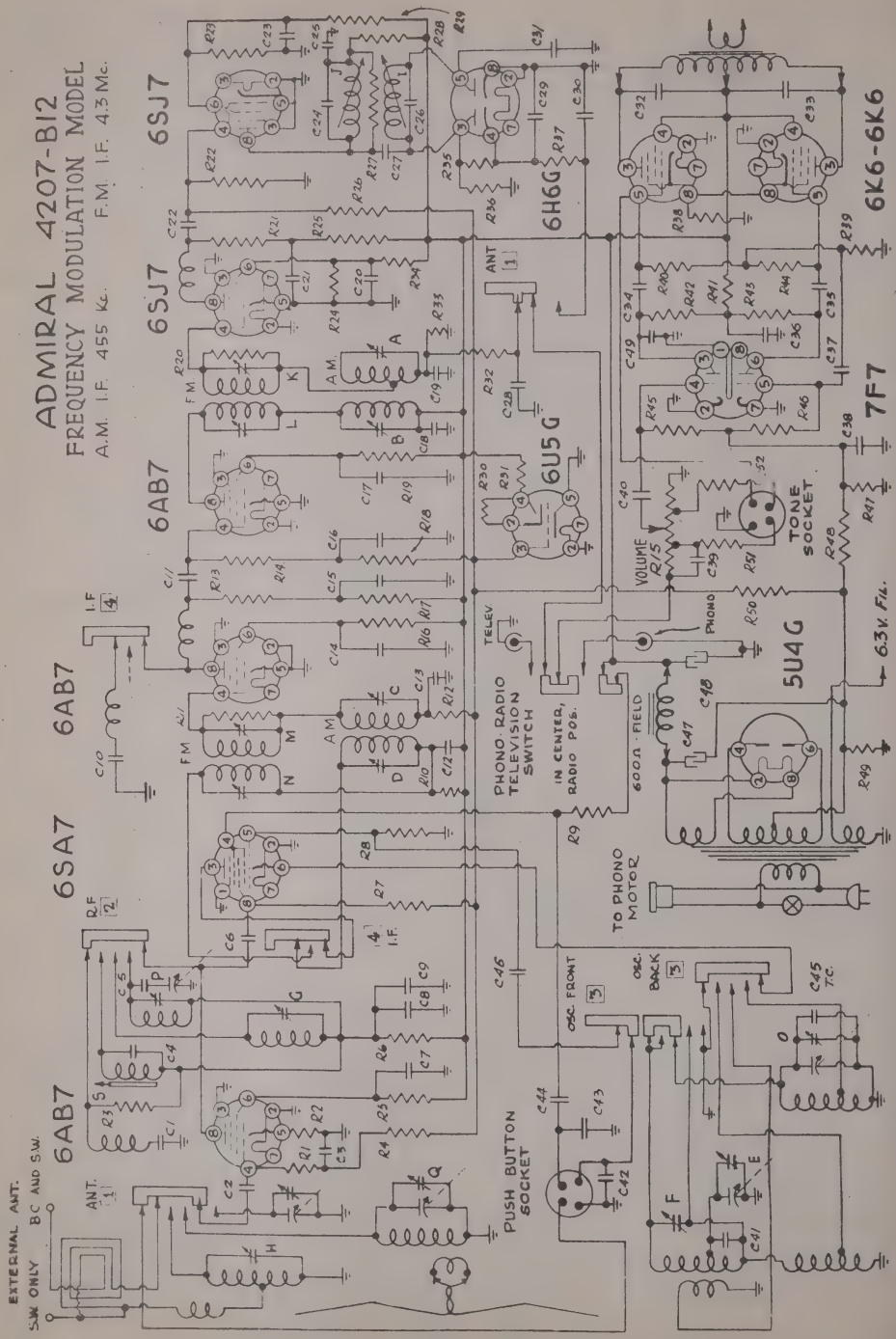
MODEL B12

CONTINENTAL RADIO & TELEV. CORP.



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CONTINENTAL RADIO & TELEV. CORP.

MODEL B12

PARTS LIST

RESISTORS

R1	3,000,000	ohms
R2	100	"
R3	5,000	"
R4	100,000	"
R5	50,000	"
R6	5,000	"
R7	2,000,000	"
R8	25,000	"
R9	25,000	"
R10	1,000	"
R11	20,000	"
R12	100,000	"
R13	10,000	"
R14	100,000	"
R15	1,000,000	" V.C. (Tapped at 300,000 ohms and 600,000 ohms from Ground.)
R16	50,000	ohms
R17	1,000	"
R18	25,000	"
R19	50,000	"
R20	20,000	"
R21	10,000	"
R22	200,000	"
R23	40,000	"
R24	60,000	"
R25	1,000	"
R26	4,000,000	"
R27	6,000	"
R28	25,000	"
R29	50,000	"
R30	1,000,000	"
R31	100,000	"
R32	100,000	"
R33	50,000	"
R34	50,000	"
R35	100,000	"
R36	100,000	"
R37	100,000	"
R38	300	"
R39	500,000	"
R40	500,000	"
R41	25,000	"
R42	250,000	"
R43	250,000	"
R44	500,000	"
R45	250,000	"
R46	250,000	"
R47	500,000	"
R48	500,000	ohms
R49	27	"
R50	1,000,000	"
R51	100,000	"
R52	50,000	"

CONDENSERS

C1	.00006	mfd.	Mica
C2	.000250	"	"
C3	.05	"	
C4	.00078	"	Mica Silver
C5	.0005	"	" "
C6	.00025	"	"
C7	.05	"	
C8	.05	"	
C9	.005	"	Mica
C10	.00006	"	"
C11	.00005	"	"
C12	.05	"	
C13	.05	"	
C14	.05	"	
C15	.05	"	
C16	.01	"	
C17	.05	"	
C18	.05	"	
C19	.00005	"	Mica
C20	.00005	"	"
C21	.05	"	
C22	.00002	"	"
C23	.05	"	
C24	.00015	"	Mica Silver
C25	.1	"	
C26	.00027	"	" Silver
C27	.00003	"	"
C28	.00025	"	"
C29	.00025	"	"
C30	.0015	"	
C31	.00003	"	Mica
C32	.005	"	" 600 V.
C33	.005	"	" 600 V.
C34	.02	"	
C35	.02	"	
C36	.05	"	
C37	.01	"	
C38	.1	"	
C39	.00025	"	Mica
C40	.01	"	
C41	.00025	"	Mica
C42	.0005	"	" Silver
C43	.003	"	"
C44	.05	mfd.	
C45	.00002	"	T.C.
C46	.00005	"	Mica
C47	20.	"	Elec.
C48	20.	"	"
C49	.00025	"	Mica

TRIMMER IDENTIFICATION

A. I.F. 455 Kc.
B. I.F. 455 Kc.
C. I.F. 455 Kc.
D. I.F. 455 Kc.
E. Osc, Broadcast
F. Osc, 31 meter
G. R.F., 31 meter
H. Antenna, 31 meter
I. F.M. Disc. Sec.
J. F.M. Disc. Pri.
K. I.F. 4.3 Mc. F.M.
L. I.F. 4.3 Mc. F.M.
M. I.F. 4.3 Mc. F.M.
N. I.F. 4.3 Mc. F.M.
O. Oscillator, F.M.
P. R.F., F.M.
Q. Antenna, F.M.
R. Antenna, Broadcast
S. R.F., Broadcast

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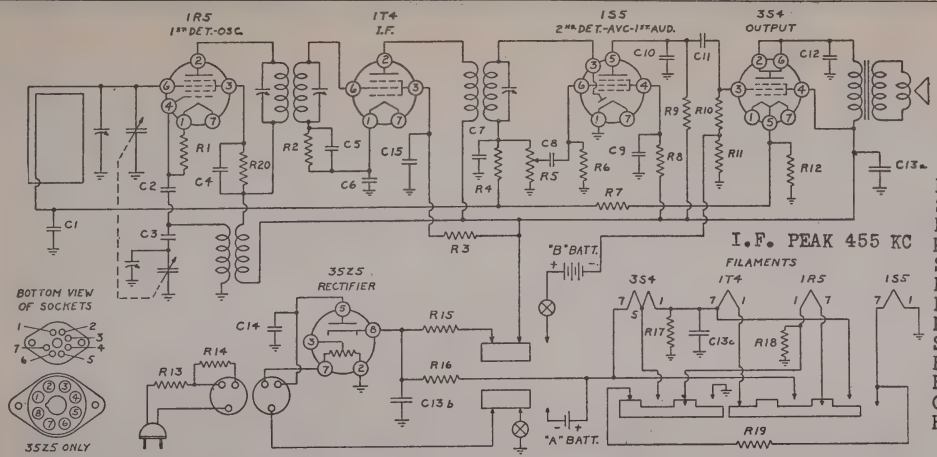


VOLTAGES

Line 117 volts AC
Power Consumption 35 watts.
Volume Control maximum and no signal tuned in.
Meter 1000 ohms per volt, 150 volt scale.

Plate (2) of 1R5 tube to ground	66	volts
Screen (3) of 1R5 tube to ground	45	volts
Filament (7) to (1) of 1R5 tube	1.4	volts
Plate (2) of 1T4 tube to ground	66	volts
Screen (3) of 1T4 tube to ground	45	volts
Filament (7) to (1) of 1T4 tube	1.3	volts
Filament (7) to (1) of 1S5 tube	1.3	volts
Plate (2) and (6) of 3S4 tube to ground	66	volts
Screen (4) of 3S4 tube to ground	67½	volts
Filament (1) to (5) of 3S4 tube	1.3	volts
Filament (7) to (5) of 3S4 tube	1.3	volts
Cathode (8) of 35Z5 tube to ground	90	volts
Filament (2) of 35Z5 tube to ground	37.5	v.(AC)

AC-DC-Battery Switch shown in AC-DC position.

RESISTORS

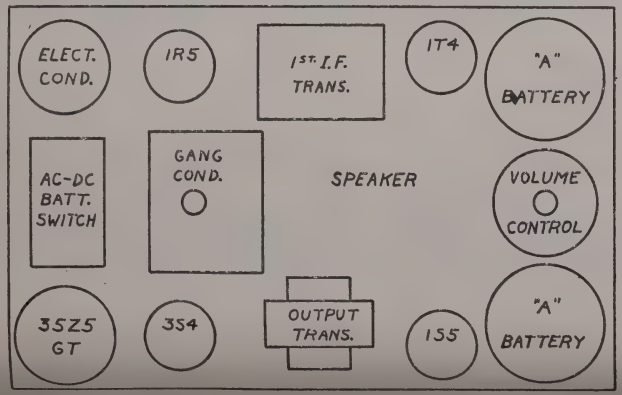
No.	Ohms	Watts	No.	Ohms	Watts
R1	100,000	¼	R12	3,000—10%	¼
R2	5,000,000	¼	R13	80) part of	
R3	25,000—10%	¼	R14	350) line cord	
R4	5,000,000—10%	¼	R15	2,000—10%	½
R5	1,000,000	V.C.	R16	1,750—10%	4
R6	10,000,000	¼	R17	1,700—10%	¼
R7	10,000,000—10%	¼	R18	1,000—10%	¼
R8	4,000,000	¼	R19	55—10% (wire wound)	½
R9	1,000,000	¼			
R10	2,000,000	¼	R20	10,000	¼
R11	750—10%	¼			

CONDENSERS

No.	Capacity (Mid.)	Volts	No.	Capacity (Mid.)	Volts
C1	.05	200	C10	.00005	Mica
C2	.0001	Mica	C11	.005	200
C3	.000410-2%	Mica	C12	.01	200
C4	.01	120	C13a	20.	150
C5	.01	120	C13b	30.	150
C6	.1	120	C13c	100.	12
C7	.00025	Mica	C14	.05	400
C8	.01	200	C15	.01	120
C9	.05	200			

ALIGNMENT

IF 455 KC
OSC. trim. 1630 KC
Ant. trim. 1400 KC



Oscillator Coil (Part No. P4722)
Looking at the connection end in a clockwise direction starting at the mounting bracket the terminals are: No. 1, ground (direct to mounting bracket); No. 2, plate; No. 3, B+; No. 4, grid.
Primary—No. 2 and No. 3—Resistance.....3.4 ohms
Secondary—No. 1 and No. 4—Resistance.....2.6 ohms

First I.F. Transformer (Part No. P4610)
The primary leads are on one end (opposite sides) and the secondary leads on the other end. The red dots indicate the end of the windings. The primary and secondary windings are identical.
Resistance (primary or secondary).....16.7 ohms

Second I.F. Transformer (Part No. P4712)
Looking at the coil starting at the lug nearest the red dot in a clockwise direction the terminals are: No. 1, start of pri.; No. 2, start of sec.; No. 3, end of sec.; No. 4, end of pri.
Primary—No. 1 and No. 4—Resistance.....43.3 ohms
Secondary—No. 2 and No. 3—Resistance.....34.2 ohms

Power Change Switch
The power change switch connects the tube filaments in series (7½ volt) on AC-DC operation and parallel (1½ volt) on battery operation.

THE CROSLEY CORP.

MODELS 22CA, 22CB, 22CP
Chassis 59 AM-FM

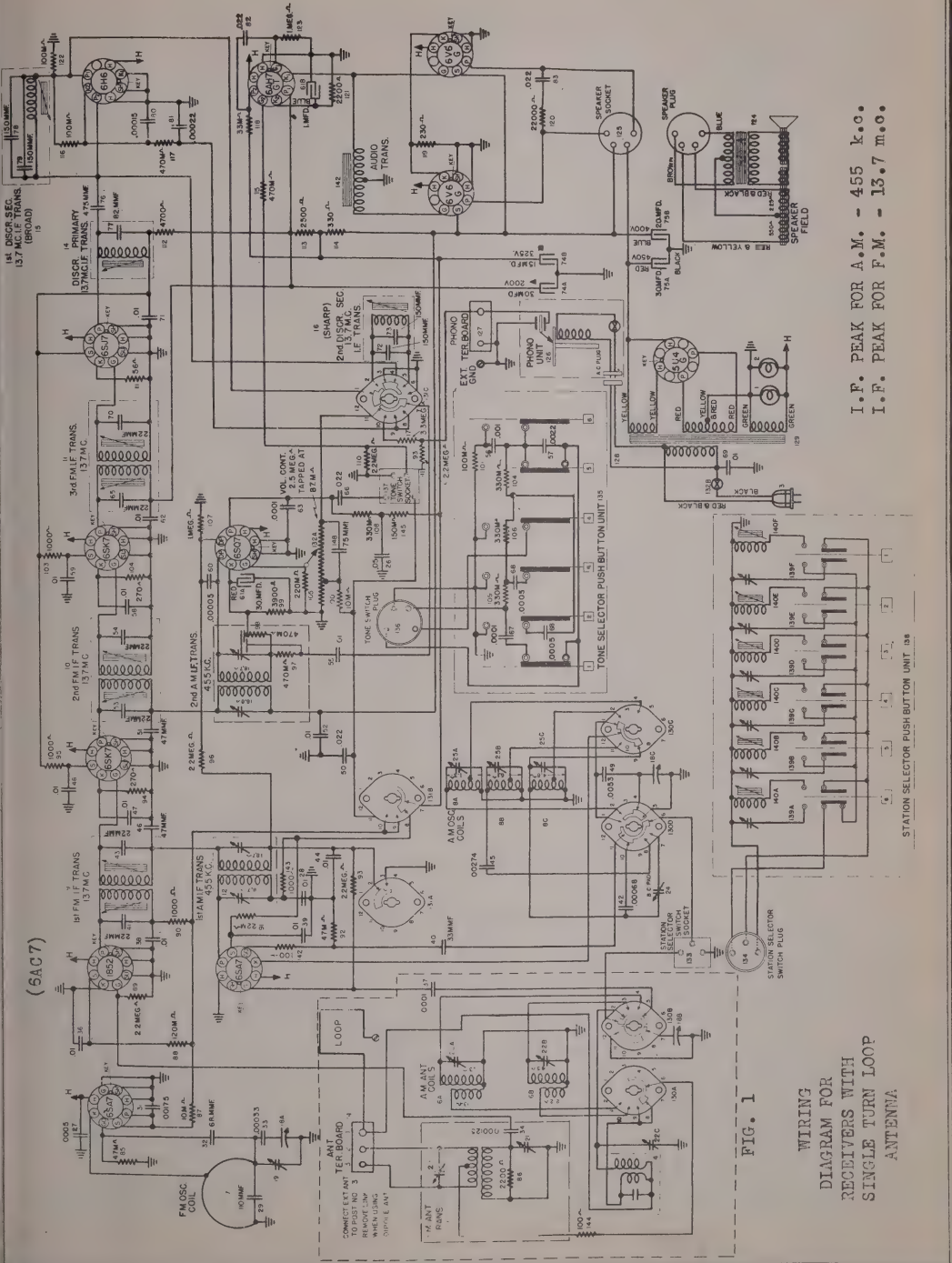


FIG. 1

WIRING DIAGRAM FOR RECEIVERS WITH SINGLE TURN LOOP ANTENNA

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MODELS 22CA, 22CB, 22CP
Chassis 59 AM-FM

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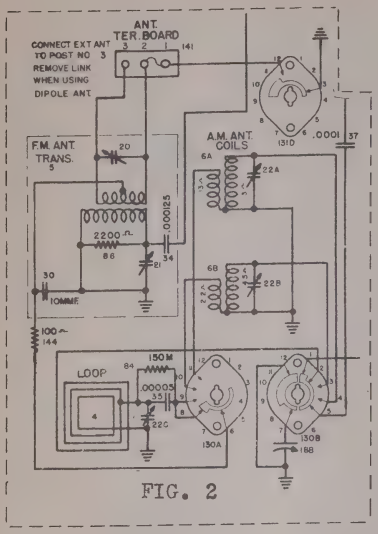


FIG. 2

SPECIAL NOTE

If the loop antenna has multiple turns, Fig. 2 is substituted for the portion of the schematic enclosed by dotted lines in Fig. 1.

TUNING RANGES

American Broadcast 540 to 1630 KC (555 to 184 Meters)
Police Amateur, etc., 1600 to 5200 KC (187 to 57.5 Meters)
Shortwave (Foreign) 5.2 to 18.0 MC (57.5 to 16.6 Meters)
Frequency Modulation 42 to 50 MC (7.1 to 6.0 Meters)

FUNCTIONAL SWITCH

The left-hand-inner knob controls the functional switch. From left to right, they are: "A. M.", "FM-1" "FM-2" and "PHONO" Use "FM-1" for sharp clear reception of stations operating on channels where adjacent channel stations might interfere. "FM-2" provides high fidelity reception over a broader range

TUBE VOLTAGE CHART

SOCKET VOLTAGES MEASURED AT 117.5 V. LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT, 500 V. RANGE VOLTMETER

TUBE	FUNCTION	1	2	3	4	5	6	7	8	POSITION OF FUNCTION SW
6SA7	Oscillator	Gnd	Gnd	290	100	—8	0	6.3	0	A. M.
6SA7	Converter—A. M.	Gnd	Gnd	260	260	—.2	0	6.3	Gnd	F. M. 1 or 2
6AC7	Det.—1st F. M.	Gnd	Gnd	Gnd	—.6	Gnd	85	6.3	260	F. M. 1 or 2
6SK7	I. F. Amp. (A. M. 1st FM)	Gnd	Gnd	Gnd	0	3	100	6.3	300	A. M.
6SK7	I. F. Amp. 2nd F. M.	Gnd	Gnd	Gnd	0	3	100	6.3	190	F. M. 1 or 2
6SJ7	Limiter F. M.	Gnd	Gnd	Gnd	0	.5	200	6.3	100	F. M. 1 or 2
6H6	Discriminator	Gnd	Gnd	—.5(FM)	+.5(AM)	—.5(FM)	J.B.	6.3	Gnd	Note range settings for 3, 4 & 5
6SQ7	Det. A. M.—1st A. F.	Gnd	0	1	.4	0	140	6.3	Gnd	F. M. or A. M.
6AH7GT	2nd A. F. Driver	0	2	195	7	0	160	6.3	Gnd	F. M. or A. M.
6V6	Output	Gnd	Gnd	330	310	2	N.C.	6.3	20	F. M. or A. M.
6V6	Output	Gnd	Gnd	330	310	2	N.C.	6.3	20	F. M. or A. M.
5U4	Rectifier	N.C.	400	J.B.	360AC	J.B.	360AC	J.B.	400	

MAX. POWER OUTPUT ..... 15 WATTS
POWER CONSUMPTION ..... 120 WATTS
DROP ACROSS SPEAKER FIELD ..... 80 VOLTS
J. B.—Junction Block. N. C.—No Connection.

Voltages may vary 10% of values given.

SET-UP PROCEDURE

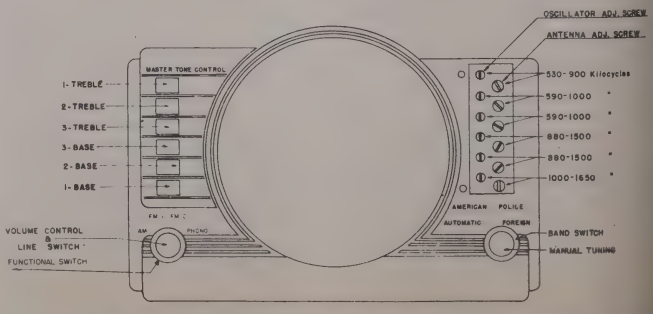
Remove station selector push button escutcheon. Turn the receiver on and let it operate for a sufficient length of time to permit the tubes to reach their normal operating conditions.

Note: To simplify the set up and insure accurate adjustments the following pre-adjustments should be made.

Tighten all Antenna Trimmer screws moderately tight. See Fig. 1. Turn the Oscillator adjusting screws to the left (counter clockwise) until the threaded portion extends approximately ½ inch.

continued

PUSH-BUTTON ADJUSTMENT



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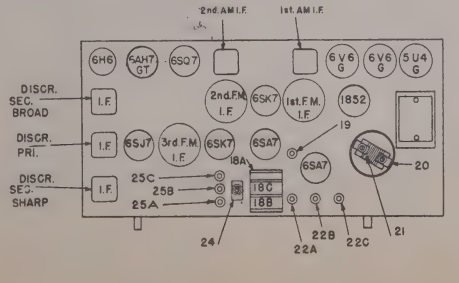
Preliminary
Output Meter Connections.....Plate to Plate of 6V6's
Generator Ground Connection.....To chassis or Ground Lead
Dummy Antenna to be in series with generator output.....See Chart Below
Position of Volume Control.....Fully On
Position of Master Tone Control.....All Buttons Out

A. M. ALIGNMENT PROCEDURE CHART

	Signal Generator						
Alignment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Stator lug Middle section of Gang Cond.	B. C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	.0002 MF.	1630 Kc.	Ant. Terminal	B. C.	Fully open	B. C. "OSC" Trimmer 25-C	Adjust for peak; gang does not have to tune thru signal. Loop must be connected.
3.	.0002 MF.	600 Kc.	Ant. Terminal	B. C.	Approx. 60 on dial	B. C. "OSC" Series Trimmer 24	Adjust for maximum output while rocking gang thru signal.
4.	Repeat Step No. 2 to check possible shift due to series adjustment.						
5.	.0002 MF.	1400 Kc.	Ant. Terminal	B. C.	Approx. 140 on dial	B. C. Loop 22-C	Adjust for maximum output do not touch B. C. Osc. Trimmer.
6.	400 ohm (carbon)	5.3 Mc.	Ant. Terminal	Police	Fully open	Pol "OSC" 25-B	Adjust for peak; gang does not have to tune thru signal.
7.	400 ohm (carbon)	5.0 Mc.	Ant. Terminal	Police	Approx. 5.0 on dial	Pol "ANT" Trimmer 22-B	Adjust for maximum output.
8.	400 ohm (carbon)	18.3 Mc.	Ant. Terminal	S. W.	Fully open	S. W. "OSC" 25-A	Adjust for peak. Gang does not have to tune thru signal.
9.	400 ohm (carbon)	18.0 Mc.	Ant. Terminal	S. W.	Approx. 18 on dial	S. W. "ANT" Trimmer 22-A	Adjust for maximum output while rocking gang thru signal.
10.	Repeat the above alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A. V. C. circuit.						

IMPORTANT ALIGNMENT NOTES

When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency and not on the image which is approximately 910 kilocycles less **as indicated on the Receiver dial.** To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles **lower on the Receiver dial** than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position).



F. M. ALIGNMENT

EQUIPMENT NECESSARY: 1 modulated signal generator accurately calibrated and an output meter.

1. Connect output meter from plate to plate 6V6's.
2. Remove F. M. oscillator tube—6SA7 to right of gang.
3. Connect generator input to #4 pin of 6SJ7 F. M. limiter tube and generator ground to chassis.
4. Set generator to exactly 13.6 megacycles (AM signal with 400 cycle modulation).
5. Turn function switch to FM2.
6. Adjust the discriminator primary and secondary (broad) for peak.
7. Set generator to exactly 13.7 megacycles.
8. Adjust discriminator secondary (broad) for null (minimum reading on output meter). This null is very sharp and one peak will be considerably higher than the other.
9. Adjust discriminator primary until uniform peaks are obtained by shifting generator alternately from 13.6 to 13.8 MC, and carefully noting output meter readings.
10. Set generator to exactly 13.7 MC and note null point reading on output meter. Then turn function switch to FM1 (sharp) and adjust discriminator secondary (sharp) to null point. This adjustment is necessary to assure that FM1 and FM2 positions have same cross-over point.

NOTE: The relative height of peaks on FM1 is somewhat less than the FM2 position as can be noted by comparing with readings obtained in operation 9.

IF ALIGNMENT

1. Connect generator output to #4 pin of second I-F 6SK7 amplifier.
2. While shifting generator from 13.6 to 13.8 MC, adjust 3rd FM I-F primary and secondary for maximum gain and EQUAL PEAKS.
3. Connect generator output to #4 pin of 1st I-F 6SK7.
4. Follow same procedure outlined in step #2, using just enough output to give a reasonable indication on meter.
5. Clip generator output to 3rd terminal on antenna board and adjust 1st FM I-F primary and secondary, following same procedure as in step #2, using just enough input to give a reasonable indication on meter.

F. M. R-F ALIGNMENT

(a) Check Dial Calibration

1. Leave generator output connected to antenna —replace FM oscillator 6SA7.
2. Set generator to exactly 12.5 MC (fourth harmonic is 50 MC). Tune in 50 MC signal on dial, null between peaks.
3. Set generator to 10.5 MC (fourth harmonic—42 MC). Tune in 42 MC signal on dial, null between peaks. Correct dial calibration by bending osc. plate on gang.

(b) Set Generator to 11.5 MC (fourth harmonic—46 MC).

4. Remove dipole shorting clip (not on all models) and ground #2 dipole lug. Place a 100 ohm carbon resistor between terminals #2 and #3.
5. Connect signal generator output to #3 terminal.
6. Tune dial to either of signal peaks (not null).
7. Turn FM antenna primary trimmer, item 20, all the way in.
8. Adjust FM antenna secondary trimmer, item 21, for peak.
9. Repeak FM antenna primary.
10. Check at 42 MC (Gen. 12.5 MC), 50 MC (Gen. 12.5 MC), output meter readings should be approximately the same over band, with slight humps on ends.

NOTE: If there is an appreciable variation between readings on the output meter on the frequencies in step #10, carefully repeat complete R-F alignment.

NOTE: If some receivers oscillate at one end of dial and not at the other end, it is possible that the red lead (top) on the FM oscillator coil is too close to the secondary side. This lead should be dressed down toward the chassis and closest to the grounded end of oscillator coil, using top as reference point.

PUSH-BUTTON ADJUSTMENT (cont'd)

Note: Care should be taken when adjusting the oscillator screws so that the selected station is not passed over. Turn the screws slowly. It is essential that the frequency (kilocycles) of the station selected is within the range of the push button to be set for that station. See Fig.

1. Turn the band change switch to the "American" position. Using the station selector knob, carefully tune in the the station to which the No. 1 push button is to be set. Note program.

2. Turn the band change switch to the "Automatic" position, depress No. 1 push button, and using a small screw driver, carefully turn in a clockwise direction the Oscillator adjusting screw until the station previously tuned in manually is heard again. Adjust for maximum output in the speaker.

3. Adjust the Antenna adjusting screw for maximum volume in the speaker.

4. Turn band change switch from "Automatic" to "American" and back again to check if adjustment has been correctly made. There should be no change in tone quality when switched from one to the other.

5. Repeat above procedure for the remaining push buttons.

To tune the receiver with the push buttons, set the band change switch on "Automatic" and depress completely the button corresponding to the station you wish to hear.

MODELS 22CA, 22CB, 22CP
Chassis 59 AM-FM

THE CROSLEY CORP.

PARTS LIST, MODELS 22CA-CB-CP—CHASSIS MODEL No. 59

Figures in first column refer to parts in Diagrams.

ITEM No.	PART No.	DESCRIPTION
1	48885	Dial Light 6 V.
2	48885	Dial Light 6 V.
	132343-6	Escutcheon & Lens.
	132346-1	Lens.
	132347-1	Gasket.
	132320-1	Dial Pointer.
	132321-5	Dial Face Assem.
	48899	Screw—Dial Face Mtg. (2)
	49637-22	Light Socket Assem.
	132167-4	Drive Cord Assem.
	132584-1	Tuning Shaft Assem.
	49786-1	Drive Shaft Brg.
	132608-1	Drive Shaft Brk't.
3	132300-2	A. C. Power Plug & Cable
4	133769-3	Antenna Coil.
5	32000-239	F. M. Ant. Trans. Assem.
6A, 6B	32000-238	AM Ant. Coil H. F. / AM Ant. Coil Pol.
7	132583	F. M. Osc. Coil Assy.
8A, 8B, 8C	32002-265	A. M. Osc. Coil H. F. / A. M. Osc. Coil Pol. / A. M. Osc. Coil B. C.
9	32004-279	1st F. M. I. F. Trans.
10	32004-279	2nd F. M. I. F. Trans.
11	32004-279	3rd F. M. I. F. Trans.
12	32004-277	1st A. M. I. F. Trans.
13	32004-278	2nd A. M. I. F. Trans.
14	32004-280	Discr. Primary I. F. Trans.
15	32004-281	1st Discr. Sec. I. F. Trans.
16	32004-281	2nd Discr. Sec. I. F. Trans.
17	39002-28	Res. 3.3 Megohm ¼ W.
18A, 18B, 18C	132296-3	Var. Cond. F. M. Section. / Var. Cond. A. M. Ant. Section. / Var. Cond. A. M. Osc. Section.
19	132852-1	F. M. Osc. Trimmer Cond.
20	49934	F. M. Ant. Pri. Trimmer.
21	131756-3	F. M. Ant. Sec. Trimmer.
22A, 22B, 22C	132386-1	A. M. Ant. Trimmer H. F. / A. M. Ant. Trimmer Pol. / Trimmer A. M. B. C. Loop.
23		
24	49652-1	B. C. Padder Cond.—600 Kc.
25A, 25B, 25C	132386-1	Trimmer H. F. Osc. / Trimmer Pol. Osc. / Trimmer B. C. Osc.
26	39001-41	Cond. .05 Mf. 400 V. Paper.
27	39001-5	Cond. .005 Mf. 600 V. Paper.
28	132627-1	Cond. .01 Mf. Bakelite.
29	132581-2	Cond. 110 Mmf. Ceramic.
30		
31	34007-7	Cond. .00175 Mf. Mica.
32	132582-2	Cond. 68 Mmf. Ceramic.
33	132591-8	Cond. .00033 Mf. Ceramic.
34	132591-6	Cond. .000125 Mf. Ceramic.
35		
36	132627-1	Cond. .01 Mf. Bakelite.
37	39004-1	Cond. .0001 Mf. Mica.
38	132627-1	Cond. .01 Mf. Bakelite.
39	132627-1	Cond. .01 Mf. Bakelite.
40	39004-4	Cond. 100 Mmf. Mica.
41	132591-3	Cond. 22 Mmf. Ceramic.
42	34005-37	Cond. 330 Mmf. Mica.
43	132591-3	Cond. 22 Mmf. Ceramic.
44	132627-1	Cond. .01 Mf. Bakelite.
45	34005-35	Cond. 2740 Mmf. Mica.
46	132591-4	Cond. 47 Mmf. Ceramic
47	132627-1	Cond. .01 Mf. Bakelite.
48	132627-1	Cond. .01 Mf. Bakelite.
49	34005-34	Cond. 5300 Mmf. Mica.
50	39001-63	Cond. .022 Mf. 200 V.
51	132591-4	Cond. 47 Mmf. Ceramic.
52	132627-1	Cond. .01 Mf. Bakelite.
53	132591-3	Cond. 22 Mmf. Ceramic.
54	132591-3	Cond. 22 Mmf. Ceramic.
55	132627-1	Cond. .01 Mf. Bakelite.
56	39001-7	Cond. .001 Mf. 600 V. Paper.
57	39001-9	Cond. .0022 Mf. 600 V. Paper
58	132627-1	Cond. .01 Mf. Bakelite.
59	132627-1	Cond. .01 Mf. Bakelite.
60	39004-5	Cond. 50 Mmf. Mica.
61A, 61B	132673-2	Cond. 30 Mfd. Electro. / Cond. 1 Mfd. Electro.
62	132627-1	Cond. .01 Mf. Bakelite.
63	39004-7	Cond. 100 Mmf. Mica.
64	39001-5	Cond. .0005 Mf. 600 V.
65	132591-3	Cond. 22 Mmf. Ceramic.
66	39001-15	Cond. .022 Mf. 600 V.
67	39001-1	Cond. 100 Mmf. 600 V.
68	39001-5	Cond. .0005 Mf. 600 V.
69	30805	Cond. .01 Mf. 120 V. A. C.
70	132591-3	Cond. 22 Mmf. Ceramic.
71	132627-1	Cond. .01 Mf. Bakelite.
72	132591-7	Cond. 150 Mmf. Ceramic.
73	132591-7	Cond. 150 Mmf. Ceramic.
74A, 74B	132571-1	Cond. 30 Mfd. 200 V. Electro. / Cond. 15 Mfd. 325 V. Electro.
75A, 75B	132570-1	Cond. 30 Mfd. 450 V. Electro. / Cond. 20 Mfd. 400 V. Electro.
78	132591-1	Cond. 4.75 Mmf. Ceramic.
77	132591-5	Cond. 82 Mmf. Ceramic.
78	132591-7	Cond. 150 Mmf. Ceramic.
79	132591-7	Cond. 150 Mmf. Ceramic.
80	39004-8	Cond. 150 Mmf. Mica.
81	39001-3	Cond. 220 Mmf. 600 V. Paper.
82	39001-15	Cond. .022 Mf. 600 V. Paper.
83	39001-63	Cond. .022 Mf. 200 V. Paper.
84		
85	132579-1	Res. 47,000 Ohms Ceramic.
86	39002-9	Res. 2200 Ohms ¼ W.
87	132578-1	Res. 10,000 Ohms 5 W.
88	36320	Res. 120,000 Ohms ½ W.
89	132579-2	Res. 2.2 Megohm Ceramic.
90	39002-7	Res. 1000 Ohms ¼ W.
91	132577-1	Res. 22,000 Ohms 3 W.
92	39002-17	Res. 47,000 Ohms ½ W.
93	39002-27	Res. 2.2 Megohms ½ W.
94	132572-1	Res. 270 Ohms ½ W.
95	39002-7	Res. 1000 Ohms ¼ W.
96	39002-27	Res. 2.2 Megohm ½ W.
97	39002-23	Res. 470,000 Ohm ¼ W.
98	39002-23	Res. 470,000 Ohm ¼ W.
99	132514-1	Res. 3900 Ohm ¼ W.
100	39002-13	Res. 10,000 Ohm ¼ W.
101	39002-19	Res. 100,000 Ohm ¼ W.
102	39002-22	Res. 330,000 Ohm ¼ W.
103	39002-7	Res. 1000 Ohm ¼ W.
104	132572-1	Res. 270 Ohm ½ W.
105	39002-21	Res. 220,000 Ohm ¼ W.
106	39002-22	Res. 330,000 Ohm ¼ W.
107	39002-25	Res. 1. Megohm ¼ W.
108	39002-22	Res. 330,000 Ohm ¼ W.
109	39002-22	Res. 330,000 Ohm ¼ W.
110	39002-27	Res. 2.2 Megohm ¼ W.
111	132575-1	Res. 56 Ohm ½ W.
112	132573-1	Res. 4700 Ohm 1 W.
113	132576-1	Res. 2500 Ohm 4 W. Carbon.
114	132574-1	Res. 330 Ohm 2 W. Carbon.
115	39002-23	Res. 470,000 Ohm ¼ W.
116	132579-3	Res. 100,000 Ohm Ceramic.
117	39002-23	Res. 470,000 Ohm ¼ W.
118	39002-16	Res. 33,000 Ohm ½ W.
119	132593-1	Res. 230 Ohm 2.5 W. Cer.
120	132577-1	Res. 22,000 Ohm 3 W. Carbon.
121	39002-9	Res. 2200 Ohm ¼ W.
122	132579-3	Res. 100,000 Ohm Ceramic.
123	39002-25	Res. 1 Megohm ¼ W.
124	132348-7	Speaker
	45580-A	Grommet (4) Spkr. Mtg.
	37953	Flat Washer (4) Spkr. Mtg.
	N-8	Nut (4) Spkr. Mtg.
	L-8	Lock Washer (4) Spkr. Mtg.
	131512	Headed Bushing (4) Spkr. Mtg.
125	28807-103	Speaker Socket.
126	132467	Phono Unit Assem.
127	26719-65	Phono Ter. Board.
128		Phono Ac. Cable.
129	132601-3	Power Trans.
130a, 130b, 130c, 130d.	132580-1	Band Switch Ant. Sec. / Band Switch Ant. Sec. / Band Switch Osc. Sec. / Band Switch Osc. Sec.
131a.		Function Switch AM. I. F.
131b.		Function Switch F. M. I. F.
131c.		Function Switch F. M. & Phono.
131d.		Function Switch F. M. Ant.
132A, 132B	132564-1	Volume Control. / A. C. Power Switch.
133	47133	Station P. B. Cable Socket.
134	132437-2	Station P. B. Unit Cable.
135	132427-1	Tone Push Button Unit.
136	132437-3	Tone Switch Plug & Cable.
137	132303-1	Tone Switch Cable Socket.
138	132656	Station Push Button Unit.
139A	132436-4	Trimmer Cond.
139B	132436-3	Trimmer Cond.
139C	132436-3	Trimmer Cond.
139D	132436-2	Trimmer Cond.
139E	132436-2	Trimmer Cond.
139F	132436-1	Trimmer Cond.
140A	32002-267	Osc. Coil.
140B	32002-268	Osc. Coil.
140C	32002-268	Osc. Coil.
140D	32002-270	Osc. Coil.
140E	32002-270	Osc. Coil.
140F	32002-269	Osc. Coil.
141	26719-51	Ant. Board.
142	39002-1	Res. 100 Ohm ¼ W.
143	39002-7	Res. 1000 Ohm ¼ W.
144	39002-1	Res. 100 Ohm ¼ W.
145	39002-20	Res. 150 Ohm ¼ W.
146	39002-27	Res. 2.2 Megohm ¼ W.
147	39002-28	Res. 3.3 Megohm ¼ W.
	132531-1	Cabinet 22CA.
	132612-1	Cabinet 22CB
	132714-1	Cabinet 22CP
	132532-1	Carton 22CA.
	132613-1	Carton 22CB.
	132715-1	Carton 22CP.
	132371-1	Screw—Chassis Mtg. (4) 22CA, CB & CP.
	44725	Flat Washer—Chassis Mtg. (4) 22CA, CB & CP.
	132323-2	Mtg. Spring Bottom (4) 22 CA, CB & CP.
	132322-1	Mtg. Spring Top (4) 22 CA, CB & CP.
	132393-1	Knob (2) 22 CA-CB-CP.
	132341-1	Knob Large (2) CA-CB-CP.
	132398-1	Cabinet Protector.
	131411-1	Knob Spring.
	132429	Push Switch Assem.
	132656	Tone Switch Assem.
	132396-1	Push Button.
	132397-1	Tone Button.
	132397-2	Tone Button.
	132397-3	Tone Button.
	132397-4	Tone Button.
	132397-5	Tone Button.
	132397-6	Tone Button.
	50628-A	Button Springs (12).
	132478-2	Envelope Assem. 22CA-CB.
	132478-4	Envelope Assem. 22CP.
	134232-1	Di-Pole Antenna.
	134216-1	Instruction Envelope.
	43552	Speaker Plug Retainer Clamp.
	45808	#8 x ¼ P. K. Screw.
	133174	Record Chgr. Assem. 22CP.
	132472-2	Hinge Roller (2).
	132473-2	Hinge Roller Stud (2).
	5096	Nut Hinge Roller Stud (2).
	132463-1	Hinge Assem. R. H.
	132453-2	Hinge Assem. L. H.
	132537-1	Slide Rail (3).
	131133	Screw (9) Slide Rail.
	132850-1	Screw (8) Hinge Assem.
	132454-5	Record Changer Cable.
	134050	Cabinet Back.
	S-80	Screw (8) Cabinet Back.
	134531	Complete Fold. Brkt. for Radio Compart. Door.
	132434-1	Station Call Letters.
	132390-1	Call Letter Covers.

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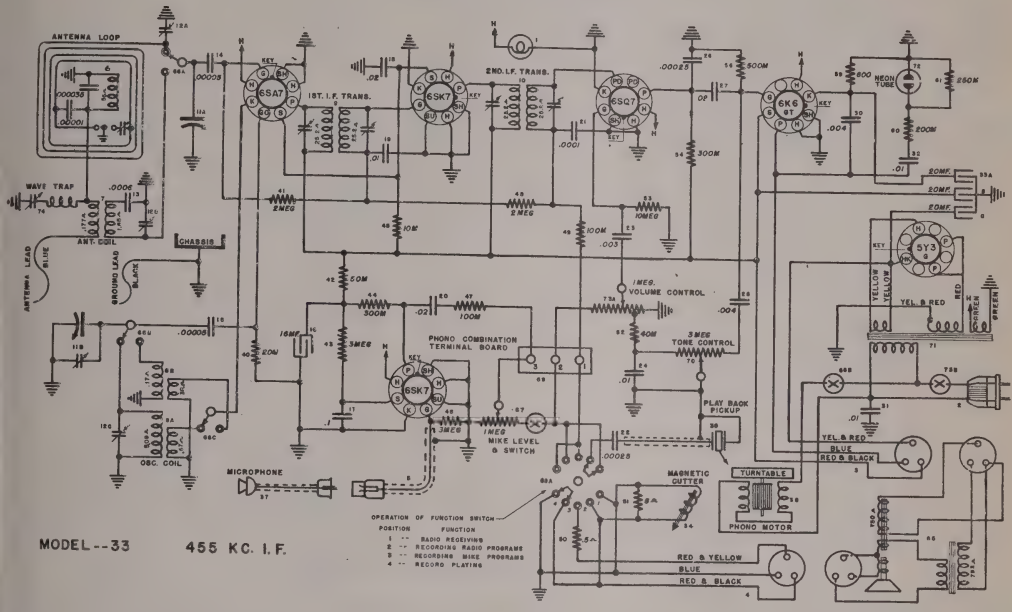
THE CROSLEY CORP.

WIRING DIAGRAM



FOR RECORDER, RECORD CHANGER, P.A. SYSTEM - SEE MODEL 33BG AND GENERAL INDUSTRIES MODEL R-70 IN RIDER'S BOOK, "AUTOMATIC RECORD CHANGER AND RECORDERS", AND ALSO VOLUME XII , PAGES 12-39 TO 12-43 INCLUSIVE.

VOLTAGE CHART

ALL VOLTAGES MEASURED FROM SOCKET PIN TO CHASSIS @ 117.5 VOLT LINE

TUBE SECTION	SOCKET PIN NUMBER 1	2	3	4	5	6	7	8
6SA7—Osc.-Mod.	0	0	200	81.5	9	0	6.3	0
6SK7—I. F. Amp.	0	0	0	0	0	81.5	6.3	200
6SQ7—Det. A.V.C.—1st A.F.	0	0	0	0	0	74	6.3	0
6K6GT—Output	0	0	184	200	0	0	6.3	12.5
6SK7—Mike Amp.	0	0	0	0	0	+	6.3	+
5Y3G—Rectifier	0	5.0	0	268 A.C.	0	268 A.C.	0	240

All voltages measured with 1000 OHM/Volt Voltmeter except heaters. Voltages may vary 10% of values given.

DROP ACROSS SPEAKER FIELD.....40 Volts
MAXIMUM POWER OUTPUT @ 130 V. LINE (approx.)..... 3 Watts
MAXIMUM POWER CONSUMPTION @ 130 V. LINE.....55 Watts

*Phono Motor 40 Watts additional.

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MODEL C33CA

THE CROSLEY CORP.

RADIO RECEIVER ALIGNMENT PROCEDURE

PRELIMINARY

Output Meter Connections.....Plate to Screen of 6K6GT
Generator Ground Connection.....To chassis or Ground Lead
Dummy Antenna to be in series with generator output.....See Chart Below
Position of Volume Control.....Fully On
Position of Tone Control.....Treble or Speech

Alignment Sequence	Dummy Antenna	Frequency Setting	Input to Receiver	Band Switch	Tuning Cond. Setting	Trimmers Adjusted	Remarks
1.	.02MF	455 Kc.	Ant. Lead (Blue)	B. C.	Fully Open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum output. Adjust for Maximum output.
2.	400 ohm (carbon)	15.3 Mc.	Ant. Lead (Blue)	S. W.	Fully Open	S. W. "OSC" (on gang)	Adjust for Peak. See foot note.
3.	400 ohm (carbon)	15.0 Mc.	Ant. Lead (Blue)	S. W.	Approx. 15 on dial	S. W. "ANT" center trimmer on right end	Adjust for Maximum while rocking gang back and forth.
4.	.0002 MF.	1650 Kc.	Ant. Lead (Blue)	B. C.	Fully Open	B. C. "OSC" front trimmer on right end	Adjust for peak. Make sure the switch on loop is in B. C. position.
5.	.0002 MF.	1400 Kc.	Ant. Lead (Blue)	B. C.	Approx. 140 on dial	B. C. "ANT" rear trimmer on right end	Adjust for Maximum output.
6.	.0002 MF.	2.5 Mc.	Ant. Lead (Blue)	B. C. and switch on loop to Pol.	Approx. 2.5 on dial lower right corner	Pol. Ant on loop	Adjust for Maximum output.

IMPORTANT ALIGNMENT NOTES

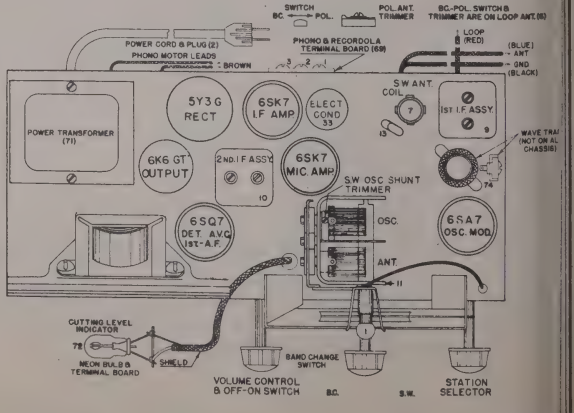
When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency which is approximately 910 kilocycles less **as indicated on the dial.** To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles **lower on the dial** than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position)

Repeat the original alignment procedure for more accurate adjustments.

Always keep signal generator output as low as possible to prevent action of the A.V.C. circuit

WAVE TRAP ADJUST.

The wave trap should be adjusted last. Feed a 455 kc signal through a .0002 mfd. condenser to the antenna lead of the receiver. With the band selector switch on the broadcast band, the dial set to 60, and the volume control full on, adjust the wave trap trimmer condenser to minimum.



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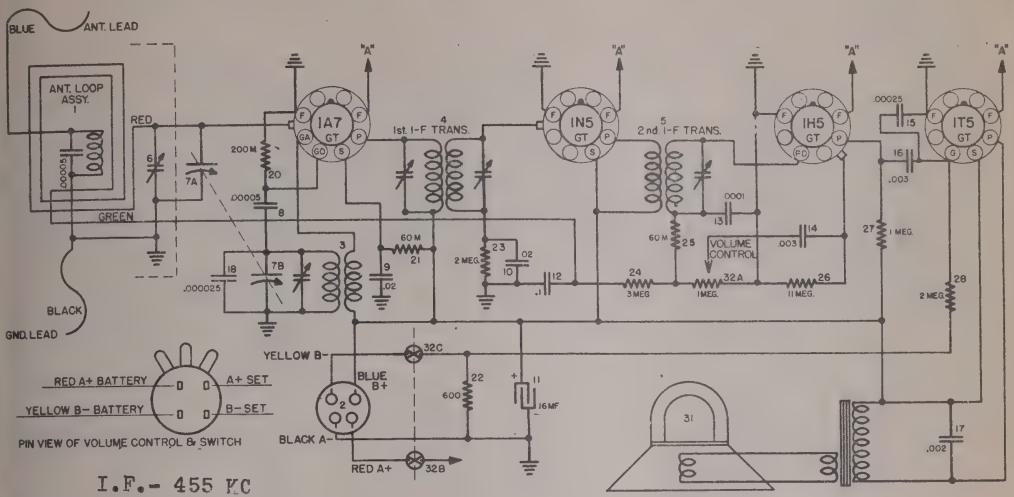


BATTERIES REQUIRED — 1—CROSLEY "A & B" BATTERY PACK No. CR 60 or CR 28 OR EQUIVALENT (1.5 VOLT "A" and 90 VOLT "B") BATTERY PACK.

TUBE SOCKET VOLTAGE READINGS (MEASURED FROM SOCKET PIN TO CHASSIS)

Tube	Function	PIN NUMBER No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
1A7GT	Osc.-Mod.	GND.	1.5	87	43	Osc. Grid	87	F—	J.B.
1N5GT	I-F Amp.	GND.	1.5	87	87	N.C.	N.C.	F—	N.C.
1H5GT	Det.-A.V.C.-1st A. F.	GND.	1.5	20	DIODE	J.B.	J.B.	F—	GND.
1T5GT	Output	GND.	1.5	84	87	—6	N.C.	F—	J.B.

* —6 volts measured across item 22.

Max. Power Output approximately 320 milliwatts. "A" Battery Drain approximately .20 Ampere at 1.5 Volts.
"B" Battery Drain approximately 11 Milliamperes at 90 Volts. *Measured across item 22. J.B.=Junction Block.

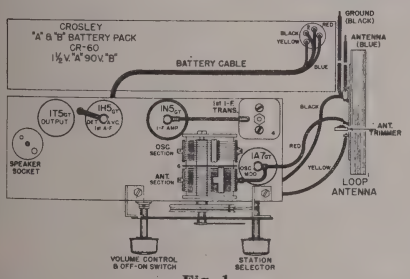


Fig. 1

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary, the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter across the "P" and "S" terminals of the 1T5GT output tube. Be certain that the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning I-F Amplifier to 455 Kilocycles

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 1A7GT tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" lead or chassis. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely in mesh and turn the volume control knob on the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust 2nd I-F trimmer, located below spk. front chassis flange, for maximum reading on the output meter.

(e) Adjust both trimmers on the 1st I-F transformer for maximum output.

(f) Check operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier

When aligning the R-F amplifier the output lead from the signal generator should be connected through a .0001 mfd. condenser to the "ANT" lead (Blue). (Check dial pointer to see that it covers complete range.)

(a) Set the signal generator to 1650 kilocycles.

(b) Open the condenser gang all the way.

(c) Adjust the "OSC" trimmer condenser on gang for maximum output.

(d) Set the signal generator to 1400 kilocycles.

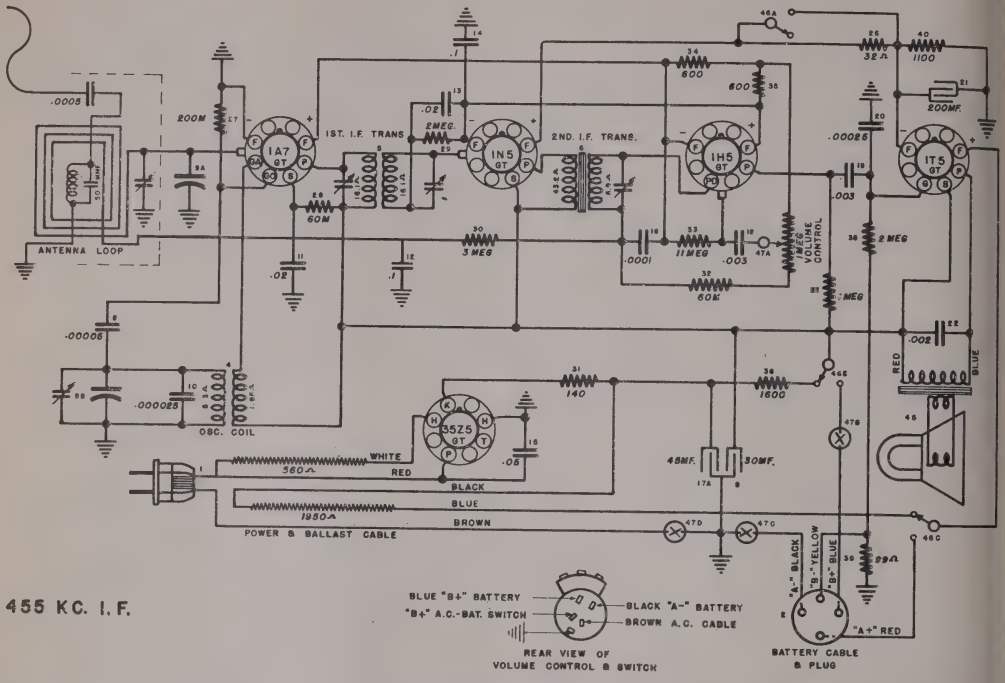
(e) Tune the receiver to the generator signal for maximum output (approximately 140 on the dial).

(f) Adjust the "ANT" trimmer condenser on loop for maximum output. DO NOT READJUST THE "OSC" TRIMMER AT 1400 KILOCYCLES.

(g) Repeat operations (e) and (f) alternately until no further improvement in output can be obtained.

MODEL 43BT, Chassis 43

THE CROSLEY CORP.



ALIGNMENT PROCEDURE		Volume Control on full	Output meter connected to Plate and Screen of 1T5GT	
SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION TO RADIO	DUMMY ANTENNA	TUNING COND. SETTING	TRIMMERS TO ADJUST (See Fig. 1)	REMARKS
455 Kc	Grid 1A7GT	.02 MF	Fully open	2nd I-F (1) located on front chassis flange	Adjust for maximum signal.
455 Kc	Grid 1A7GT	.02 MF	Fully open	1st I-F (2)	Adjust for maximum signal. Located top of 1st I-F ass'y.
1650	Ant. Lead	.0001 MF	Approx. 140	"OSC" Shunt on gang	Adjust for maximum output. Gang does not have to tune through signal.
1400	Ant. Lead	.0001 MF	on dial	"ANT" shunt on loop ant.	Adjust for maximum output.

Repeat above for more accurate adjustments
Maximum power output @ 75 V. "B" — approx. 200 M. W.
Maximum power output @ 90 V. "B" — approx. 340 M. W.

A Battery drain @ 6 volts, .05 Amp.; "B" Battery drain @ 75 V., 9 M. A.; @ 90 V., 12 M. A.
Power consumption @ 117.5 volts line—30 Watts

DO NOT CONNECT A GROUND WIRE TO THIS RECEIVER.

POWER SUPPLY —

BATTERIES REQUIRED — 1 No. CR61 Crosley "A & B" Battery Pack (6 Volts "A" and 90 Volts "B") or equivalent.

Receiver will operate on any 110 Volt (50-60 cycle) A.C. or D.C. electric circuit. When used on 110 Volts D.C. the electric polarity must be correct to the receiver.

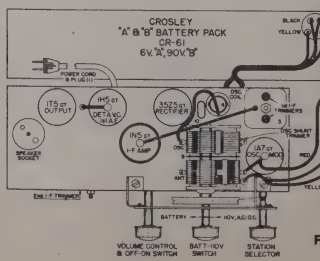


Fig. 1

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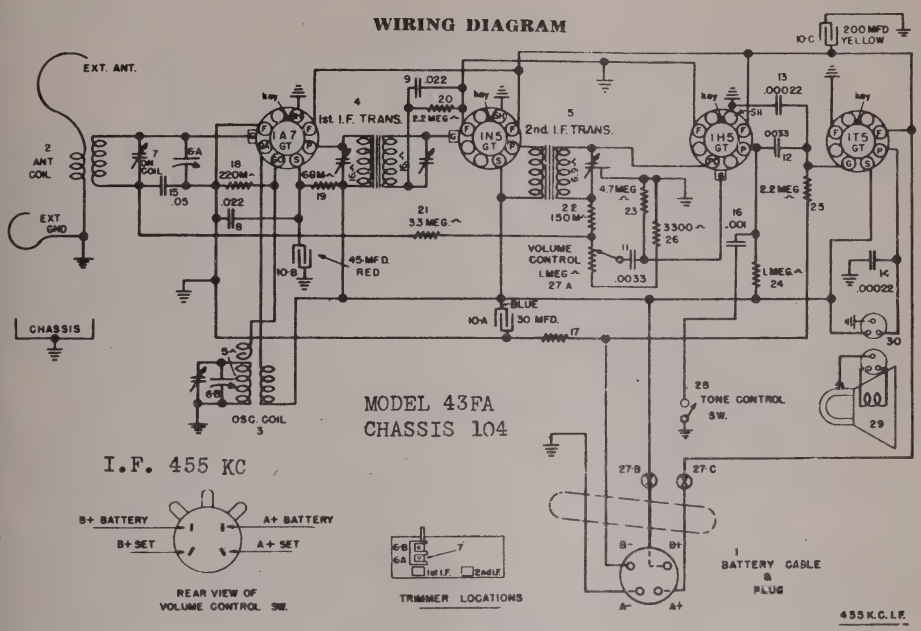
MODEL 43FA, Chassis 104
MODELS 53FA, 53FB, Ch. 105, 106

THE CROSLEY CORP.

WIRING DIAGRAM

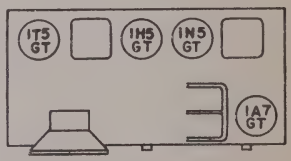


BATTERIES REQUIRED—One No. CR-69 Crosley "A and B" Battery Pack (1.5 Volt "A"—90 Volt "B").

SOCKET VOLTAGES

Measured from "B" minus using 1000 Ω/V Voltmeter, 100 V. Range, no signal input

Tube		Battery Pack (GR-69)			
Type	Function	Filament Volt	Plate Volt	Screen Volt	Osc. Anode
1A7GT	Osc. Modulator	1.5	82	11	82
1N5GT	I. F. Amplifier	1.5	82	82	....
1H5GT	Det.-A. S. C. 1st A. F.	1.5	+	....	....
1T5GT	Out Put	1.5	82	82	....



MODEL 43FA, Chassis 104. MODELS 53FA, 53FB, Chassis 105, 106
ALIGNMENT PROCEDURE

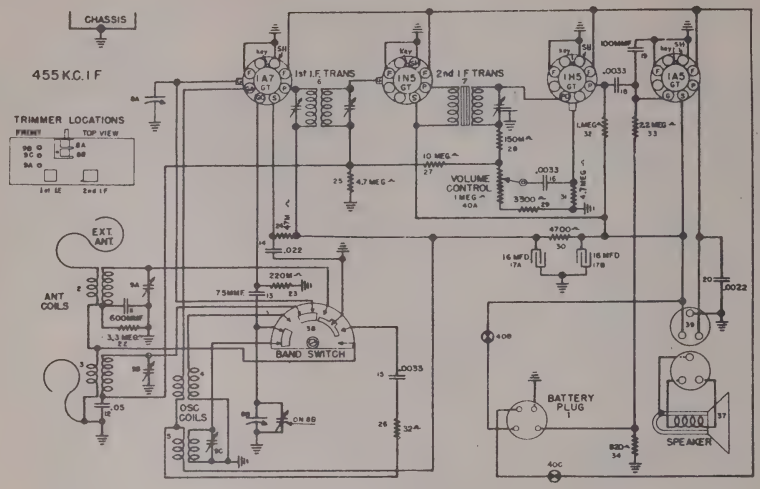
Volume Control on full Output meter connected to Plate and Screen of 1T5GT

SIGNAL GENERATOR				TRIMMERS TO ADJUST (See Fig. 1)	REMARKS
FREQUENCY SETTING	CONNECTION TO RADIO	DUMMY ANTENNA	TUNING COND. SETTING		
455 Kc	Ant. Lead	.0001 MF	Fully Open	2nd 1-F(1)	Adjust for maximum signal.
455 Kc	Ant. Lead	.0001 MF	Fully Open	1st 1-F (2)	Adjust for maximum signal. Located top of 1st 1-F ass'y.
1650	Ant. Lead	.0001 MF	Fully Open	"OSC" Shunt on gang	Adjust for maximum output Gang does not have to tune through signal.
1400	Ant. Lead	.0001 MF	140 on dial	"ANT" shunt on Coil	Adjust for maximum output

MODEL 43FB, Chassis 91

THE CROSLEY CORP.

WIRING DIAGRAM

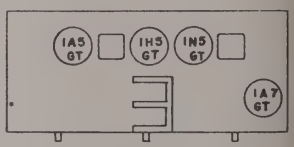


BATTERIES REQUIRED—One No. CR-69 Crosley "A and B" Battery Pack (1.5 Volt "A"—90 Volt "B").

SOCKET VOLTAGES

Measured from "B" minus using 1000 Ω/V Voltmeter, 250 V. Range, no signal input

Tube		Battery Pack (GR-69)			
Type	Function	Filament Volt	Plate Volt	Screen Volt	Osc. Anode
1A7GT	Osc. Modulator	1.5	72	40	72
1N5GT	I. F. Amplifier	1.5	84	84	....
1H5GT	Det.-A. S. C. 1st A. F.	1.5	17	....	....
1A5GT	Out Put	1.5	81	84	....



ALIGNMENT PROCEDURE

Volume Control on full Output meter connected to Plate and Screen of 1T5GT

Align. Seq.	Dummy Antenna	Freq'cy Setting	Connec'n to Radio	Band Switch	Tun'g Cond. Setting	Trimmer Adjusted	Remarks
	Signal Generator						
1.	.02 MF	455 KC.	Antenna Lead	BC	Fully Open	2nd I-F(1) 1st I-F(2)	Adjust for maximum signal. Adjust for maximum signal.
2.	400 ohm Carbon Resistor	15.3 MC.	Antenna Lead	S.W.	Fully Open	S. W. "Osc."	Adjust for maximum output.
3.	400 ohm Carbon	15.0 MC.	Antenna Lead	S.W.	15 on Dial	S.W. "Ant."	Adjust for maximum signal while rocking gang through it.
4.	.0002 MF.	1650 KC.	Antenna Lead	BC	Fully Open	B.C. "Osc."	Adjust for maximum output. Gang does not have to tune through signal.
5.	.0002 MF.	1400 KC.	Antenna Lead	BC	140 Dial	B.C. "Ant."	Adjust for maximum output.

Rèpeat above procedures for more accurate adjustments.

Maximum power output at 90 V. "B"—approx. 340 M. W.

A Battery drain at 1.5 volts, .20 Amp.; "B" Battery drain at 90 V., 11 M. A.

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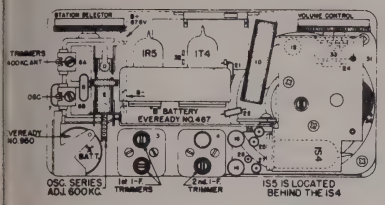
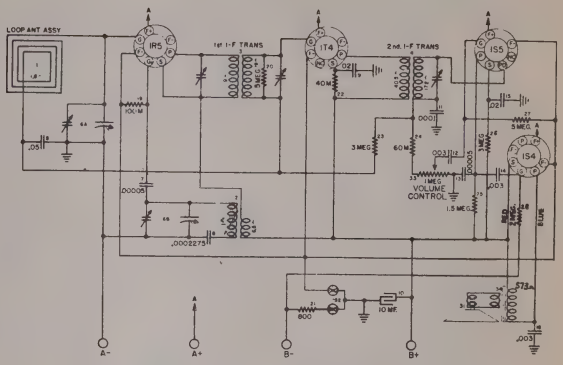
MODEL 45, Chassis 45
COMMUTER

THE CROSLEY CORP.





BATTERIES REQUIRED—1 Eveready No. 950 size "D", 1.5 volt "A" Battery or equivalent; 1 Eveready No. 467 Minimax 67½ Volt "B" Battery or equivalent.

SOCKET VOLTAGES

Measured from socket contact to chassis ground using 10 volt range (for Filament) and 500 Volt range (for Plate and Screen) of a 100,000 ohm per volt Voltmeter.

TUBE	FUNCTION	SOCKET PIN NUMBER						
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
IR5	Osc-Mod	Gnd.	51	51	—	—	—	1.3
IT4	I-F Amp.	Gnd.	51	33	—	—	—	1.3
IS5	Det.—A.V.C. 1st A.F.	Gnd.	—	—	5	5	—	1.3
IS4	Pwr. Output	Gnd.	51	*7.9	51	—	—	1.3

*Measured across item 21, an 800 ohm resistor.
"A" Battery drain approximately 250 M.A. "B" Battery drain @ 58.9 Volts approximately 9.2 M.A.

RECEIVER ALIGNMENT

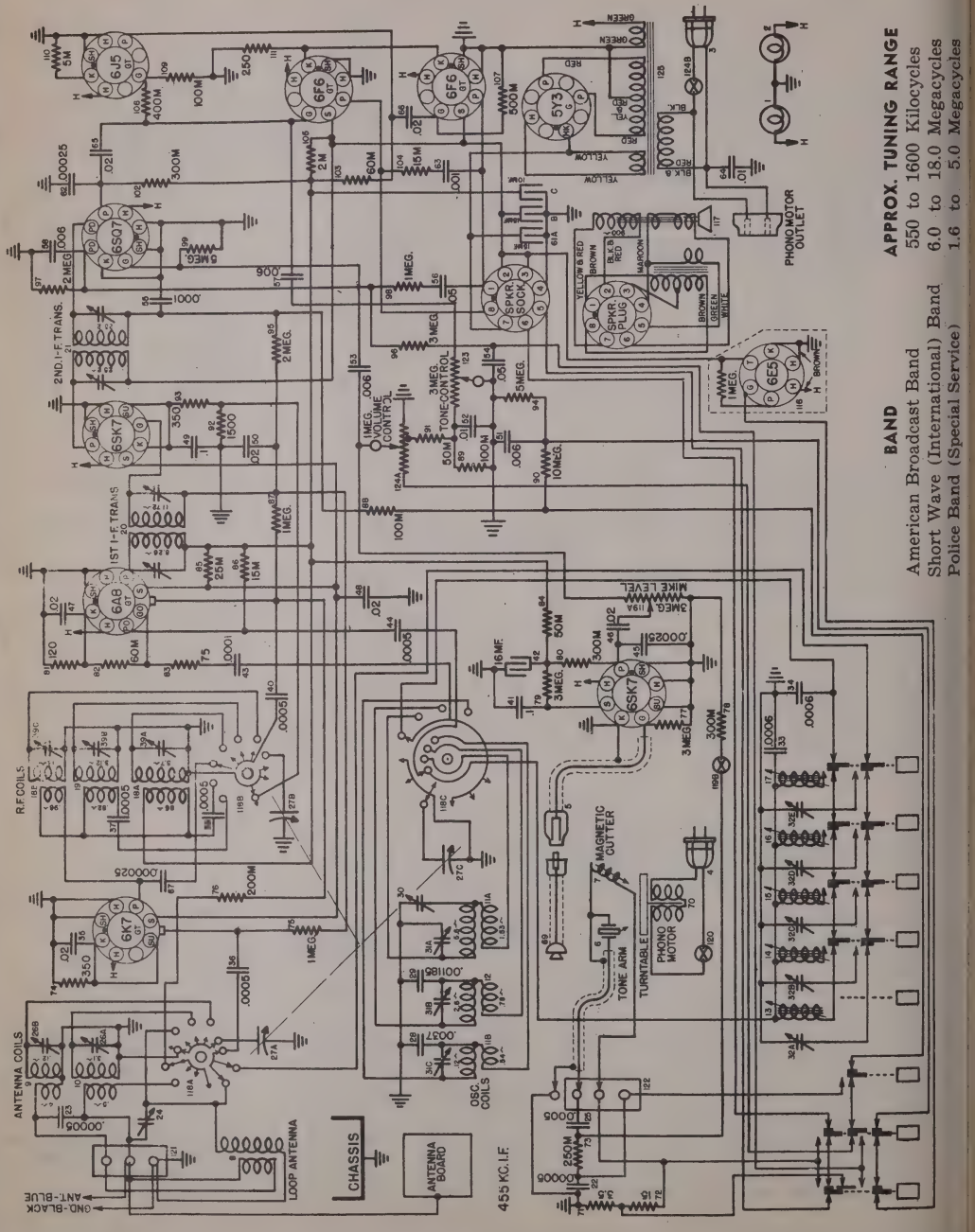
OUTPUT METER CONNECTIONS.... Plate to screen of 1S4
GENERATOR GROUND CONNECTION .... To chassis
POSITION OF VOLUME CONTROL .... Fully on

Step	Signal Generator Dummy Antenna	Frequency Setting	Input to Receiver	Tuning Cond. Setting	Trimmers Adjusted	Remarks
	02.	455 Kc.	Stator of top section of gang	Fully open	2nd I-F(2) 1st I-F(2)	Adjust for maximum output. Adjust for maximum output.
	None	1620 Kc.	Signal radiated by loop on generator	Fully open	"OSC" Trimmer	Adjust for peak gang; does not have to tune through signal.
	None	1400 Kc.	"	Approx. 140 on dial knob	"ANT" Trimmer	Adjust for maximum output
	None	600 Kc.	"	Approx. 60 on dial knob	Iron core in osc coil	Adjust for maximum output while rocking gang through signal.

REPEAT THE ABOVE ALIGNMENT PROCEDURE TO INSURE ACCURATE ADJUSTMENTS.

MODELS 48 Late, 48BF,
48CB

THE CROSLEY CORP.



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MODELS 48, 48BF, 48CB

THE CROSLEY CORP.

RADIO RECEIVER ALIGNMENT PROCEDURE

Preliminary
Output Meter Connections.....Plate to Plate of 6F6G's
Generator Ground Connection.....To chassis or Ground Lead
Dummy Antenna to be in series with generator output.....See Chart Below
Position of Volume Control.....Fully On
Position of Tone Control.....Treble or Speech
Position of Function Switch.....Radio
Position of Mike Level Control.....All the Way to Left (Off)

	Signal Generator						
Alignment Sequence	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Grid of 6A8GT	B. C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	.0002 MF.	1650 Kc.	Ant. Lead (Blue)	B. C.	Fully open	B. C. "OSC" Trimmer	Adjust for peak; gang does not have to tune thru signal.
3.	.0002 MF.	600 Kc.	Ant. Lead (Blue)	B. C.	Approx. 60 on dial	B. C. "OSC" Series Trimmer	Adjust for maximum output while rocking gang thru signal.
4.	Repeat Step No. 2 to check possible shift due to series adjustment						
5.	.0002 MF.	1400 Kc.	Ant. Lead (Blue)	B. C.	Approx. 140 on dial	B. C. "ANT" Trimmer B. C. "R-F" Trimmer	Adjust for maximum output; do not touch B. C. Osc. Trimmer. Adjust for maximum output while rocking gang thru signal.
6.	400 ohm (carbon)	5.3 Mc.	Ant. Lead (Blue)	Police	Fully open	Pol "OSC"	Adjust for peak; gang does not have to tune thru signal.
7.	400 ohm (carbon)	5.0 Mc.	Ant. Lead (Blue)	Police	Approx. 5.0	Pol "ANT" and "R-F" Trimmers	Adjust for maximum output while rocking gang thru signal.
8.	400 ohm (carbon)	18.3 Mc.	Ant. Lead (Blue)	S. W.	Fully open	S. W. "OSC"	Adjust for peak. Gang does not have to tune thru signal.
9.	400 ohm (carbon)	18.0 Mc.	Ant. Lead (Blue)	S. W.	Approx. 18	S. W. "ANT" and "R-F" Trimmers	Adjust for maximum output while rocking gang thru signal.

When aligning the shortwave bands "OSC" trimmers care must be exercised to see that the circuits are aligned on the correct frequency and not on the image which is approximately 910 kilocycles less **as indicated on the dial.** To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles **lower on the dial** than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position).

Repeat the original alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A.V.C. circuit.

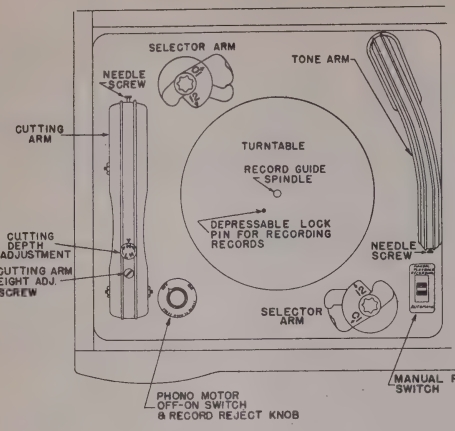
SOCKET VOLTAGES MEASURED @ 117.50 VOLTS LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT, 500 VOLT RANGE VOLTMETER D.C.)

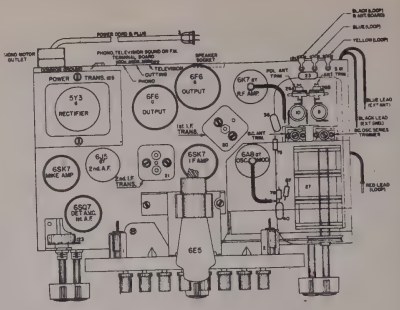
	SOCKET PIN NUMBER							
TUBE FUNCTION	1	2	3	4	5	6	7	8
6K7GT—R-F Amp.	.....	.....	195	78.6	.....	2.0	*6.3	2.0
6A8GT—Osc.-Mod.	.....	.....	195	78.6	.....	136	*6.3	1.0
6SK7—I-F Amp.	.....	.....	.....	.....	5.5 B.C. 2.6 S.W.	78.6	*6.3	234
6SQ7—Det. A.V.C. 1st A-F	.....	.....	.....	.....	.....	110	*6.3	.....
6J5GT—Phase Invert	.....	.....	118	195	.....	110	*6.3	4.5
6F6G—Outpút	.....	.....	220	228	.....	.....	*6.3	15.0
6F6G—Output	.....	.....	220	228	.....	.....	*6.3	15.0
6SK7—Mike Amp.	.....	.....	.....	.....	.....	.....	*6.3	POS.
5Y3G—Rectifier	.....	305 D.C.	.....	*325	.....	*325	.....	305 D.C.
6E5—Indicator	.....	.....	.....	225	.....	*6.3		

*Measured with A.C. volt meter

VOLTAGE DROP ACROSS SPEAKER FIELD=77 VOLTS
MAXIMUM POWER OUTPUT @ 130 V. Line=7.5 Watts
POWER CONSUMPTION @ 117.5 V. Line=Radio 80 Watts, Phono Motor 35 Watts—TOTAL=115 WATTS
Voltages may vary 10% of values given.

THE CROSLEY CORP.





FOR OTHER DATA PERTAINING TO THE RECORD CHANGER AND RECORDER, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS", AND VOLUME XII PAGES 12-39 TO 12-43 INCLUSIVE.

ADJUSTING PUSH BUTTONS TO STATIONS

SET-UP PROCEDURE

Remove push button escutcheon. Turn the receiver "on" and leave operate a sufficient length of time to permit the tubes to reach normal operating conditions.

NOTE: To simplify the set up and insure accurate adjustments the following pre-adjustments should be made.

Tighten all the "ANT" Trimmer screws just moderately tight. See Fig. 3.

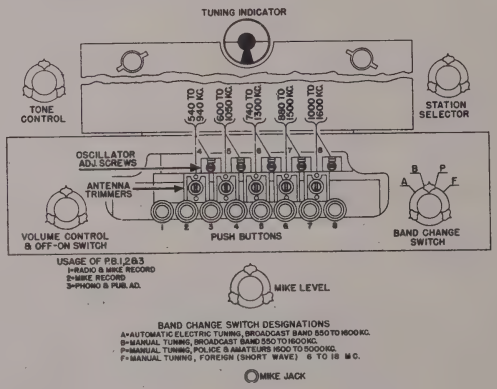


FIG. 3

Turn the "OSC" adjusting screws to the left (counter clockwise) until the end of the screw is about flush (even) with the top of the "ANT" padder condenser. NOTE: Care should be exercised when adjusting the "OSC" screws so that the selected station is not passed over; turn screws slowly.

It is essential that the frequency (Kilocycles) of the station selected is **within** the range of the push button to be set for that station, see Fig. 3.

1. Turn the band switch to "B" position, first notch from left end. Using the station selector knob (upper right) carefully tune in the station to which the No. 4 push button is to be set. Note program.

2. Turn the band switch to the left ("A") and using a small screw driver, carefully turn (in a clockwise direction) the "OSC" screw for the No. 4 push button (first screw on left in the upper row), until the station you tuned in (Manually) is heard again. Adjust for maximum output in speaker (narrowest width of shadow on tuning indicator tube).

3. Adjust the No. 4 push button "ANT" adjusting screw for maximum volume in speaker, (narrowest width of shadow on tuning indicator tube).

4. Turn band switch one notch to right "B" then back to "A" to check if push button is correctly adjusted.

5. The set-up for No. 4 push button is now complete. Set up remaining buttons to be set, following the same procedure, adjusting the "OSC" screw first, then the "ANT" padder screw.

6. After all the buttons have been set, they should be rechecked to insure accurate adjustments.

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MODEL 49BZ

THE CROSLEY CORP.

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MODEL 49BZ

THE CROSLEY CORP.

ALIGNMENT PROCEDURE

PRELIMINARY

Output meter connections.....Plate to Screen 6K6GT
Generator ground connection.....To chassis or ground lead
Dummy antenna to be in series with generator output.....See chart below
Position of volume control.....Fully on
Position of tone control.....Treble or speech

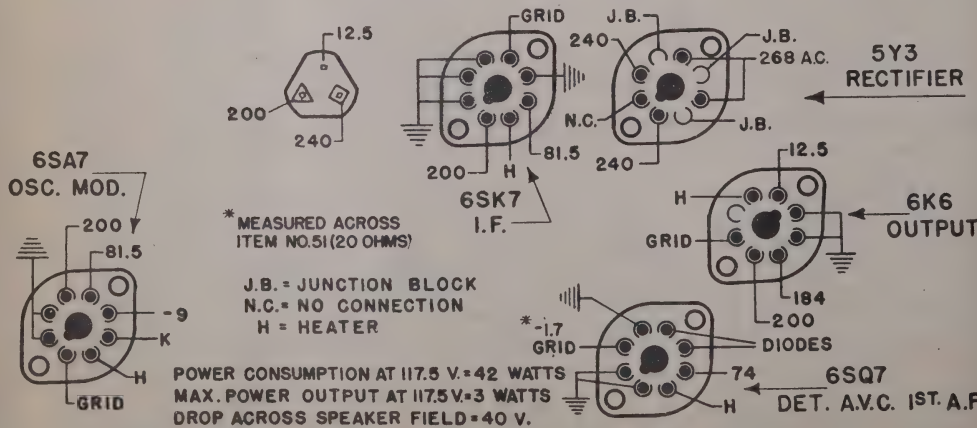
ALIGNMENT PROCEDURE CHART

Alignment Sequence	Signal Generator Dummy Antenna	Signal Generator Frequency Setting	Input Connection To Receiver	Band Switch	Tuning Cond.	Trimmer Adjusted	Remarks
1	.02 Mf.	455 Mc.	Ant. Lead	B. C.	Fully open	2nd I-F 1st I-F	Adjust for maximum output.
2	400 Ohm Carbon	15.4 Mc.	Ant. Lead	S. W.	Fully open	S. W. "OSC" rear section of gang	Adjust for Peak.
3	400 Ohm Carbon	15.0 Mc.	Ant. Lead	S. W.	Approx. 15 on dial	S. W. Ant.	Adjust for maximum output while rocking gang thru signal.
4	.0002 Mf.	1650 Kc.	Ant. Lead	B. C.	Fully open	B. C. "OSC"	Adjust for peak; gang does not have to tune thru signal.
5	.0002 Mf.	1400 Kc.	Ant. Lead	B. C.	Approx. 140 on dial	D. C. Ant.	Adjust for maximum output.
6	.0002 Mf.	2.5 Mc.	Ant. Lead	B. C. and switch on loop to POL.	Approx. 2.5 on dial	POL. Ant. on loop	Adjust for maximum output.

When aligning the shortwave band "OSC" trimmer care must be exercised to see that the circuit is aligned on the correct frequency and not on the image which is approximately 910 kilocycles less AS INDICATED ON THE DIAL. To check, increase generator output, tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles LOWER ON THE DIAL than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position).

Repeat the original alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A. V. C. Circuit.

SOCKET VOLTAGE CHART



VOLTAGES MEASURED BETWEEN SOCKET PIN & GROUND WITH A 250 VOLT, 1000 OHMS PER VOLT, VOLT METER. READINGS MAY VARY 10%

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THE CROSLEY CORP.

PHONO CONNECTIONS

This chassis is so constructed as to be adaptable to a phonograph pick-up (high impedance type) for the reproduction of recordings. The terminals may also be used for the reproduction of television sound as supplied by a suitable television converter unit. The double pole double throw switch for changing from Radio to Phono or television sound, should be connected as shown in the diagram (Fig. 3). The terminals are coded as follows: 1, 2, 3, respectively. The No. 2 terminal connects to the high side of the phono pickup or television A-F connections.

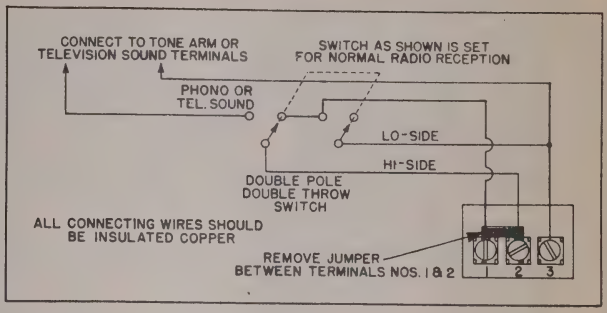

CONNECT TO TONE ARM OR TELEVISION SOUND TERMINALS
SWITCH AS SHOWN IS SET FOR NORMAL RADIO RECEPTION
PHONO OR TEL. SOUND
LO-SIDE
HI-SIDE
DOUBLE POLE DOUBLE THROW SWITCH
ALL CONNECTING WIRES SHOULD BE INSULATED COPPER
REMOVE JUMPER BETWEEN TERMINALS NOS. 1 & 2
1
2
3

FIG. 3

NOTE: The jumper wire between No. 1 and No. 2 terminals must be removed when phono-radio switch is connected. If phono switch is removed, it is absolutely essential that the jumper wire between No. 1 and No. 2 terminals be replaced. Be sure all connections are tight.

The No. 3 terminal is the ground or low side connection. The No. 1 terminals should be connected to the No. 3 terminals by some means (as indicated in the above diagram). This prevents any radio signals from the receiver proper interfering with the Phono or Television sound reproduction.

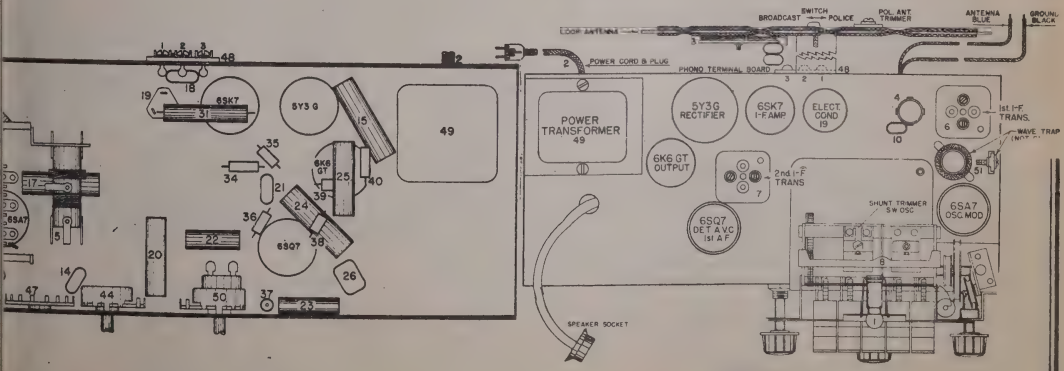
SETTING THE PUSH BUTTONS

The push buttons are easily and accurately set from the front of the receiver without removing any panels, etc.

Determine the five favorite stations to which the buttons are to be set and remove their call letters from the stations tab list supplied.

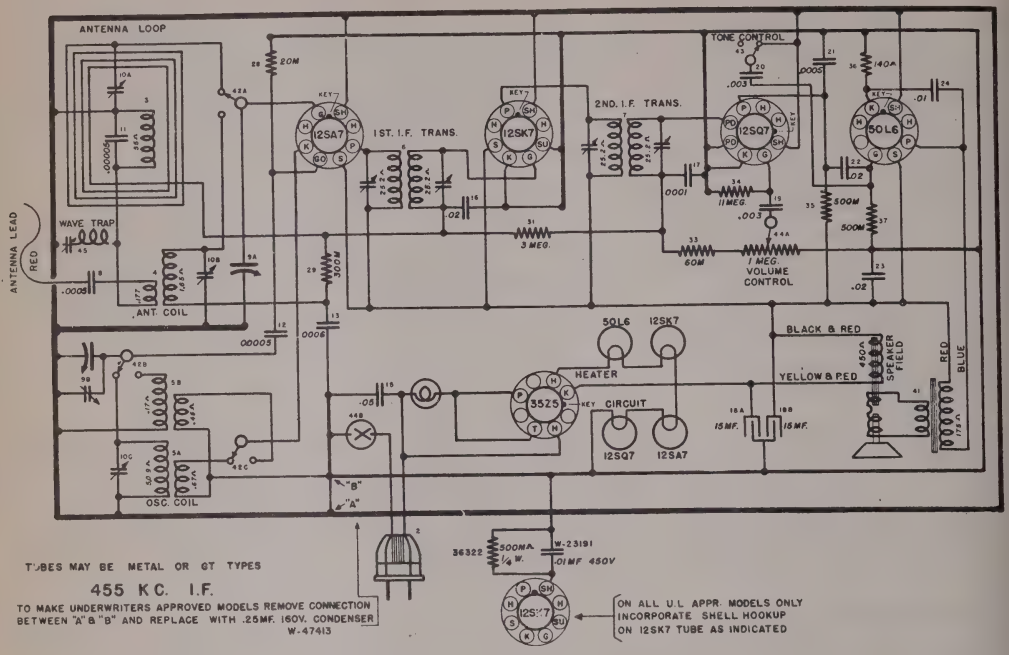
Place the call letters in the buttons in the order of their frequency (Kilocycles), that is, the station which is tuned-in nearest the 55 end of the dial should be placed in the left hand buttons, etc. After the call letters have been placed in the buttons, break five pieces from the scored celluloid strip supplied and snap into place over the call letter tabs in the buttons to protect and hold them in place.

To set the push buttons, lift up on push button and the setting screw is easily accessibe through cutout on right side of button. With a small screw driver loosen the setting screws two or three turns (DO NOT REMOVE)

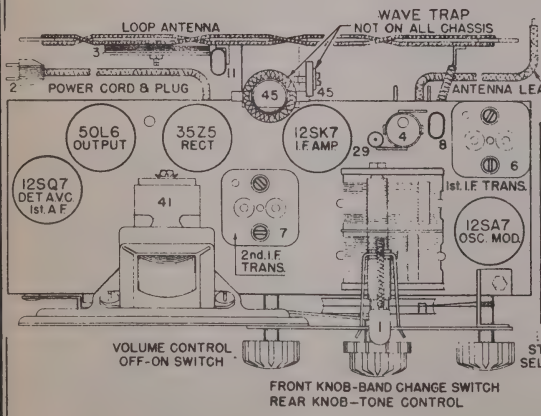


MODELS TH52, TH52W, TH52J
Chassis 65, 65JW

THE CROSLEY CORP.



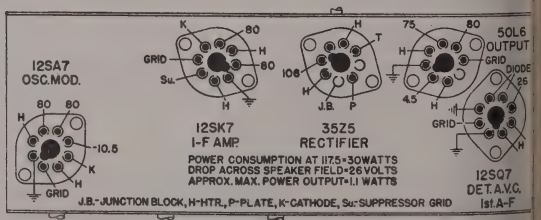
GROUND: Never Attach a Ground Wire to This Receiver.



Top View

TUNING RANGE

Broadcast band — 1600 to 540 Kilocycles
Short wave band — 15 to 6 Megacycles



VOLTAGES MEASURED BETWEEN SOCKET PIN & GND. SIDE OF VOL. CONT. WITH 250VOLT, 1000 OHMS. PER. VOLT METER. READINGS MAY VARY 10%

Socket Voltage Chart

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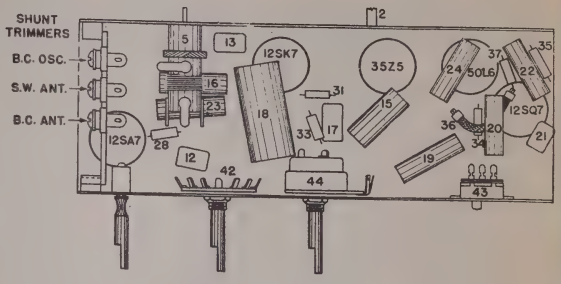
MODELS TH52, TH52W, TH52J
Chassis 65, 65JW

THE CROSLEY CORP.

ALIGNMENT PROCEDURE

1.—Aligning I-F TO 455 Kc.

(a) Connect the output lead of the signal generator through a .0001 mf. condenser to the antenna lead extending from the rear of the chassis. Do not use a ground return from the signal generator unless it is found to be absolutely necessary. If necessary a small condenser (.001 mf.) should be connected in series with the ground lead of the signal generator and the chassis.
(b) Open tuning gang condenser all the way (plates completely out of mesh). Turn volume control to maximum.



Bottom View

(c) Set the signal generator to 455 kilocycles.
(d) Adjust the two trimmer condensers on top of 2nd I-F assembly (Fig. 2) for maximum output.
(e) Adjust the two trimmer condensers on top of the 1st I-F assembly (Fig. 2) for maximum output.
(f) Repeat (d) and (e) for more accurate adjustments.

2.—Aligning R-F Amplifier.

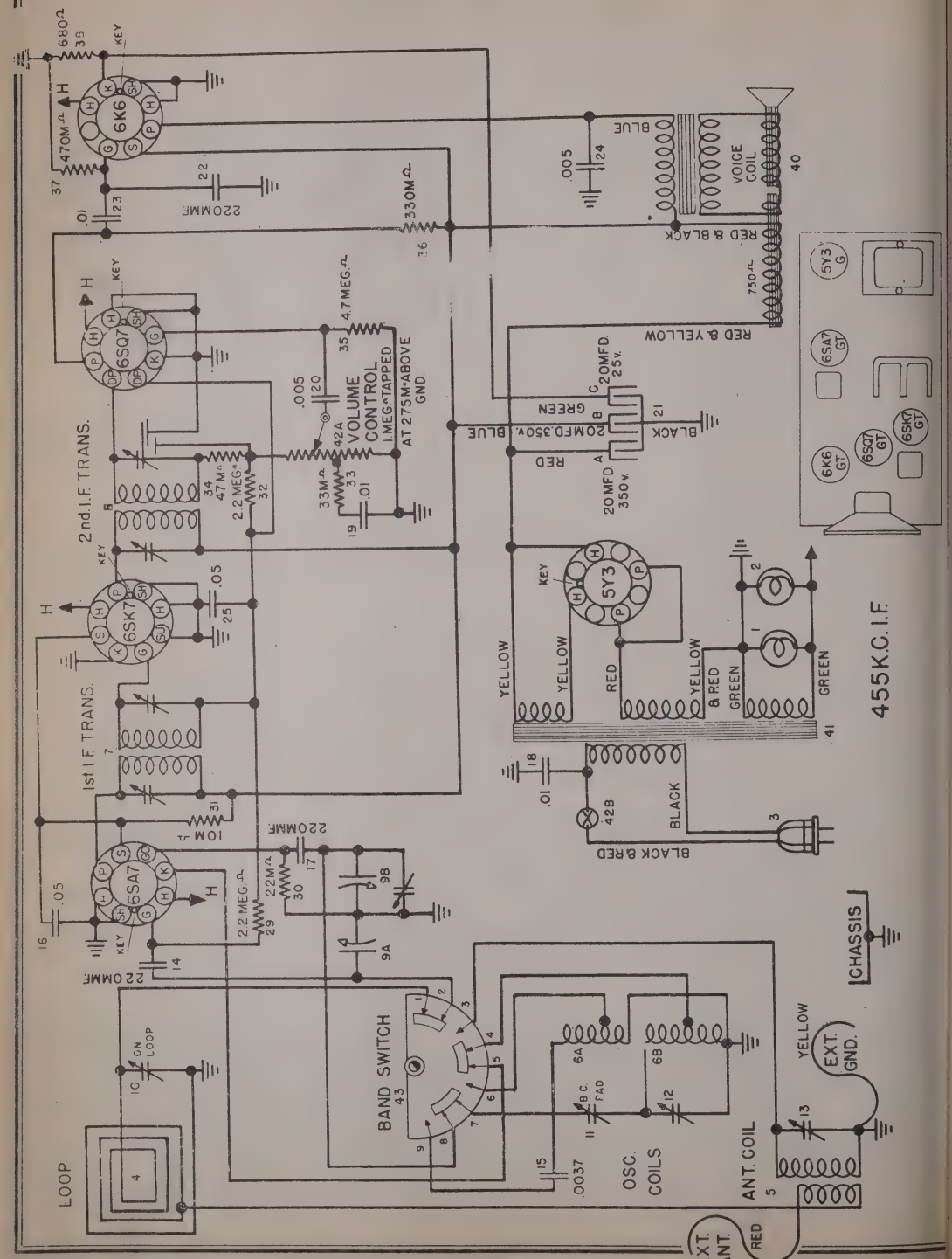
The short wave band 6-15 mc., must be aligned before the Broadcast Band 540-1600 kc.
(a) Connect the signal generator output lead through a dummy antenna (400 ohm carbon resistor) to lead (Blue or Red) extending from rear of chassis. Turn the band swtich to S. W. (right) and open tuning condenser all the way.
(b) Set signal generator to 15.0 megacycles.
(c) Adjust the S. W. "OSC" trimmer condenser (Fig. 2) (on rear section of gang) for maximum output. The gang should just tune through this signal.
(d) Tune in 15.0 mc. signal with gang and while slowly rocking gang through signal, adjust the S. W. "ANT" trimmer condenser for maximum output. (Center trimmer on right end of chassis). NOTE: When aligning the Short Wave band care should be exercised so that the circuits are aligned on the fundamental rather than on the image frequency which is approximately 910 kilocycles more than the fundamental. To check this increase the output of the signal generator approximately 10 times and try to tune in both, the fundamental, at the signal generator frequency as indicated on the dial and the image which should be approximately 910 kilocycles lower (approximately 14) on the dial.
(e) Repeat (c) and (d) for more accurate adjustments.
(f) Replace 400 ohm carbon antenna dummy with a .0001 mf. condenser. Turn band switch to the Broadcast band, open gang condenser all the way, etc.
(g) Set the signal generator to 1650 kilocycles.
(h) Adjust B. C. "OSC" trimmer (rear trimmer right end of chassis) Fig. 2, for maximum output.
(i) Set signal generator to 1400 kilocycles.
(j) Tune in generator signal for maximum output then adjust B. C. "ANT" trimmer (front trimmer right end of chassis) Fig. 2, for maximum output.
(k) Repeat (h) and (j) for more accurate adjustments.

WAVE TRAP — 65W Chassis Only

The wave trap snould not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a .0001 mfd. condenser into the antenna terminal of the receiver. With the band selector switch turned to the Broadcast Band position, the gang condenser set to approximately 60 on the dial, and the volume control full on, adjust the trimmer condenser on the wave trap for MINIMUM output. Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal an antenna may be attached to the receiver and the receiver turned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.

MODEL 52TL, Chassis 86

THE CROSLEY CORP.



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TUBE VOLTAGE CHART

SOCKET VOLTAGES MEASURED AT 117.5 V. LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT, 500 V. RANGE VOLTMETER (D. C.)

TUBE	FUNCTION	PIN NUMBER 1	2	3	4	5	6	7	8
6SA7	—OSC.—Mod.	0	0	180	73		0	6.3 A. C.	0
6SK7	—I. F. Amplifier	0	0	0	0	0	73	6.3 A. C.	180
6SQ7	—Det. A. S. C. 1st A. F.	0	0	0	0	0	68	6.3 A. C.	0
6K6G or GT	—Output	0	0	160	180	0	180	6.3 A. C.	9
5Y3G	—Rectifier	0	225		270 A.C.		270 A. C.		225

MAX. POWER OUTPUT.....3.0 WATTS.
POWER CONSUMPTION.....55 WATTS.
DROP ACROSS SPEAKER FIELD.....45 VOLTS.

Voltages may vary 10% of values given.

ALIGNMENT PROCEDURE

Output Meter Connections.....Plate and Screen of 6K6G
Generator Ground Connection.....To Chassis or Ground Lead
Dummy Antenna to be in series with generator output.....See Chart Below
Position of Volume Control.....Fully On

ALIGNMENT PROCEDURE CHART

Alignment Sequence	Signal Generator: Dummy Antenna	Signal Generator: Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Stator lug Rear section of Gang Cond.	B. C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum Adjust for Maximum.
2.	400 ohm (carbon)	18.3 Mc.	Ant. Terminal	S. W.	Fully open	S. W. "OSC"	Adjust for peak. Gang does not have to tune thru signal.
3.	400 ohm (carbon)	18.0 Mc.	Ant. Terminal	S. W.	Approx. 18	S. W. "ANT" Trimmer	Adjust for maximum output while rocking gang thru signal. do not touch B. C. Osc. Trimmer.
4.	.0002 MF.	1650 Kc.	Ant. Terminal	B. C.	Fully open	B. C. "OSC" Trimmer	Adjust for peak; gang does not have to tune thru signal. Loop must be connected.
5.	.0002 MF.	600 Kc.	Ant. Terminal	B. C.	Approx. 60 on dial	B. C. "OSC" Series Trimmer	Adjust for maximum output while rocking gang thru signal.
6.	.0002 MF.	1400 Kc.	Ant. Terminal	B. C.	Approx. 140 on dial	B.C. LOOP "ANT" Trimmer	Adjust for maximum output do not touch B. C. Osc. Trimmer.
7.	Repeat the above alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A. S. C. circuit.						

IMPORTANT ALIGNMENT NOTES — When aligning the shortwave band "OSC" trimmer care must be exercised to see that the circuit is aligned on the correct frequency and not on the image which is approximately 910 kilocycles less **as indicated on the Receiver dial.** To check, increase generator output tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles **lower on the Receiver dial** than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position.)

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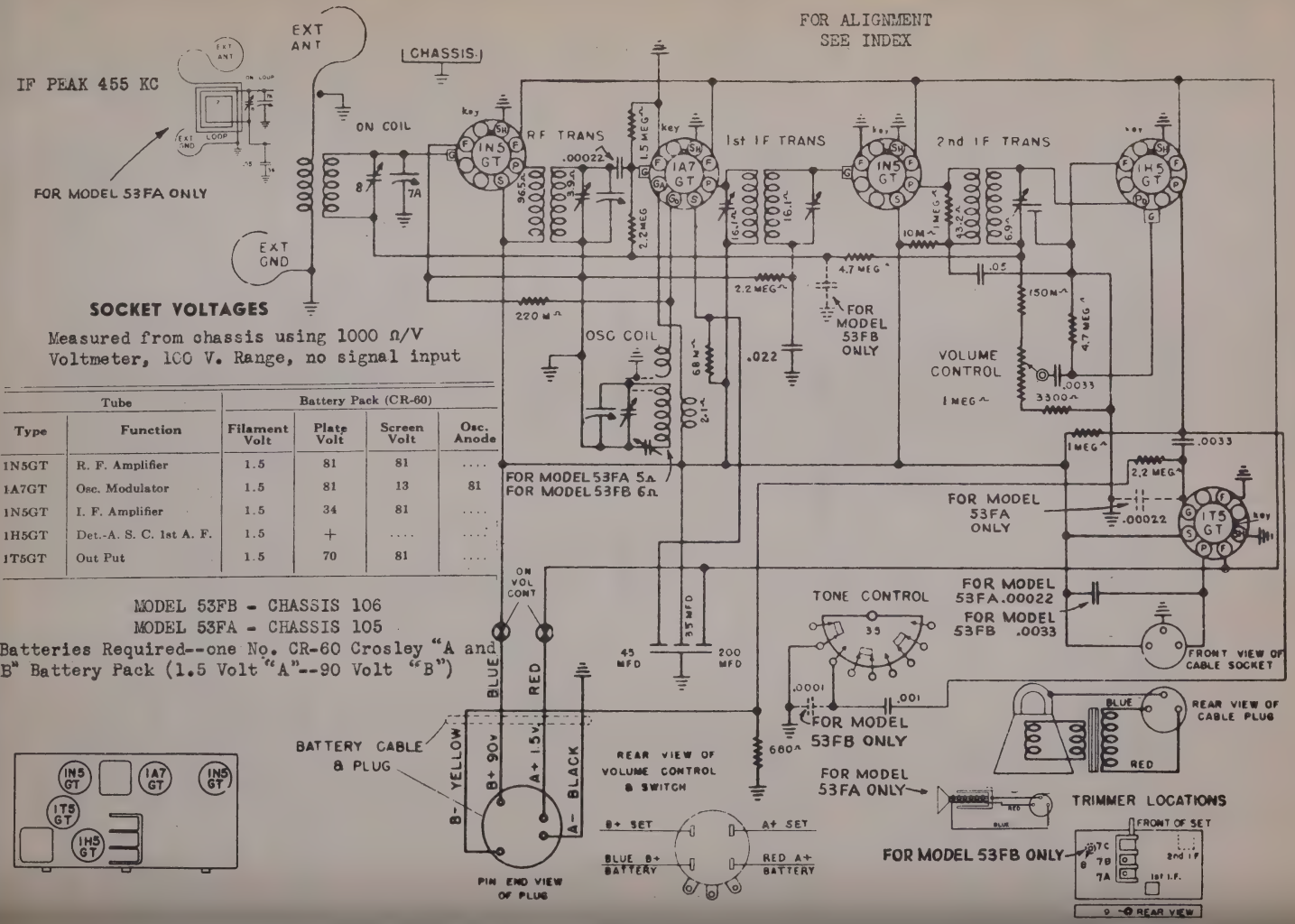


SOCKET VOLTAGES

Measured from chassis using 1000 ohm/V Voltmeter, 100 V. Range, no signal input

Tube		Battery Pack (CR-60)			
Type	Function	Filament Volt	Plate Volt	Screen Volt	Osc. Anode
1N5GT	R. F. Amplifier	1.5	81	81	....
1A7GT	Osc. Modulator	1.5	81	13	81
1N5GT	I. F. Amplifier	1.5	34	81	....
1H5GT	Det.-A. S. C. 1st A. F.	1.5	+	....	....
1T5GT	Out Put	1.5	70	81	....

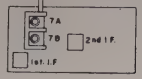
MODEL 53FB - CHASSIS 106
MODEL 53FA - CHASSIS 105

Batteries Required--one No. CR-60 Crosley "A and B" Battery Pack (1.5 Volt "A"--90 Volt "B")

MODEL 53TP
CHASSIS 100

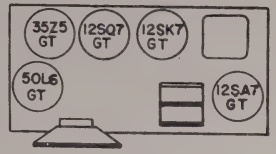
TRIMMER LOCATIONS

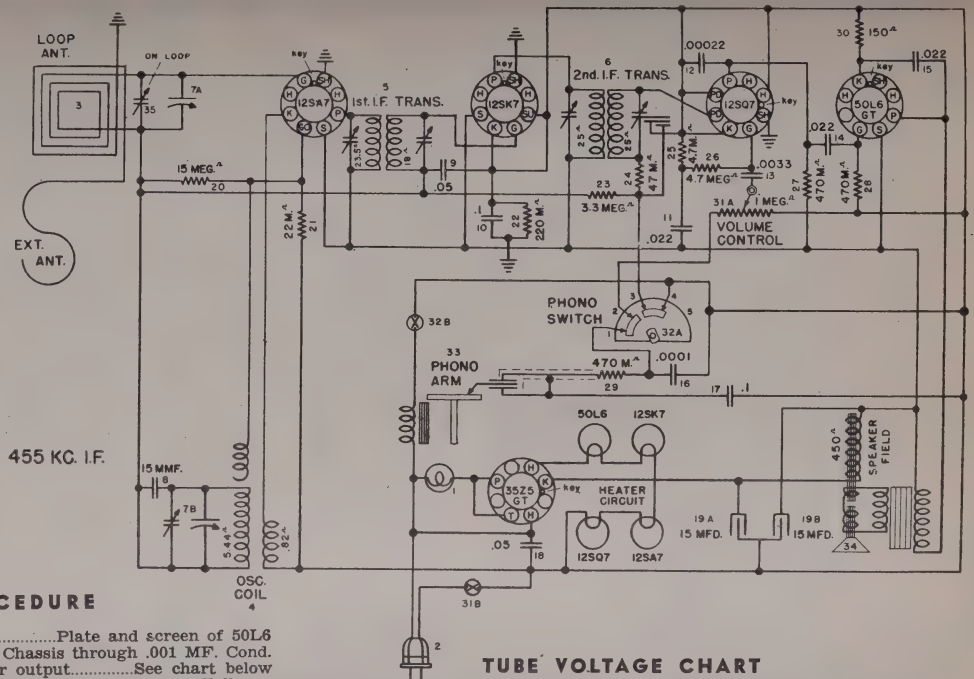
FRONT OF CHASSIS



TUNING RANGE — Broadcast Band 1600 to 540 kilocycles, or 18.75 to 555 meters.

TUBE LAYOUT





ALIGNMENT PROCEDURE

Preliminary
Output Meter Connections.....Plate and screen of 50L6
Generator Ground Connections.....To Chassis through .001 MF. Cond.
Dummy Antenna to be in series with generator output.....See chart below
Position of Volume Control.....Fully on

ALIGNMENT PROCEDURE CHART

Alignment Seq.	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Phono. Radio Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.0001 MF.	455 Kc.	Antenna Lead	Radio	Fully Open	1st I-F (2) 2nd I-F (2)	Adjust for maximum signal. Adjust for maximum signal.
2.	.0001 MF.	1620 Kc.	Antenna Lead (red)	Radio	Fully Open	B. C. "Osc."	Adjust for maximum output. Gang does not have to tune through signal
3.	.0001 MF.	1400 Kc.	Antenna Lead (red)	Radio	140 Dial	B. C. "Ant."	Adjust for maximum output.

Repeat the original alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A.V.C. circuit.

TUBE VOLTAGE CHART

Socket Voltage is measured @ 117.5 V line (BETWEEN SOCKET PINS AND B—) WITH 1000 OHM PER VOLT—500 V. RANGE D. C. VOLTMETER.

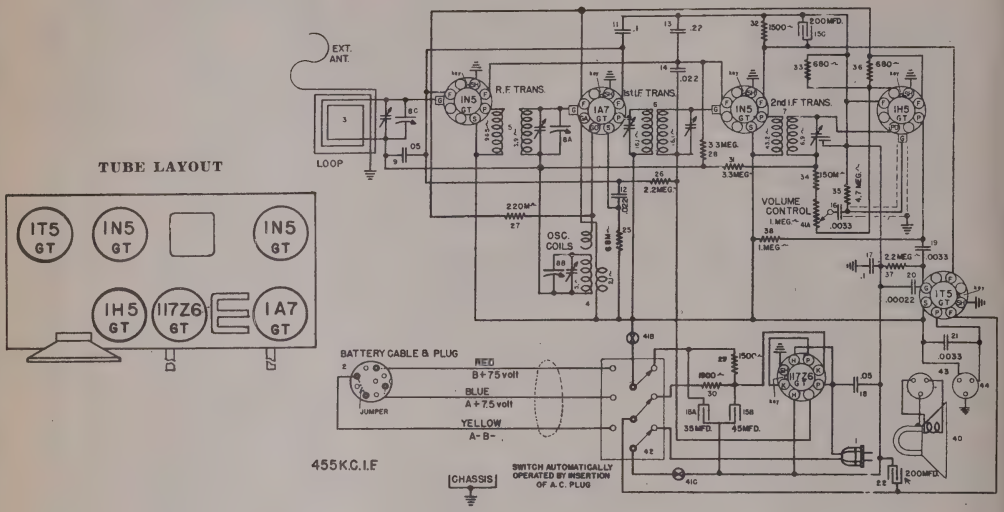
TUBE	FUNCTION	PIN NUMBER 1	2	3	4	5	6	7	8
12SA7	Osc. Mod.	....	....	85	85	Neg.	0	....	Neg.
12SK7	I. F. Amp.	....	....	0	Neg.	0	85	....	85
12SQ7	Det., Etc.	....	0	0	0	Neg.	40	....	0
50L6	B. P. O.	....	....	80	85	0	....	....	....
35Z5	Rect.	....	....	....	....	117.5A.C.	....	....	110

All voltages may vary 10% of values indicated. Neg. indicates Neg. reading on Voltmeter Scale but of too small a value to record accurately.

Power consumption at 117.5 V. line, 60 watts. Phono Motor 20 watts additional. Drop across Speaker Field—35 V. Current thru Speaker Field—90 M. A.

MODELS 62PA, 62PB
Chassis 68

THE CROSLEY CORP.



BATTERIES REQUIRED — one No. CR68 CROSLEY "A and B" Battery Pack (7.5-Volt "A" and 75-Volt "B") OR EQUIVALENT

SOCKET VOLTAGES — Models 62-PA and 62-PB

Measured from "B" minus using 1000 Ω/V — Voltmeter, 100 V. Range, no signal input

Tube		@ 117.5-Volt Line				Battery Pack			
Type	Function	Filament Volt	Plate Volt	Screen Volt	Cathode Volt	Filament Volt	Plate Volt	Screen Volt	Cathode Volt
1N5GT	R. F. Amplifier	3.8	.....	.....	.....	4.6	75	75	.....
1A7GT	Osc. Modifier	2.6	80	31	.....	3.1	75	28	.....
1N5GT	I. F. Amplifier	5.0	80	80	.....	6.1	75	75	.....
1H5GT	Det.-A. V. C. 1st A. F.	1.3	7	.....	.....	1.6	4.5	.....	.....
1T5GT	Out Put	6.2	72	80	100	7.7	68	75	.....
117Z6GT	Rectifier	117.5 A. C.	117.5 A. C.	.....	.....				

ALIGNMENT PROCEDURE — Volume Control on full Output meter connected to Plate and Screen of 1T5GT

SIGNAL GENERATOR					
FREQUENCY SETTING	CONNECTION TO RADIO	DUMMY ANTENNA	TUNING COND. SETTING	TRIMMERS TO ADJUST (See Fig. 1)	REMARKS
455 Kc	Ant. Lead	.0001 MF	Fully open	2nd 1-F(1) front chassis flange	Adjust for maximum signal.
455 Kc	Ant. Lead	.0001 MF	Fully open	1st 1-F (2)	Adjust for maximum signal. Located top of 1st 1-F ass'y.
1650	Ant. Lead	.0001 MF	Fully open	"OSC" Shunt on gang	Adjust for maximum output. Gang does not have to tune through signal.
1400	Ant. Lead	.0001 MF	140 on dial	"ANT" shunt on gang	Adjust for maximum output.
1400	Ant. Lead	.0001 MF	140 on dial	"RF" shunt on gang	Adjust for maximum output.
600	Ant. Lead	.0001 MF	60 on dial	Iron core in "OSC" coil	Adjust for maximum output while rocking gang.

Repeat above for more accurate adjustments
Maximum power output @ 75 V. "B" — approx. 200 M. W.

A Battery drain @ 6 volts, .05 Amp.; "B" Battery drain @ 75 V., 9 M. A.; @
Power consumption @ 117.5 volts line — 25 Watts

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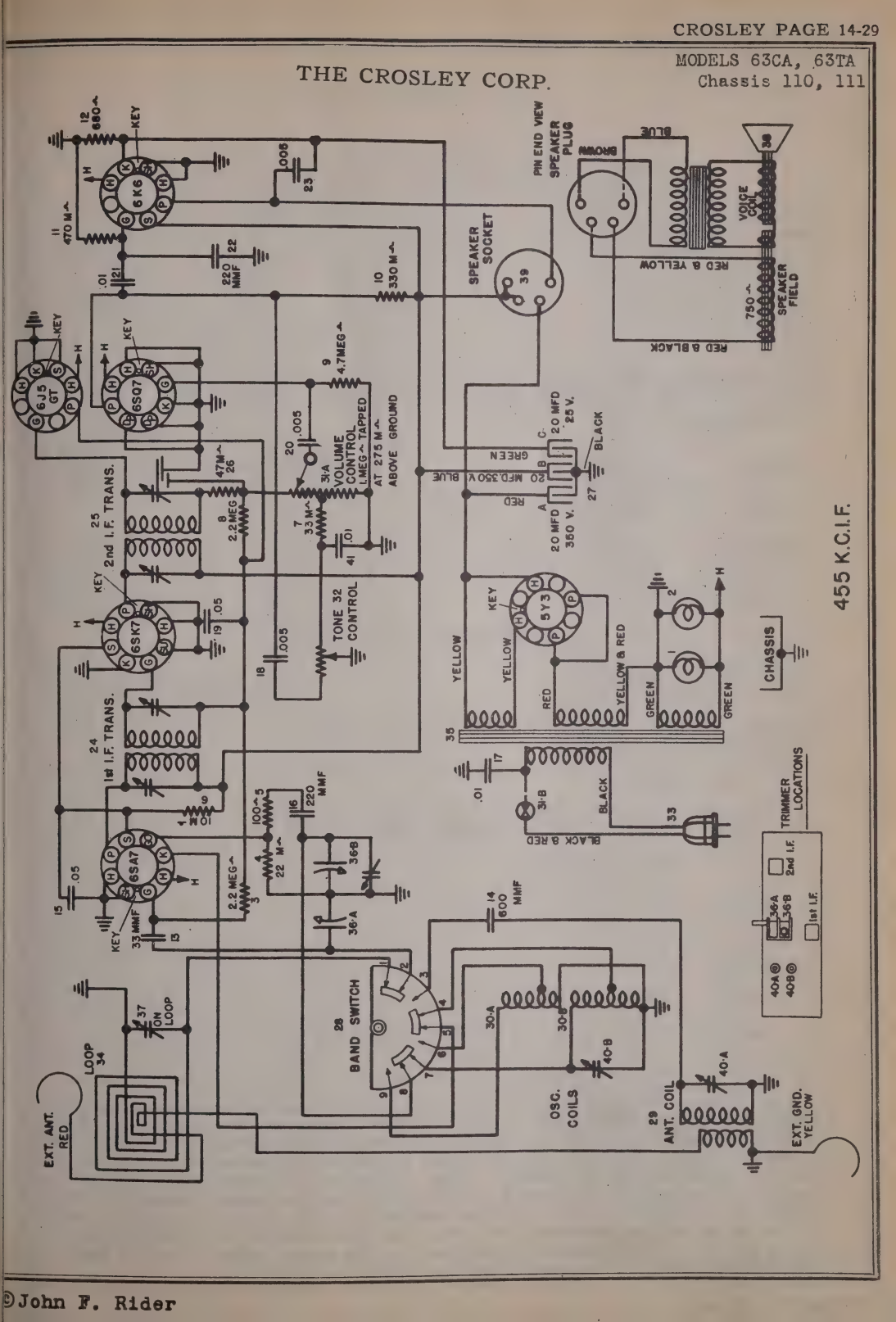
MODELS 63CA, 63TA
Chassis 110, 111



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MODELS 63CA, 63TA
Chassis 110, 111

THE CROSLEY CORP.

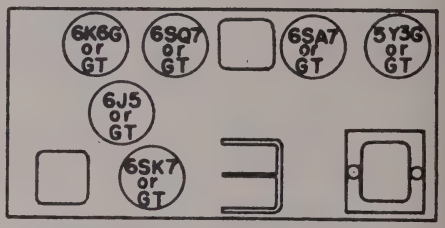
TUBE VOLTAGE CHART

Voltages measured with 1000 ohm per volt meter on the 500 volt range between socket pin and chassis

TUBE	FUNCTION	PIN NUMBER 1	2	3	4	5	6	7	8
6SA7	OSC.—Mod.	..	..	180	73	..	..	6.3 A. C.	..
6SK7	I. F. Amplifier	..	..	..	..	..	73	6.3 A. C.	180
6J5	Detector A. J. C.	..	..	..	..	..	..	6.3 A. C.	..
6SQ7	1st A. F.	..	..	..	..	..	68	6.3 A. C.	..
6K6G or GT	Output	..	..	160	180	..	..	6.3 A. C.	9
5Y3G	Rectifier	..	225	..	270 A.C.	..	270 A.C.	..	225

MAX. POWER OUTPUT, 3.0 WATTS. POWER CONSUMPTION, 60 WATTS. DROP ACROSS SPEAKER FIELD, 45 VOLTS. Voltages may vary 10% of values given.

TUBES	FUNCTION
1—6SA7 GT	Oscillator-Modulator
1—6SK7 GT	Intermediate Frequency Amplifier
1—6J5 GT	Detector A. V. C.
1—6SQ7 GT	1st Audio Amplifier
1—6K6 GT	Pentode Output
1—5Y3 GT	Rectifier



ALIGNMENT PROCEDURE

Output Meter Connections.....Plate and Screen of 6K6GT
Generator Ground Connection.....To Chassis or Ground Lead
Dummy Antenna to be in series with generator output.....See Chart Below
Position of Volume Control.....Fully On

Align-ment Seq.	Signal Generator: Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Stator lug rear section of Gang Cond.	B.C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	400 ohm (carbon)	15.3 Mc.	Ant. Terminal	S. W.	Fully open	S. W. "OSC"	Ajdust for peak. Gang does not have to tune thru signal.
3.	400 ohm (carbon)	15.0 Mc.	Ant. Terminal	S. W.	approx. 18	S. W. "ANT" Trimmer	Adjust for maximum output while rocking gang thru signal. Do not touch B. C. Osc. Trimmer.
4.	.0002 MF.	1620 Kc.	Ant. Terminal	B. C.	Fully open	B. C. "OSC" Trimmer	Adjust for peak; gang does not have to tune thru signal. Loop must be connected.
5.	.0002 MF.	1400 Kc.	Ant. Terminal	B. C.	Approx. 140 on dial	B. C. "ANT" Trimmer	Adjust for maximum output. Do not touch B. C. OSC. Trimmer.
6.	Repeat the above alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A. S. C. circuit.						

IMPORTANT ALIGNMENT NOTES—When aligning the shortwave band "OSC" trimmer care must be exercised to see that the circuit is aligned on the correct frequency and not on the image which is approximately 910 kilocycles **less as indicated on the Receiver dial.** To check, increase generator output tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles **lower on the Receiver dial** than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position.)

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MODEL 72TA, Chassis 79

THE CROSLEY CORP.

TUBE VOLTAGE CHART

SOCKET VOLTAGES MEASURED AT 117.5 V. LINE (BETWEEN SOCKET PIN AND CHASSIS) WITH 1000 OHM PER VOLT, 500 V. RANGE VOLTMETER (D. C.)

TUBE	FUNCTION	PIN NUMBER 1	2	3	4	5	6	7	8
6SK7	R. F. Amplifier	0	0	0	0	0	80	6.3 A. C.	235
6SA7	OSC.—Mod.	0	0	260	80	0	0	6.3 A. C.	0
6SK7	I. F. Amplifier	0	0	0	0	0	80	6.3 A. C.	260
6SQ7	Det. A. S. C. 1st A. F.	0	0	0	0	0	85	6.3 A. C.	0
6AD7	Phase Inverter and output	0	0	255	260	0	180	6.3 A. C.	23
6F6	Output	0	0	255	260	0	235	6.3 A. C.	23
5Y3G	Rectifier	N. C.	330	J. B.	300A.C.	J. B.	300 A. C.	J. B.	330

MAX. POWER OUTPUT.....6.5 WATTS.
POWER CONSUMPTION..... 85 WATTS.
DROP ACROSS SPEAKER FIELD..... 70 VOLTS.
J. B.—Junction Block. N. C.—No Connection.

Voltages may vary 10% of values given.

ALIGNMENT PROCEDURE

Output Meter Connections.....Plate of 6AD7 to Plate of 6F6
Generator Ground Connection.....To Chassis or Ground Lead
Dummy Antenna to be in series with generator output.....See Chart Below
Position of Volume Control.....Fully On
Position of Tone Control.....Treble or Speech

ALIGNMENT PROCEDURE CHART

Alignment Sequence	Signal Generator: Dummy Antenna	Signal Generator: Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Stator lug Rear section of Gang Cond.	B. C.	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	.02 MF.	455 Kc.	Stator lug Rear section of Gang Cond.	B. C.	Fully open	Adj. Wave Trap Trimmer.	Adjust for Minimum.
3.	.0002 MF.	1650 Kc.	Ant. Terminal	B. C.	Fully open	B. C. "OSC" Trimmer	Adjust for peak; gang does not have to tune thru signal. Loop must be connected.
4.	.0002 MF.	600 Kc.	Ant. Terminal	B. C.	Approx. 60 on dial	B. C. "OSC" Series Trimmer	Adjust for maximum output while rocking gang thru signal.
5.	Repeat Step No. 3 to check possible shift due to series adjustment.						
6.	.0002 MF.	1400 Kc.	Ant. Terminal	B. C.	Approx. 140 on dial	B.C. LOOP "ANT" Trimmer	Adjust for maximum output do not touch B. C. Osc. Trimmer.
7.	400 ohm (carbon)	18.3 Mc.	Ant. Terminal	S. W.	Fully open	S. W. "OSC"	Adjust for peak. Gang does not have to tune thru signal.
8.	400 ohm (carbon)	18.0 Mc.	Ant. Terminal	S. W.	Approx. 18	S. W. "ANT" Trimmer	Adjust for maximum output while rocking gang thru signal. do not touch B. C. Osc. Trimmer.
9.	Repeat the above alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A. S. C. circuit.						

IMPORTANT ALIGNMENT NOTES — When aligning the shortwave band "OSC" trimmer care must be exercised to see that the circuit is aligned on the correct frequency and not on the image which is approximately 910 kilocycles less **as indicated on the Receiver dial.** To check, increase generator output tune-in the generator frequency and then tune-in the image frequency which should be weaker than the fundamental and come in approximately 910 kilocycles **lower on the Receiver dial** than the fundamental. If image cannot be tuned-in, the "OSC" trimmer is adjusted to the wrong peak. (Correct peak is the second peak on trimmer from the closed position.)

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MODELS 83CA, 83CB, 83CC, 83CP, 83CQ, 83TA
Chassis 96

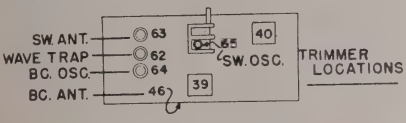
TUBE VOLTAGE CHART

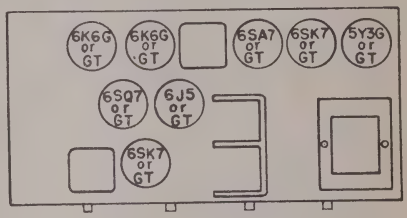
Socket voltages measured at 117.5 V. Line (between socket pin and chassis) with 1000 OHM PER VOLT, 500 V. RANGE VOLTMETER (D.C.)

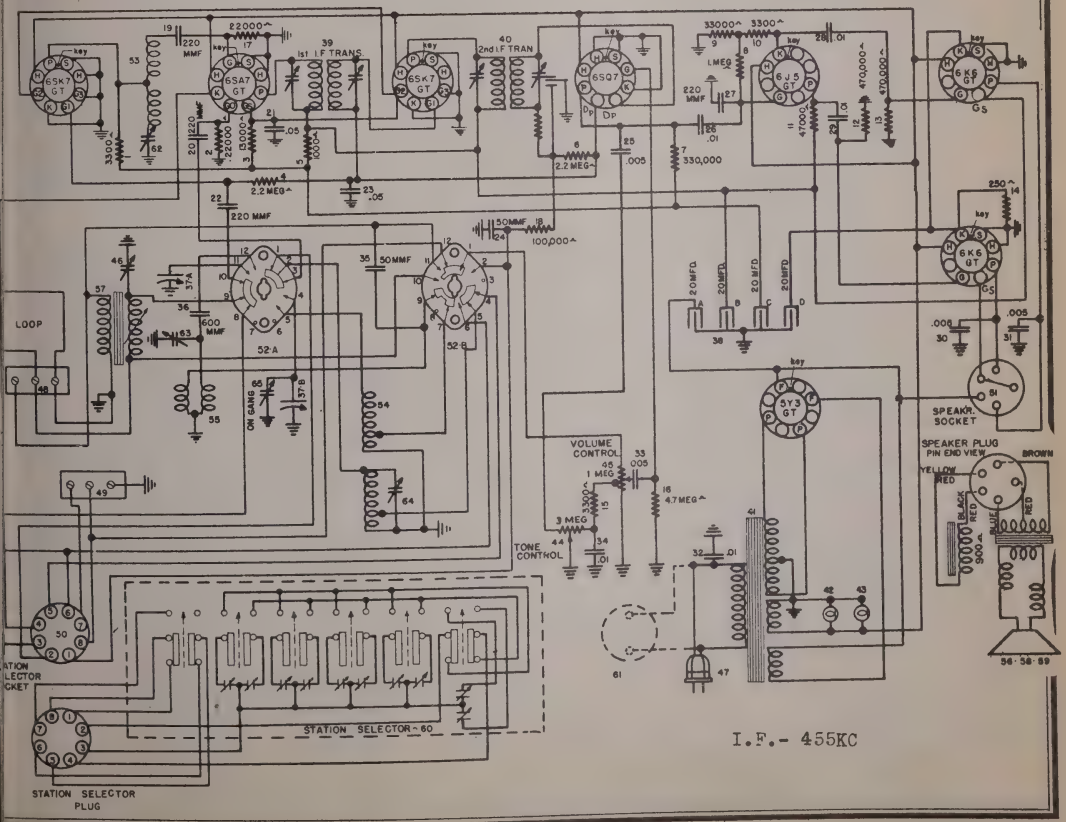
TUBE	FUNCTION	PIN NUMBER 1	2	3	4	5	6	7	8
6SK7GT	R. F. Amplifier	0	0	0	0	0	70	6.3 A. C.	175
6SA7GT	OSC.—Mod.	0	0	235	70	0	0	6.3 A. C.	0
6SK7GT	I. F. Amplifier	0	0	0	0	0	70	6.3 A. C.	235
6SQ7GT	Det. A. S. C. 1st A. F.	0	0	0	0	0	40	6.3 A. C.	0
6J5GT	Phase Inverter	0	0	155	0	0	0	6.3 A. C.	46
6K6GT	(2) Output	0	0	220	235	0	0	6.3 A. C.	16
5Y3G	Rectifier	..	330	..	355A.C.	..	355A.C.	J. B.	320

MAX. POWER OUTPUT ..... 6.8 WATTS
POWER CONSUMPTION ..... 85 WATTS
DROP ACROSS SPEAKER FIELD ..... 95 VOLTS
PHONO MOTOR ..... 25 WATTS

Voltages may vary 10% of values given.







MODELS 83CA, 83CB, 83CC, 83CP, 83CQ, 83TA Chassis 96

THE CROSLEY CORP.

ADJUSTING PUSH BUTTONS TO STATIONS: MODELS 83CA and 83CQ: There are six pusn buttons, five of which may be pre-set to any station whose frequency (kilocycles) is within range covered by that button. See Figure No. 1.

On Model 83CA, the left hand push button is to be used only when an external Record Player is connected to the Phono terminals on rear of chassis.

On Model 83CQ, the lower push button must be depressed to place the Automatic Record Changer in operation.

SET-UP PROCEDURE: Carefully remove the push button escutcheon. Turn receiver on and let it operate a sufficient length of time to permit the tubes to reach normal operating conditions.

1. Turn the band change switch to "A" (American) position. Using manual tuning knob, carefully tune in the station to which the No. 2 push button is to set. Note program.
2. Turn band change switch to "P" (Push Button) position. Depress No. 2 push button and using a small screw driver, carefully turn the OSCILLATOR adjusting screw until the station previously tuned-in manually is heard again. Adjust for maximum volume in speaker.
3. Adjust the No. 2 push button ANTENNA for maximum volume in speaker.
4. Turn band switch from "P" to "A" and back again to check if adjustment has been correctly made. There should be no change in tone quality when switched from one to the other.
5. Repeat above procedure for remaining buttons.
6. Select station call letters to which the push buttons have been set from the sheets supplied. Place them in the windows over corresponding push buttons. After tabs are in place, break celluloid covers from strip furnished and snap them in place over the tabs.

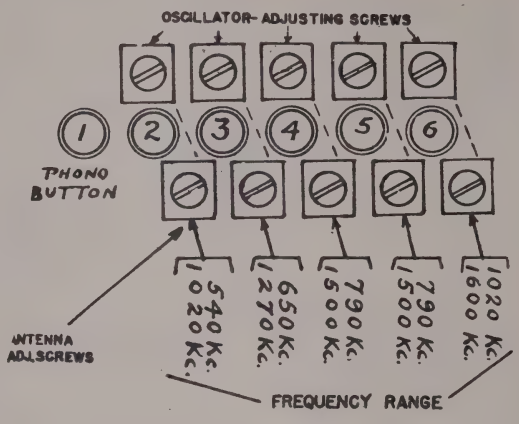


Fig. 1.

ALIGNMENT PROCEDURE

Output Meter Connections	Plate to Plate of 6K6
Generator Ground Connection	To Chassis or Ground Lead
Dummy Antenna to be in series with generator output	See Chart Below
Position of Volume Control	Fully On
Position of Tone Control	Treble or Speech

Signal Generator

Alignment Seq.	Dummy Antenna	Frequency Setting	Input Connection to Receiver	Band Switch	Tuning Cond. Setting	Trimmer Adjusted	Remarks
1.	.02 MF.	455 Kc.	Stator lug front section of Gang Cond.	A	Fully open	2nd I-F (2) 1st I-F (2)	Adjust for Maximum. Adjust for Maximum.
2.	.02 MF.	455 Kc.	Stator lug front section of Gang Cond.	A	Fully open	Adj. Wave Trap Trimmer.	Adjust for Minimum.
3.	400 ohm (carbon)	15.3 Mc.	Ant. Terminal	F	Fully open	S. W. "OSC"	Adjust for peak. Gang does not have to tune thru signal.
4.	400 ohm	15.0 Mc.	Ant. Terminal	F	Approx. 15	S. W. "ANT"	Adjust for maximum output while rocking gang thru signal. Do not touch B. C. Osc. Trimmer.
5.	.0002 MF.	1630 Kc.	Ant. Terminal	A	Fully open	B. C. "OSC" Trimmer	Adjust for peak; gang does not have to tune thru signal. Loop must be connected.
6.	.0002 MF.	600 Kc.	Ant. Terminal	A	Approx. 60 on dial	B. C. "OSC" Series	Adjust iron core on rear of chassis for maximum output.
7.	.0002 MF.	1400 Kc.	Ant. Terminal	A	Approx. 140 on dial	B. C. "ANT" Trimmer Rear Chassis	Adjust for maximum output. Do not touch B. C. Osc. Trimmer.
8.	Repeat the above alignment procedure for more accurate adjustments. Always keep signal generator output as low as possible to prevent action of the A. V. C. circuit.						

IMPORTANT ALIGNMENT NOTES—When aligning the shortwave band "OSC" trimmer care must be exercised to see that the circuit is aligned on the correct frequency and not on the image which is approximately 910 kilocycles less as indicated on the Receiver dial.

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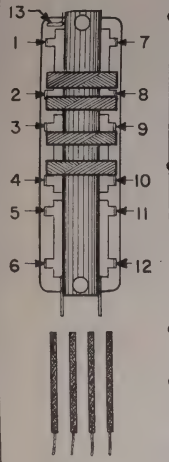


Fig. 6

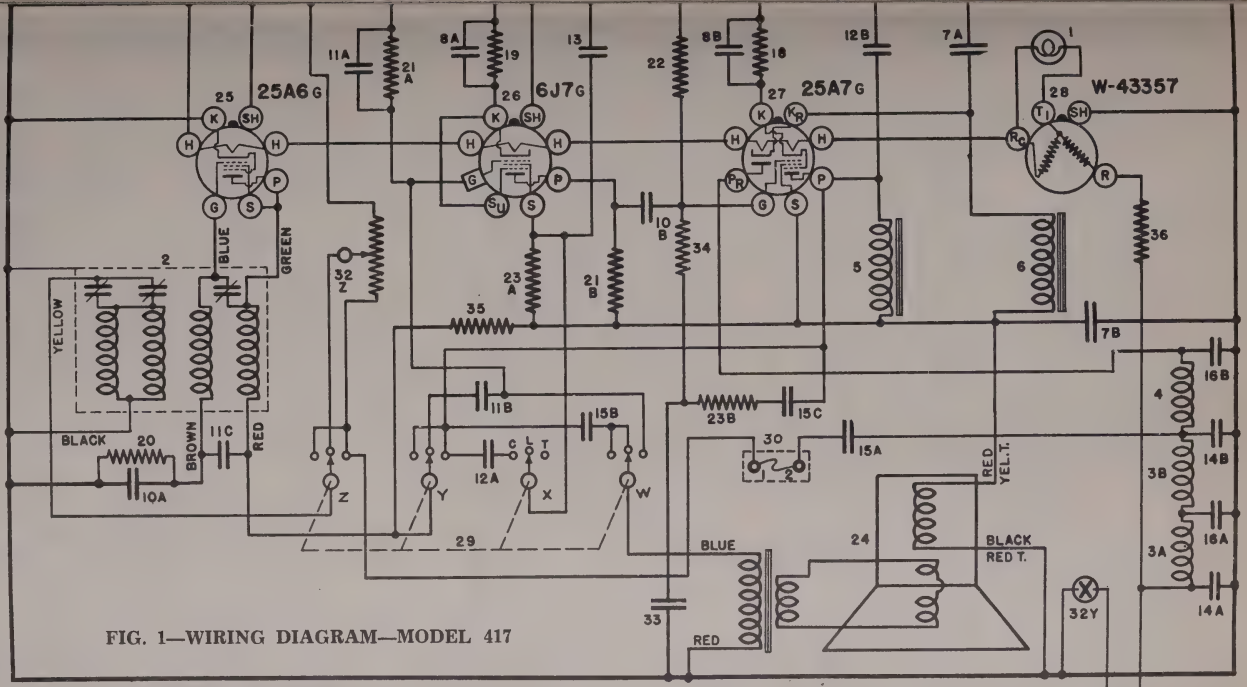


FIG. 1—WIRING DIAGRAM—MODEL 417

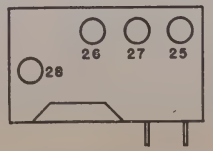
SOCKET VOLTAGES

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt D. C. voltmeter (except filaments) with the volume control full "ON." The filament voltage should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	K
25A6G	Oscillator and Det.	25	—	—	0
6J7G	Audio Driver	5.8	7	5	1.3
25A7G	Rectifier	25	105	—	—
	Modulator		90	95	11
	Output		90	95	11
W43357	Ballast		Rc—R 48 Volts, T1—R 43 Volts		

*Voltage drop across speaker field 95 volts.
Power consumption 50 watts.
All readings taken on 117.5 volt a. c. line.



JUNE 1938

MODEL--417
OPERATING FREQ. 90 Kc's.

MODEL 417,Chattabox

THE CROSLEY CORP.

SPECIFICATIONS

The Crosley Chattabox is a two way loud speaking communication system which may be used between offices or departments in a large organization, between rooms in a home such as 1st floor and recreation room or between 1st floor and nursery or 1st floor and garage, at sports events for communication between judges and announcer, at mines for communication between the surface and interior, etc.

The units are designed to operate on 100-125 volt power supply lines, either A. C. or D. C. When transmitting, a carrior frequency of approximately 90 kilocycles is routed over the regular power supply lines. The carrior frequency will not, however, pass through large inductances such as transformer windings.

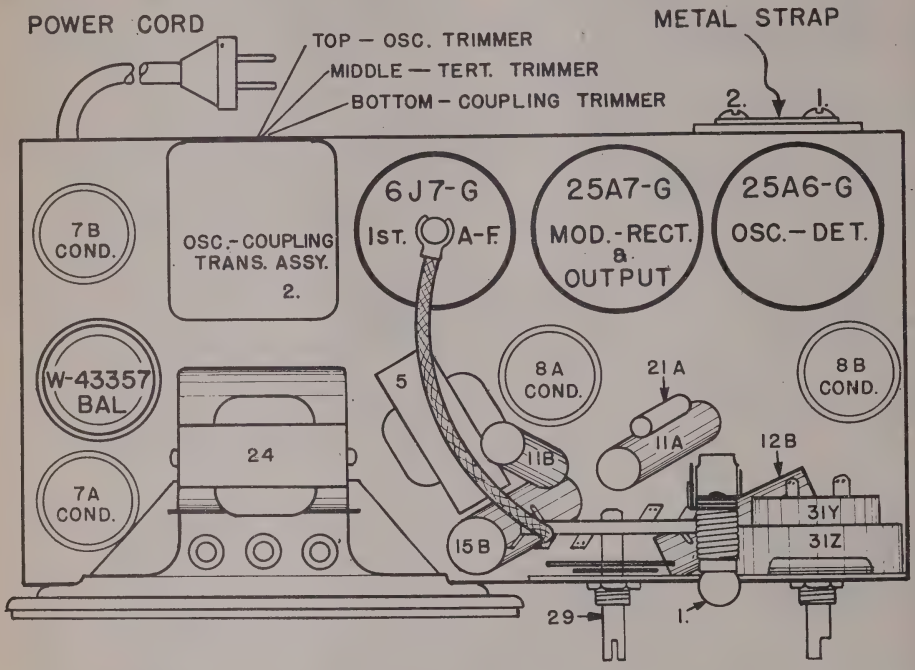


Fig. 2. Top View Model 417

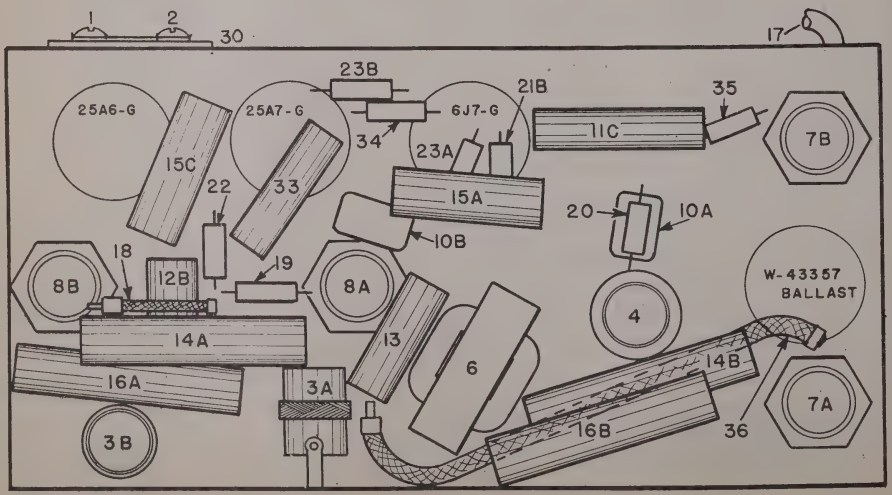


Fig. 3. Bottom View Model 417

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CIRCUIT CHANGES

Several circuit changes should be made in all earlier models before any tests or adjustments are made. (1) The free terminal of the volume control should be connected to chassis, (2) item 35 should be changed to the value shown in the Parts List, (3) item 36 should be added and (4) Remove the triple-tuned transformer from the chassis and then remove its can.

Referring to Fig. 6, connect a jumper wire between lugs 10 and 11 and another jumper wire between lugs 9 and 12. Attach a solder lug to the top end of the coil form, No. 13. Remove the black lead and two coil leads from lug 3 and solder them to the new lug, No. 13.

After these circuit changes have been made, the condenser and resistor which were required in the direct transmission line of the earlier units, will no longer be required.

ALIGNMENT PROCEDURE

Equipment Required

(1) Standard 400 cycle modulated signal generator.
(2) Output meter.
(3) Radio receiving set.
(4) Two Chattaboxes which are known to be in good operating condition.

Procedure

Arrange the equipment as shown in Fig. 4.

(a) Feed a 400 cycle modulated signal into the receiver and tune the receiver to this signal.

(b) Place one of the good Chattaboxes in front of the speaker of the radio. Turn the Chattabox "ON" and lock the switch in the "TALK" position.

(c) Place the unit to be aligned in an adjacent room and connect to the same electric circuit as the good unit in the other room is connected.

(d) The second good unit should be set up in the same room as the unit to be aligned. Its switch should remain in the "LISTEN" position.

(e) Connect the output meter from the plate of the 25A7G tube to chassis of the unit being aligned. A .1 mfd., or larger, condenser should be connected in series with one of the leads.

(f) Turn the unit "ON" and with the switch in the "LISTEN" position, adjust all three trimmers on the triple-tuned transformer for maximum reading on the output meter. (Fig. 2.)

(g) Lock the switch in the "TALK" position. The signal produced in the good unit will be the beat note produced by the interaction of the unit being aligned and the good unit in the other room. CAUTION: The volume level of the good unit receiving the beat note should be kept low enough to prevent a microphonic howl.

(h) Adjust the top trimmer on the triple-tuned transformer until the note in the good unit is reduced almost to zero beat.

(i) Throw the switch lever back and forth several times between the "LISTEN" and "TALK" positions, listening each time to the tone of the beat note. If the note changes in pitch or disappears altogether, readjust the top trimmer. Repeat this operation until the note is stable and as close as possible to zero beat.

Alternate Method

If the units to be aligned are not too far out of adjustment a quick alignment may be made without the use of special equipment.

(a) Place the two units to be aligned in the same room and turn them "ON." Leave one set in the "LISTEN" position and lock the other in the "TALK" position.

(b) If they are not too far out of adjustment a microphonic howl will be heard between them. Retard the volume control on the one which is receiving until the howl is just audible.

(c) Adjust all three trimmer condensers on the triple-tuned transformer in the unit which is acting as a transmitter for maximum howl.

(d) Repeat operations (b) and (c) until maximum interaction is obtained.

(e) Reverse the functions of the two units and repeat the above procedure.

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1	W —44337	Bulb—Dial Light
2	G151—32002	Osc. and Coupling Coil Assy.
3A	G1 —32007	R-F. Filter Choke
3B	G1 —32007	R-F. Filter Choke
4	G2 —32007	R-F. Filter Choke
5	G18 —29535	Audio Choke
6	G17 —29535	Rectifier Filter Choke
7A	W —43280	Condenser, 25 Mf. 150 V.
7B	W —43280	Condenser, 25 Mf. 150 V.
8A	W —44434	Condenser, 50 Mf. 25 V.
8B	W —44434	Condenser, 50 Mf. 25 V.
9		None
10A	G3 —34002	Condenser, .0005 Mf. 200 V.
10B	G3 —34002	Condenser, .0005 Mf. 200 V.
11A	W —30270	Condenser, .001 Mf. 400 V.
11B	W —30270	Condenser, .001 Mf. 400 V.
11C	W —30270	Condenser, .001 Mf. 400 V.
12A	W —23191A	Condenser, .01 Mf. 400 V.
12B	W —23191A	Condenser, .01 Mf. 400 V.
13	W —27216	Condenser, .05 Mf. 200 V.
14A	W —23615	Condenser, .05 Mf. 400 V.
14B	W —23615	Condenser, .05 Mf. 400 V.
15A	W —24049C	Condenser, .1 Mf. 200 V.
15B	W —24049C	Condenser, .1 Mf. 200 V.
15C	W —24049C	Condenser, .1 Mf. 200 V.
16A	W —22688	Condenser, .1 Mf. 400 V.
16B	W —22688	Condenser, .1 Mf. 400 V.
17	B —33906B	Power Cord and Plug
18	W —29585	Resistor, 600 Ohm ½W. Flex.
19	—35934	Resistor, 6,500 Ohm ¼W. Ins.
20	—36760	Resistor, 20,000 Ohm ¼W. Ins.
21A	—35601	Resistor, 300,000 Ohm ¼W. Ins.
21B	—35601	Resistor, 300,000 Ohm ¼W. Ins.
22	—36322	Resistor, 500,000 Ohm ¼W. Ins.
23A	—35602	Resistor, 1. Megohm ¼W. Ins.
23B	—35602	Resistor, 1. Megohm ¼W. Ins.
24	269BL6"U"	Speaker—Spec. No. 5-B-103
	—45172	V. C. and Cone Assy.
	—45292	Output Transformer
25	G161—36400	Socket, Type 25A6
26	G157—36400	Socket, Type 6J7
27	G181—36400	Socket, Type 25A7
28	G170—36400	Socket Ballast—W-43357
29	B —44333	Switch—Listen, Talk and Signal
30	G40 —26719	Direct Line Term. Board
31		None
32	—44612	Vol. Cont. (5,000-Ohm) and Line Switch
33	W —28619	Condenser, .006 Mf. 200 V.
34	—35927	Resistor, 2 Megohm ¼W. Ins.
35	—38623	Resistor, 750,000 Ohm ¼W. Ins.
36	W —45418	Resistor, 50 Ohm 6W. Flex.
	7DF	Cabinet
	W —43320	Knob (Vol. Cont.)
	W —44616B	Switch Lever
	W —44617A	Switch Lock
	W —29023	Bezel (Jewel)
	W —28723B	Jewel
	—44460	Cabinet Back
	W —23012	Resistor (40 Ohm) Direct Line

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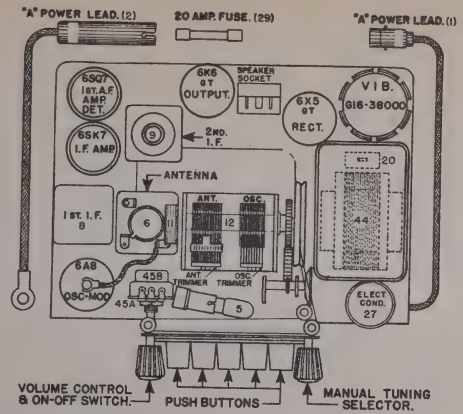


Fig. 2-A—Top View Model A-459

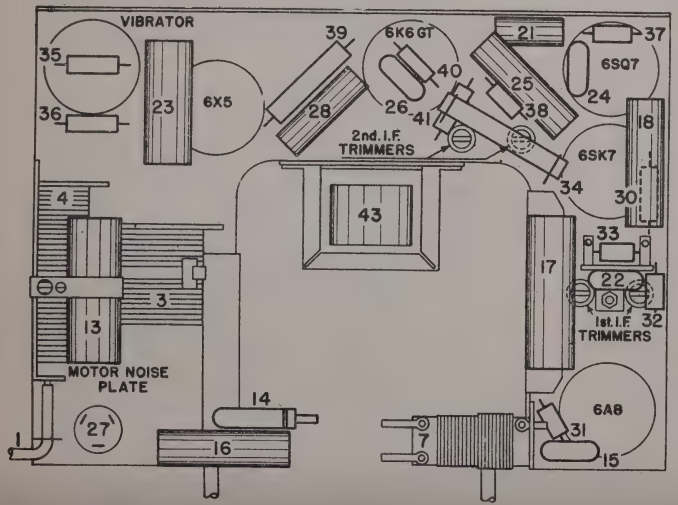


Fig. 3-A—Bottom View Model A-459

SPECIFICATIONS

This model Roamio is a two unit five-tube superheterodyne receiver, designed expressly for installation in the Crosley automobile. It incorporates a mechanical push button tuning system of simple, rugged trouble free construction. The tubes used and their functions are as follows: one 6A8 as oscillator-modulator, one 6SK7 I-F amplifier, one 6SQ7 as diode detector, A. V. C., and 1st audio, one 6K6GT as Pentode output and one 6X5GT as rectifier. Bias for the 6A8 and 6SK7 is obtained from the drop across item 30, a 160 ohm resistor and bias for the 6K6GT is obtained from the drop across item 41, a 600 ohm resistor. The 6SQ7 is operated at zero bias. A. V. C. is supplied to the 6A8 and 6SK7 through item 32, a 500,000 ohm filter and item 33, a 1 megohm filter respectively. The B circuit is filtered by means of item 39, a 1,400 ohm resistor, and the two 10 mf. sections of item 27, a three section electrolytic condenser. Item 14 is a chemical temperature compensating condenser used in the oscillator circuit to prevent station drift.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1,000 ohm per volt, 250 volt volt-meter (except filaments) with the volume control full "ON" and no signal input. The filament voltages should be measured with an accurate low range volt-meter.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	SOCKET PIN NUMBER No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
6A8	OSC.-MOD.	GND.	GND.	206	102	−4.5	101	6	3
6SK7	I-F Amplifier	GND.	GND.	GND.	Grid	3	102	6	207
6SQ7	Det., A.V.C., 1st A-F	GND.	Grid	0	Diode	Diode	67	6	GND
6K6GT	Output	GND.	GND.	230	213	Grid	210 J.B.	6	14
6X5GT	Rectifier	GND.	GND.	A.C.	—	A.C.	—	6	245

Maximum Power Output—approximately 3.6 watts.
Normal "A" Drain—6.5 amperes.
GND.—Ground. J.B.—Junction Block.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary such as when an I-F assembly has been changed and etc., the circuit can best be properly aligned with the use of a MODULATED SIGNAL GENERATOR and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to the plate and screen of the 6K6GT output tube. Be sure the meter is protected from D. C. by connecting a condenser (0.1 mf. or larger—not electrolytic) in series with one of the meter leads.

1. Aligning the I-F to 455 Kilocycles.

(a) Connect the ground lead from the signal generator to the chassis frame. Connect the high side of generator through an .02 mf. condenser to the grid cap of the 6A8 oscillator-modulator (leaving the tube's grid connector in place). Care should be exercised to keep signal generator leads as far as possible from the other grid leads.

(b) Open gang condenser all the way (minimum) turn volume control to maximum and then set signal generator to 455 kilocycles.

(c) Adjust both 2nd I-F trimmers for maximum output. Trimmers are accessible from bottom of the chassis. Fig. 3.

(d) Adjust both 1st I-F trimmers for maximum output. Trimmers are accessible from bottom of the chassis. Fig. 3.

(e) Repeat (c) and (d) with as low an output as gives a reasonable indication on output meter for more accurate adjustment.

2. Aligning the R-F.

(a) The output lead from the signal generator should be connected through a .0001 mf. condenser to the "ANT" connection of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the "OSC" section of the tuning condenser for maximum output.

(e) Adjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

(f) Readjust the station selector for maximum output.

(g) Repeat operation (e) for more accurate adjustment.

3. Setting the Push Buttons.

The push buttons are easily and accurately set from the front of the receiver.

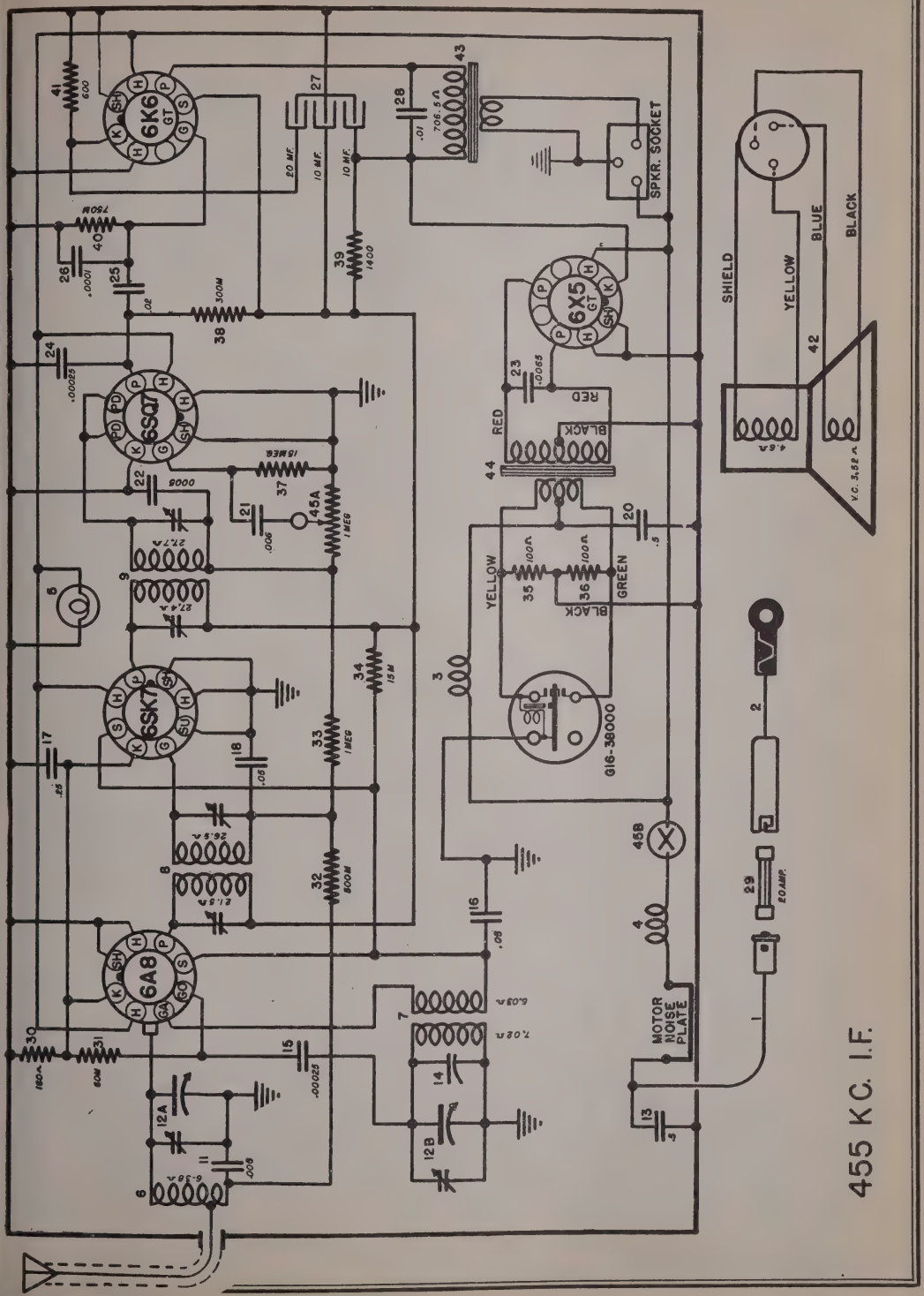
To set push buttons, remove button by pulling straight out and the setting screw is easily accessible. Loosen the screws of the buttons to be set (two or three turns to the left).

By means of the manual tuning knob tune-in AS ACCURATELY AS POSSIBLE, the station for which the button is to be set. REMEMBER: the accuracy of the push buttons depends upon how accurate YOU tune-in the station when setting them.

With a small screw driver push the key all the way down. While holding the key down, securely tighten the setting screw. It is essential that you apply pressure while tightening the setting screw, in order to keep mechanism lined up with station tuned-in.

THE CROSLEY CORP.

MODEL A459, Roamio


6K6 GT
6SQ7
6SK7
6A8
6X5 GT
SPKR. SOCKET
SHIELD
YELLOW
BLUE
BLACK
RED
BLACK
YELLOW
GREEN
BLACK
MOTOR NOISE PLATE
20 MF.
10 MF.
10 MF.
300M
1400
1MEG
15MEG
.008
.0008
.0001
.02
.00025
.05
.08
.5
.1
.01
.0065
.00025
.0005
.00005
.006
.25
.1
.1
.1

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SPECIFICATIONS

Model 539—This model is a phonograph combination designed for 110 volt 50-60 cycle operation. The radio chassis used in this model is almost identical to Model 5539 (Phono-Radio switch replaces tone control switch).

The phonograph motor is small, efficient and self-starting. The pickup or tone arm is an improved crystal cartridge type having a high output with an unusual wide frequency response. The turn table is rim driven. Special receptacles are provided for new and used needles.

The later series of this model were equipped with adjustable loop antennas.

Model J-539—This model is identical with model 539 except that it has a 1:1 isolating power transformer (for receiver) and slightly different phono. motor.

Model 5539—This model Crosley is a five tube, single band superheterodyne receiver. It is designed for operation on 110 volt power circuits, either DC or 50-60 cycle AC.

Model J-5539—This model is the same as Model 5539 except that it is designed for 110 volt, 50-60 cycle operation only.

ALIGNMENT PROCEDURE

MODELS 539, J539, 5539, J5539

NOTE: The chassis of this receiver is connected to one side of the power lines and for this reason all test equipment should be thoroughly insulated in order that the power supply will not become short circuited while aligning the receiver. This does not apply to the J models which have isolating power transformers.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 50L6GT output tube. Be certain that the meter is protected from DC by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning the I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a 100 mmf. condenser to the antenna connection (BLUE LEAD) on the receiver. Do not use a ground return from the signal generator unless it is found to be absolutely necessary. If it is found to be necessary, a small condenser (approximately .001 mfd.) should be connected in series with the ground terminal of the signal generator and the receiver chassis. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust the 2nd I-F trimmer condensers (Fig. 2) for maximum reading on the output meter.

(e) Adjust the 1st I-F trimmer condensers (Fig. 2) for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustmnets.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

Aligning the R-F Amplifier.

(a) Leave signal generator output lead connected to the antenna lead (BLUE). Set signal generator to 1712 kilocycles for models without a loop antenna, or to 1620 kilocycles for models equipped with a loop antenna.

(b) With the condenser gang turned to the minimum capacity position, adjust the trimmer condenser on the "OSC" section of the gang for maximum output. It is not necessary that the receiver tune through this signal.

(c) Set the signal generator to 1400 kilocycles.

(d) Tune in the 1400 kilocycles in the region of 140 on the dial for maximum output.

(e) Adjust the trimmer condenser on the "ANT" section of the gang for maximum output.

(f) Repeat the above for more accurate adjustments.

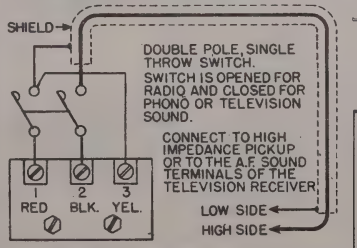
WAVE TRAP

Some models without the loop antenna are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly consists of a coil, a fixed condenser and a trimmer condenser as illustrated by the dotted lines in the Wiring Diagram (item 30).

The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a 50 mmf. condenser into the antenna terminal of the receiver. With the gang condenser open and the volume control full on, adjust the trimmer condenser on the wave trap for MINIMUM output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal the antenna may be attached to the receiver and the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.

PHONO. CONNECTIONS 539, J-539



Some chassis are so constructed as to be adaptable to a phonograph pickup (high impedance type) for the reproduction of recordings. The terminals may also be used for the reproduction of television sound as supplied by a suitable television converter unit.

The double pole single throw switch for changing from Radio to Phono or television sound, should be connected as shown in the above diagram.

The terminals are coded as follows: RED, BLACK, YELLOW, or numbered 1, 2, 3, respectively. The BLACK or No. 2 terminal connects to the high side of the phono pickup or television A-F connection. The YELLOW or No. 3 terminal is the ground or low side connection. The RED or No. 1 terminal should be connected to the YELLOW (3) terminal by some means (as indicated in the above diagram). This prevents any radio signals from the receiver proper from interfering with the Phono or Television sound reproduction.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with the volume control full "ON" and no signal input, measured on a 117.5 volt AC line and voltage may vary plus or minus 10% of the values given.

MODEL 539, J539, 5539, J5539

TUBE SOCKET VOLTAGE READINGS

Tube	Function	SOCKET PIN NUMBER No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
12A8GT	Oscillator-Modulator	—	—	95	50	-10	95	—	—
12SK7GT	I-F Amplifier	—	—	—	-1	—	95	—	95
12SQ7GT	Det. AVC, A-F Amplifier	—	—	—	Diode	Diode	35	—	—
50L6GT	Output	—	—	95	95	-8*	—	—	—
35Z5GT	Rectifier	—	—	Tap	—	117.5 A.C.	—	—	100

Power output approximately 2.5 watts.
Power consumption approximately 35 watts.
Voltage drop across speaker field 100 volts.
*Measured across 75 ohm resistor.

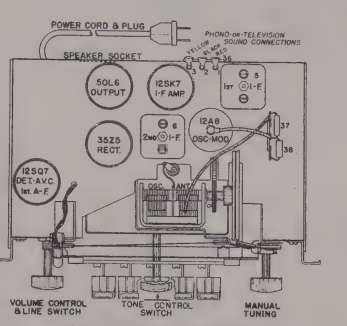


Fig. 2—Top View Model 539

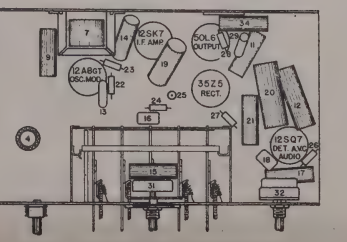


Fig. 3—Bottom View Model 5539

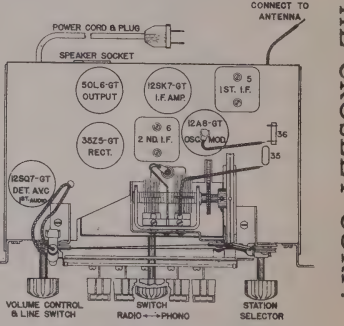


Fig. 4—Top View Model 539

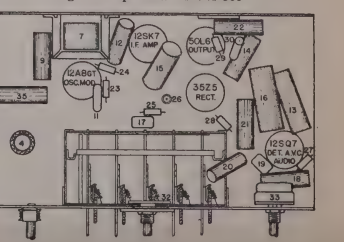
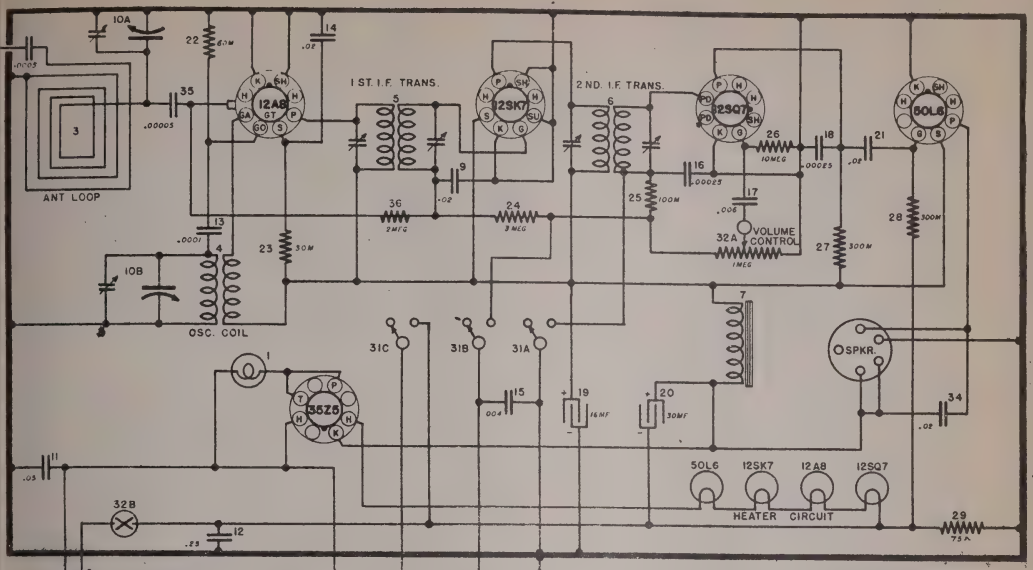
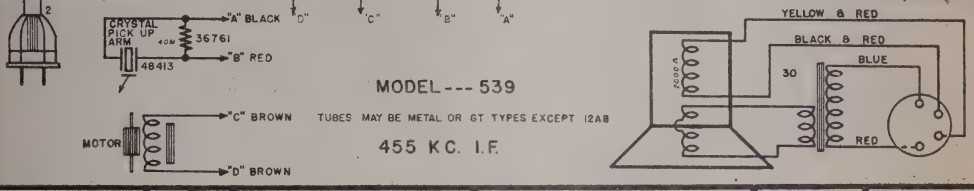


Fig. 5—Bottom View Model 539

THE CROSLEY CORP.

MODEL 539
MODEL J539

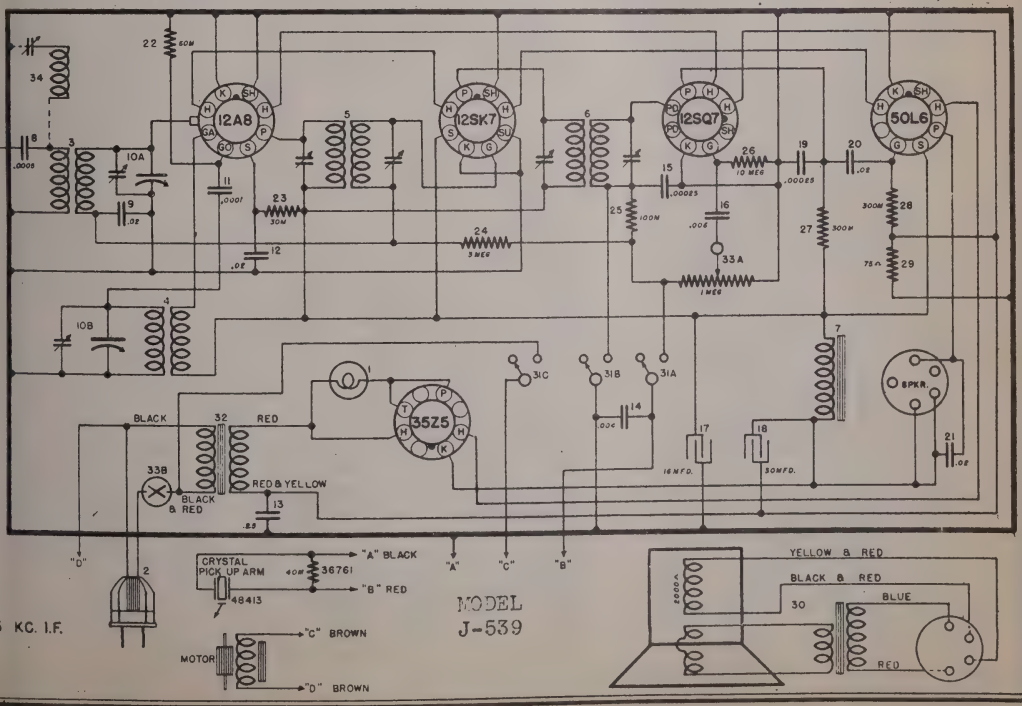




MODEL --- 539

TUBES MAY BE METAL OR GT TYPES EXCEPT 12A8

455 KC. I.F.



455 KC. I.F.

MODEL J-539

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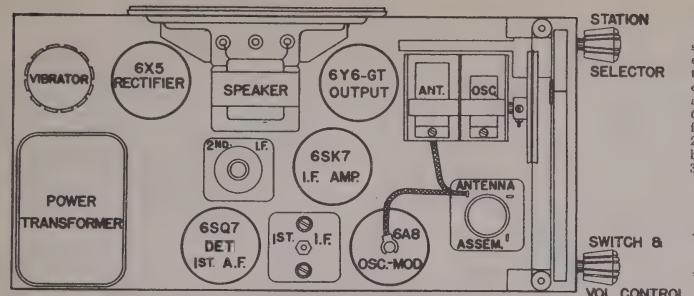

Fig. 2—Top View Model A-559

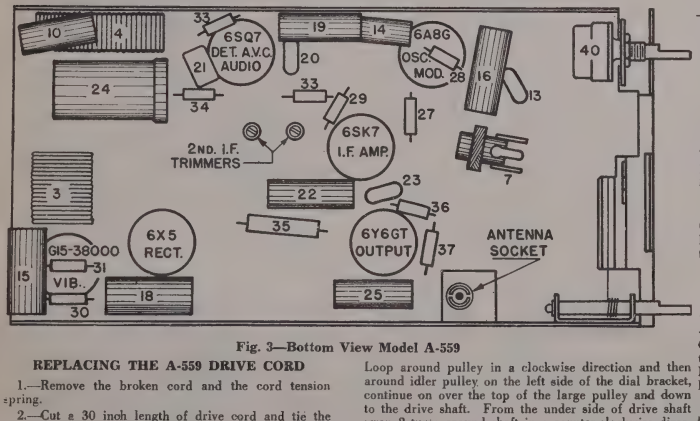

Fig. 3—Bottom View Model A-559

REPLACING THE A-559 DRIVE CORD

1.—Remove the broken cord and the cord tension spring.

2.—Cut a 30 inch length of drive cord and tie the tension spring approximately 4 inches from one end. Thread both ends through the eyelet in the large pulley from the inside. Hook the other end of the spring to th catch in the pulley and bend catch to secure spring.

3.—Close the condenser gang and see that the eyelet in pulley is on top and that the end of the condenser shaft is flush with the inside of the pulley.

4.—Take the long end of cord and place on small brass idler pulley on the right side of the dial bracket. Loop around pulley in a clockwise direction and then around idler pulley on the left side of the dial bracket, continue on over the top of the large pulley and down to the drive shaft. From the under side of drive shaft wrap 2 turns around shaft in a counter-clockwise direction, bringing cord up on the left side of large pulley. Be sure the cord is on all the pulleys then tie a knot, pulling with sufficient force to stretch the tension spring to within ½-inch of the edge of pulley.

5.—Close gang and place the pointer on the cord at the extreme left end of the dial. Check to see that pointer travels full length of the dial. It may be advisable to place some "ARATEX" or other liquid adhesive on cord where it fits into the pointer.

SPECIFICATIONS

This model Crosley Roamio is a single unit five-tube superheterodyne receiver. A highly efficient superheterodyne circuit employs five tubes to the utmost advantage as follows: one 6A8GT as an oscillator and mixer or modulator, one 6SK7 as an intermediate frequency amplifier, one 6Y6GT as power output amplifier and a 6X5 as a rectifier. A full wave vibrator is used. Bias for the 6A8GT and 6SK7 tubes is obtained across item 27 (160 ohm resistor), the 6SQ7 is operated at zero bias. Bias for the 6Y6GT is developed across item 37, a 160 ohm resistor.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and the receiver chassis. Voltage readings taken with a 1000 ohm per volt, 500 volt voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range D. C. voltmeter (approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	K	Ga	Go
6A8GT	Oscillator-Modulator	6.0	100	75	—	2.4	75	—
6SK7	I-F Amplifier	6.0	100	—	—	9	—	—
6SQ7	Diode Detector & A-F Amp.	6.0	45	—	—	0	—	—
6Y6GT	Output	6.0	105	100	—	5.6	—	—
6X5	Rectifier	6.0	—	—	—	120	—	—

Power Output approximately 4 Watts.
Battery Drain approximately 6.6 Amperes at 6 Volts.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to P and S of the 6Y6GT Output tube. Be sure the meter is protected from D. C. by connecting a condenser .1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning the I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. or larger, condenser to the top cap of the 6A8GT tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the receiver chassis frame. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Adjust the station selector so that the rotor plates of the tuning condenser are completely disengaged and turn Vol. Cont. to maximum position (RIGHT).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust both 2nd I-F trimmer condensers for maximum output. Fig. 3.

(e) Adjust both trimmers located on the 1st I-F transformer for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustments.

IN ORDER TO PREVENT A. V. C ACTION ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUT PUT METER READING.

2. Aligning R-F Amplifier.

To obtain the greatest gain from the R. F. amplifier, the capacity of the dummy antenna should be equal to the capacity of the antenna with which the receiver is to be used. The capacities of auto radio antennas range from 65 mmf. (.000065 mf) to 250 mmf. (.00025 mf.), depending upon the size and type. If the receiver is adjusted for maximum efficiency when used with an antenna having a high capacity, it will not operate at its maximum efficiency on an antenna having a much lower capacity and vice versa.

(a) If the receiver is to be used with a whip or streamlined antenna, the output lead from the signal generator should be connected through a .0001 mf. condenser to the "Ant" connection of the receiver. If a large antenna such as a running board type or built-in top antenna is to be used, a .0002 mf. condenser should be used in place of the .0001 mf. condenser.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the "OSC" section of the tuning condenser for maximum output.

(e) Adjust the trimmer on the "ANT" section of the tuning condenser for maximum output.

(f) Readjust the station selector for maximum output. DO NOT READJUST THE OSC. TRIMMER.

(g) Repeat operation (e) for more accurate adjustment.

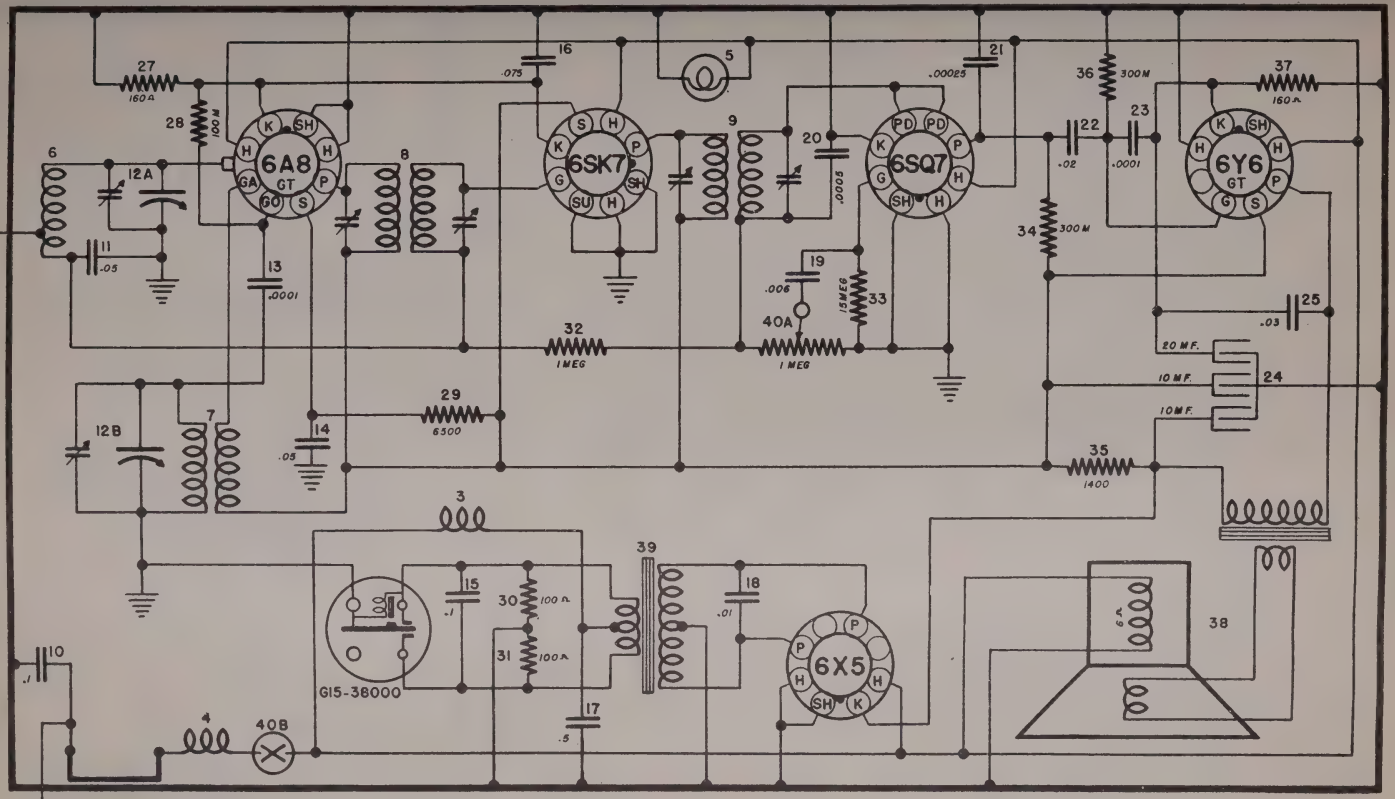

FIG. 1—WIRING DIAGRAM—MODEL A-559

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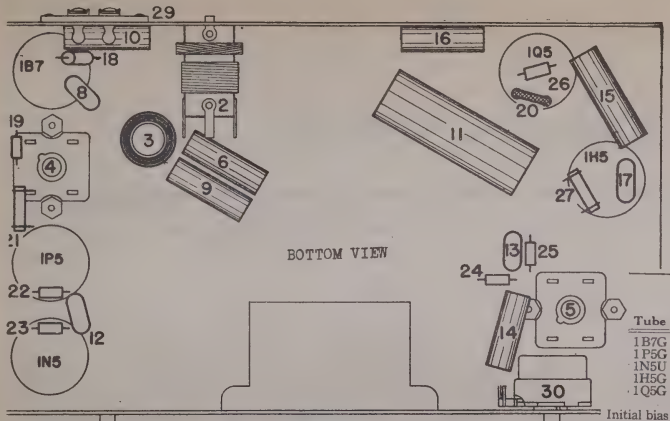


TUBE SOCKET VOLTAGE DATA

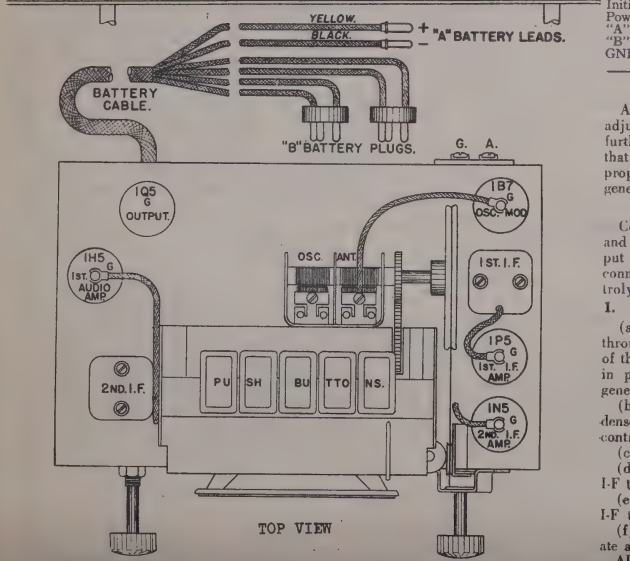
MODELS 579, 5579, 6579

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and the negative side of the "A" battery circuit (chassis). Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with receiver in operating condition and the volume control full on and no signal input. The filament voltages should be measured with an accurate low range D-C voltmeter (Approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	SOCKET PIN NUMBER No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
1B7G	OSC. MOD.	GND.	1.5	78	35	G.	78	GND.	N.C.
1P5G	1st I-F Amp.	GND.	1.5	41	90	N.C.	N.C.	GND.	N.C.
1N5U	2nd I-F Amp.	GND.	1.5	90	90	N.C.	N.C.	GND.	J.B.
1H5G	Det., AVC, 1st A-F	N.C.	1.5	22	N.C.	Diode	90 J.B.	GND.	N.C.
1Q5G	Output	-5 J.B.	1.5	85	90	G.	N.C.	GND.	N.C.

Initial bias = -5 volts measured across item 20—350 Ohms.
Power Output Approximately 500 M.W.
"A" Battery Drain = 350 M.A. @ 1.5 volts.
"B" Battery Drain = 15 M.A. @ 90 volts.
GND. = Ground. N.C. = No Connection. J.B. = Junction Block. G. = Grid.



ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 1Q5G Output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning the I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. or larger condenser to the top cap of the 1B7G Osc.-Mod. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver.

(b) Set the station selector so that the tuning condenser plates are completely meshed. Turn the volume control knob to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust both trimmers located on top of the 2nd I-F transformer assembly for maximum output. Fig. 2.

(e) Adjust both trimmers located on top of the 1st I-F transformer assembly for maximum output.

(f) Check operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) Connect the output lead from the signal generator through a .0001 mfd. condenser to the "ANT." terminal of the receiver. Connect generator ground lead to the chassis.

(b) Set signal generator to 1712 kilocycles.

(c) Open condenser gang all the way.

(d) Adjust "OSC" trimmer on gang to 1712 kc. signal, the gang should just tune through this signal.

(e) Set signal generator to 1400 kilocycles.

(f) Tune-in 1400 kc. signal with station selector, should be approximately 140 on dial.

(g) Adjust "ANT." trimmer on gang for maximum output. Do not readjust "OSC" trimmer. Repeat above operations for more accurate adjustments.

SETTING THE PUSH BUTTONS

If any of the circuits have been readjusted it may be necessary to reset the push button tuning system.

Remove the push buttons by pulling straight up. Loosen set screws a turn or two by turning to the left. Then tune-in as accurately as possible the station to which the button is to be set. With the screw driver inserted in adjustment screw slot push the key all the way down and while holding in that position securely tighten the adjusting screw. It should be remembered that when tightening the adjusting screw in this manner, to all apply a steady pressure when tightening the screw in order to keep the key aligned with the station tuned-in.

Repeat the above procedure for resetting the rest of the buttons.

THE CROSLEY CORP

FIG. 1—WIRING DIAGRAM—MODELS 579, 5579, 6579

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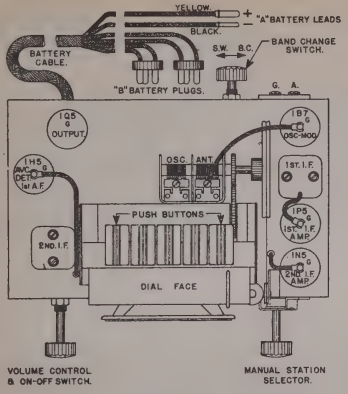

Fig. 2-A—Top View Model 589

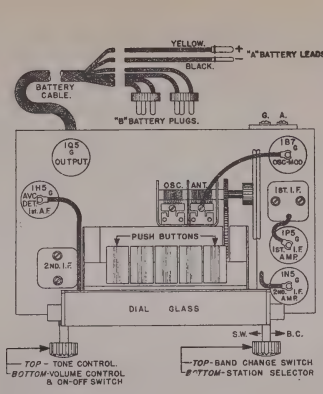

Fig. 2-B—Top View Model 5589

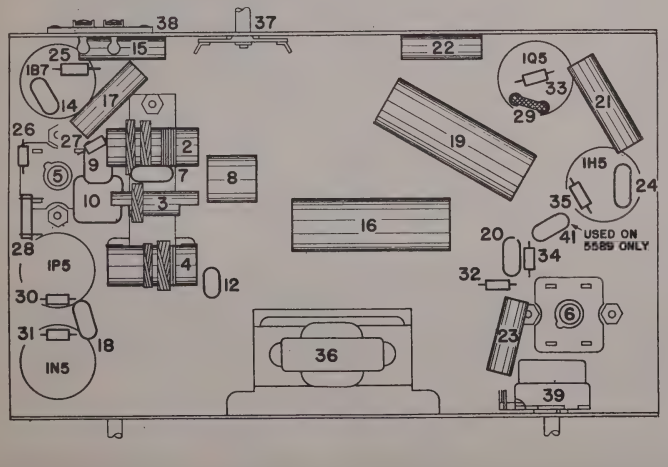

Fig. 3—Bottom View Models 589, 5589

SPECIFICATIONS

Models 589 and 5589 are five-tube two band superheterodyne receivers designed for operation from batteries. The batteries required are one Crosley "A & B" Battery Pack No. CR-28 or one 1.5 Volt plug in type "A" (Eveready No. A-1300) and two 45 Volt plug in "B" batteries (Eveready No. 386) or equivalent.

The frequency range is divided into two bands as follows:

American Broadcast—1725 to 540 Kilocycles
Short Wave Band—5.7 to 18.3 Megacycles.

Model 589 is a table model with the band change switch mounted on the rear of the chassis. Model 5589 is the console version of the 589 with tone control added and all controls on the front.

CIRCUIT DESCRIPTION

The circuit is a conventional superheterodyne and does not contain any regeneration. The tubes employed are as follows, one 1B7G as oscillator-modulator, one 1P5G as 1st I-F amplifier, one 1N5G (resistance coupled) 2nd I-F amplifier, one 1H5G as diode detector, A. V. C. and 1st audio amplifier and one 1Q5G as beam power output. The initial bias for all the tubes (except 1Q5G) is obtained from voltage drop across item 29, a 350 ohm resistor which is in the negative "B" leg.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and the negative side of the "A" battery circuit (chassis). Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with receiver in operating condition and the volume control full on and no signal input. The filament voltages should be measured with an accurate low range D-C voltmeter (Approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	SOCKET PIN NUMBER No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
1B7G	OSC. MOD.	GND.	1.5	78	35	G.	78	GND.	N.C.
1P5G	1st I-F Amp.	GND.	1.5	41	90	N.C.	N.C.	GND.	N.C.
1N5U	2nd I-F Amp.	GND.	1.5	90	90	N.C.	N.C.	GND.	J.B.
1H5G	Det., AVC, 1st A-F	N.C.	1.5	22	N.C.	Diode	90 J.B.	GND.	N.C.
1Q5G	Output	-5 J.B.	1.5	85	90	G.	N.C.	GND.	N.C.

Initial bias = -5 volts measured across item 20—350 Ohms.
Power Output Approximately 500 M.W.
GND. = Ground. N.C. = No Connection. J.B. = Junction Block. G. = Grid.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 1Q5G Output tube. Be sure the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

1. Tuning the I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. or larger condenser to the top cap of the 1B7G Osc-Mod. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and band switch to B. C. position.

(c) Set the signal generator to 455 kilocycles.

(d) Adjust both trimmers located on top of the 2nd I-F transformer assembly for maximum output. Fig. 2.

(e) Adjust both trimmers located on top of the 1st I-F transformer assembly for maximum output.

(f) Check operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

2. Aligning R-F Amplifier.

(a) Connect the output lead of the signal generator to the ANT. terminal of the receiver through a 250 ohm carbon resistor and the ground lead to the "GND" terminal.

(b) Set signal generator to 18.3 megacycles.

(c) Turn tuning condenser gang so plates are completely out of mesh, turn the volume control on full, the tone control to treble and the band switch to S. W. band.

(d) Adjust S. W. Oscillator trimmer condenser for maximum output.

(e) Set signal generator to 18.0 megacycles.

(f) With the manual tuning knob tune-in the 18. megacycle signal for maximum output. Then adjust the S. W. Antenna trimmer condenser for maximum output.

NOTE: Make sure the short wave band is aligned on the fundamental frequency (18 megacycles) and not the image frequency by increasing the signal generator output and tuning in the image frequency (approx. 17.1 mc. on the dial). If receiver is correctly aligned the image will be heard as stated above but will be much weaker than the fundamental.

(g) Repeat operations (b) to (f) for more accurate adjustments.

(h) Replace the 250 ohm resistor dummy antenna with a .0001 mf. condenser.

(i) Open gang condenser all the way, minimum capacity position, turn band switch to B. C. position, etc.

(j) Set signal generator to 1725 kilocycles.

(k) Adjust B. C. oscillator trimmer condenser for maximum output. Gang does not have to tune through this signal

(l) Set signal generator to 1400 kilocycles.

(m) Tune-in 1400 kc. generator signal on receiver, then adjust B. C. "ANT" trimmer condenser for maximum output.

(n) Repeat operations (j) to (m) for more accurate adjustments.

THE CROSLEY CORP.

MODEL 589
MODEL 5589

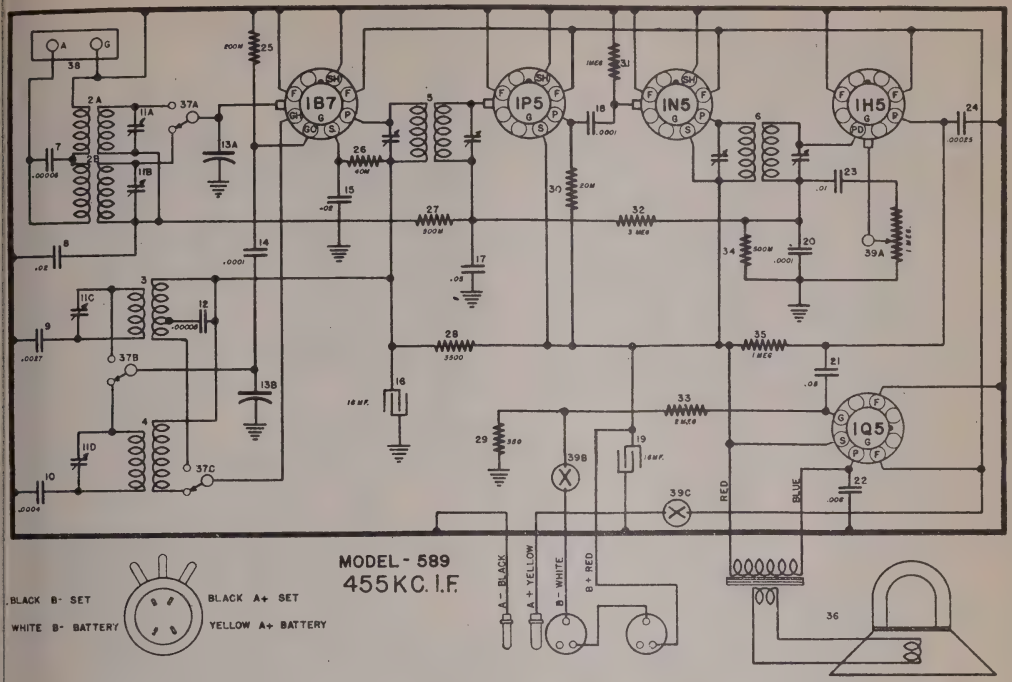

FIG. 1-A—WIRING DIAGRAM—MODEL 589

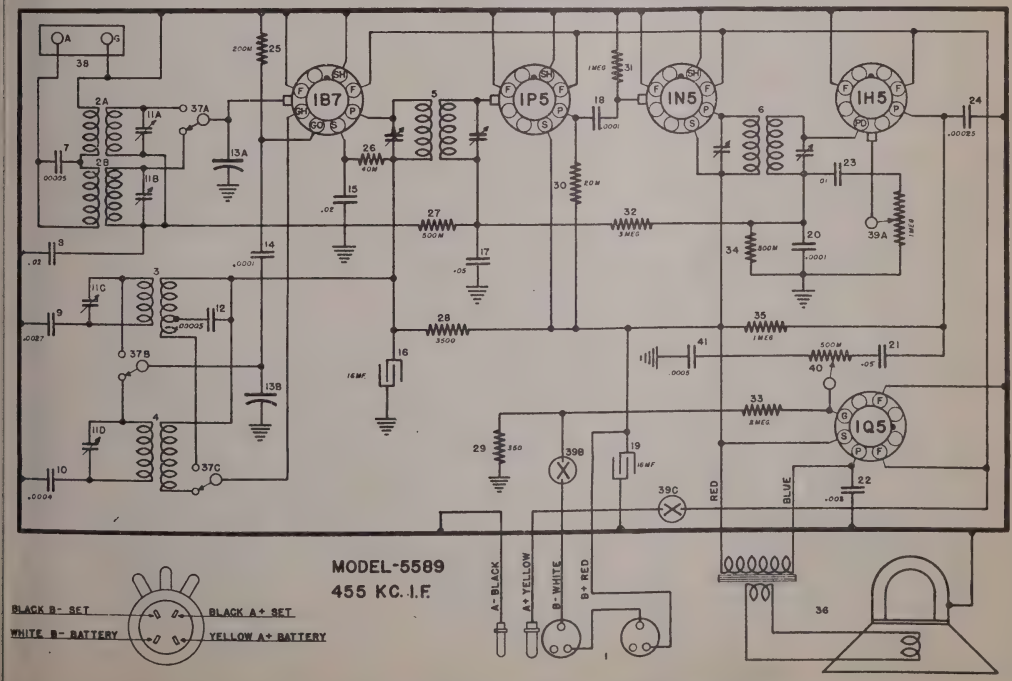

FIG. 1-B—WIRING DIAGRAM—MODEL 5589

MODEL 48
MODEL 618

THE CROSLEY CORP.

PARTS LIST — MODEL 48

Item No.	Part No.	DESCRIPTION
1	43567	Bulb, Dial Light
2	43567	Bulb, Dial Light
3	45769-A	Cable & Power Plug
4	130857	Cable & Plug (Phono Motor
5	G294-34003	Cable & Socket (Mike)
6	130857	Crystal Cart. (Tone Arm)
7	130854	Cutter, Magnetic
8	G2-130294	Loop Ant.
9	G224-32000	Coil H.F. Ant.
10	G225-32000	Coil Pol. Ant.
11A	G241-32000	Coil B.C. Osc.
11B		Coil H.F. Osc.
12	G242-32002	Coil Pol. Osc.
13	G234-32002	Coil P.B. Osc. 540-940 Kc.
14	G235-32002	Coil P.B. Osc. 600-1050 Kc.
15	G237-32002	Coil P.B. Osc. 740-1300 Kc.
16	G238-32002	Coil P.B. Osc. 880-1550 Kc.
17	G239-32002	Coil P.B. Osc. 1000-1600 Kc.
18A	G114-32001	Coil B.C. R.F.
18B		Coil H.F. R.F.
19	G115-32001	Coil Pol. R.F.
20	G246-32004	1st I-F Trans.
21	G240-32004	2nd I-F Trans.
22	G5-34002	Cond. 50 Mmf. Mica
23	G5-34002	Cond. 50 Mmf. Mica
24	49932	Cond. Trimmer
25	G3-34002	Cond. 500 Mmf. Mica
26A	37986-A	Cond. Pol. Ant. Trimmer
26B		Cond. H.F. Ant. Trimmer
27A	49929	Var. Cond. Ant. Sect.
27B		Var. Cond. B.C. Sect.
27C		Var. Cond. Osc. Sect.
28	G17-34005	Cond. 3700 Mmf. Mica
29	G14-34005	Cond. 1185 Mmf. Mica
30	130108	Cond. BC. Osc. Ser. Trim.
31A	35951-A	Cond. BC. Osc. Trimmer
31B		Cond. Pol. Osc. Trimmer
31C		Cond. HF. Osc. Trimmer
32A	49933	Cond. P.B. Trim. 540-940 Kc.
32B	49934	Cond. P.B. Trim. 600-1050 Kc.
32C	49936	Cond. P.B. Trim. 740-1300 Kc.
32D	49937	Cond. P.B. Trim. 880-1550 Kc.
32E	49938	Cond. P.B. Trim. 1000-1600 Kc.
33	G21-34002	Cond. 600 Mmf. Mica
34	G21-34002	Cond. 600 Mmf. Mica
35	45780-B	Cond. .02 Mf. 160 V. Paper
36	G2-34002	Cond. 100 Mmf. Mica
37	G3-34002	Cond. 500 Mmf. Mica
38	G3-34002	Cond. 500 Mmf. Mica
39A	35951-A	Cond. B.C. R.F. Trimmer
39B		Cond. Pol. R.F. Trimmer
39C		Cond. S.W. R.F. Trimmer
40	G3-34002	Cond. 500 Mmf. Mica
41	22688	Cond. .1 Mf. 400 V. Paper
42	48122	Cond. .16 Mf. 250 V. Elect.
43	G2-34002	Cond. 100 Mmf. Mica
44	G3-34002	Cond. 500 Mmf. Mica
45	G-134002	Cond. 250 Mmf. Mica
46	30488	Cond. .02 Mf. 400 V. Paper
47	45780-B	Cond. .02 Mf. 160 V. Paper
48	30488	Cond. .02 Mf. 400 V. Paper
49	30105	Cond. .1 Mf. 160 V. Paper
50	45780-B	Cond. .02 Mf. 160 V. Paper
51	34713	Cond. .006 Mf. 160 V. Pap.
52	130171	Cond. .01 Mf. 400 V. Paper
53	34713	Cond. .006 Mf. 160 V. Pap.
54	45817-A	Cond. .05 Mf. 160 V. Paper
55	G2-34002	Cond. 100 Mmf. Mica
56	32780-B	Cond. .05 Mf. 400 V. Paper
57	45810-B	Cond. .006 Mf. 160 V. Pap.
58	34713	Cond. .006 Mf. 160 V. Pap.
59		
60		
61A	130246	Cond. 15 Mf. 450 V. Elect.
61B		Cond. 15 Mf. 450 V. Elect.
61C		Cond. 10 Mf. 250 V. Elect.
62	G1-34002	Cond. 250 Mmf. Mica
63	30270	Cond. .001 Mf. 400 V. Pap.
64	30805	Cond. .01 Mf. 400 V. Paper
65	30488	Cond. .02 Mf. 400 V. Paper
66	30488	Cond. .02 Mf. 400 V. Paper
67	G6-34002	Cond. 25 Mmf. Mica
68		
69	130764	Microphone (Crystal)
70	130870	Motor, Phono 60-110 V.
71	130634	Res. 3.5 Ohm ½ W. Ins.
72	130655	Res. 15 Ohm ½ W. Ins.
73	38976	Res. 250,000 Ohm ¼ W. Ins.
74	38916	Res. 350 Ohm ½ W. Ins.
75	35602	Res. 1 Meg. ¼ W. Ins.
76	35930	Res. 200,000 Ohm ¼ W. Ins.
77	36688	Res. 3 Meg. ¼ W. Ins.
78	35601	Res. 300,000 Ohm ¼ W. Ins.
79	36688	Res. 3 Meg. ¼ W. Ins.
80	35601	Res. 300,000 Ohm ¼ W. Ins.
81	130311	Res. 120 Ohm ½ W. Ins.
82	35928	Res. 60,000 Ohm ¼ W. Ins.
83	47699	Res. 75 Ohm ½ W. Ins.
84	40757	Res. 50,000 Ohm ¼ W. Ins.
85	130318	Res. 25,000 Ohm 1 W. Ins.
86	47819	Res. 15000 Ohm 1 W. Ins.
87	35602	Res. 1 Meg. ¼ W. Ins.
88	35600	Res. 100,000 Ohm ¼ W. Ins.
89	35690	Res. 100,000 Ohm ¼ W. Ins.
90	50956	Res. 10 Meg. ¼ W. Ins.
91	40787	Res. 50,000 Ohm ¼ W. Ins.
92	130488	Res. 1500 Ohm ¼ W. Ins.
93	38916	Res. 350 Ohm ½ W. Ins.
94	47131	Res. 5 Meg. ¼ W. Ins.
95	35927	Res. 2 Meg. ¼ W. Ins.
96	36688	Res. 3 Meg. ¼ W. Ins.
97	35927	Res. 2 Meg. ¼ W. Ins.
98	35602	Res. 1 Meg. ¼ W. Ins.
99	47131	Res. 5 Meg. ¼ W. Ins.
100		
101		
102	35601	Res. 300,000 Ohm ¼ W. Ins.
103	35928	Res. 60,000 ½ W. Ins.
104	36318	Res. 1500 Ohm 1 W. Ins.
105	23013	Res. 2000 Ohm 1¼ W. Flex.
106	36321	Res. 400,000 Ohm ½ W. Ins.
107	36322	Res. 500,000 Ohm ½ W. Flex.
108		
109	35600	Res. 100,000 Ohm ¼ W. Ins.
110	49945	Res. 5000 Ohm ¼ W. Ins.
111	49703	
112		
113		Res. 250 Ohm 2 W. Ins.
114		
115		
116	130815	Sock. & Cable Magic Eye
117	G2-130728	Speaker & Plug
	47219	Spkr. Headed Bushing, 4
	37953	Spkr. Mtg. Flat Wash., 4
	N-8	Speaker Mtg. Nut—8-32 Hex. 4
	49219	Spkr. Mtg. Brkt., 4
	32814	Speaker Mtg. Brkt. Screws, 9
	N-5096	Spkr. Mtg. Brkt. Nuts, 4
	130359	Speaker Mtg. Brkt. Flat Washer, 4
118A	130487	Switch, Band Change
118B		Switch, Band Change
118C		Switch, Band Change
119A	130602	Mike Level, 3 Meg. Ohm
119B		Switch
120	130856	Switch, Phono Motor
121	G68-26719	Terminal Board, Loop Ant.
122	G50-26719	Terminal Board, Phono
123	130741-A	Tone Cont., 3 Meg. Ohm
124A	47782-A	Vol. Control, 1 Meg. Ohm
124B		Switch (Power)
125	130784	Transformer (Power)
	130763	Escutcheon, Magic Eye, 1
	130624-A	Escutcheon, Neon Tube, 1
	130637	Escutcheon & Dial, 1
	130518	Escutcheon Mtg. Screws, Dial & Tube, 8
	130772	Escutcheon Mtg. Screws, Magic Eye, 2
	130767	Escutcheon Push But., 1
	130324	Escutcheon Push Button Screws, 4
	130160-A	Push Button, 8
	131456	Push Button Switch, 1
	42911	Protector, Cabinet, 1
	130460	Protector, Cab. Cloth, 1
	130424	Chassis Mtg. Strap (RH) (1)
	130427	Chassis Mtg. Strap (LH) (1)
	45580-A	Chassis Grommet, Rubber (6)
	130425	Chassis Mtg. Brkt. (2)
	131512	Chassis Headed Bush. (6)
	43885	Chassis Mtg. Screw, 8
	130992	Chassis End Plate (LH), 1
	130991	Chassis End Plate (RH), 1
	130197	Knob (5)
	49859	Iron Core, 5
	130861-A	Clamp, Condenser, 1
	49674	Socket, No Marking, 9
	G7-49637	Light Socket Assy.
	130621	Mike Socket
	130591	Mike Socket Shell
	130787	Mike Socket Con. Brkt.
	130186-B	Call Letter Sheet
	130187	Call Letter Cover
	47339	Needles (Package 10)
	130801	6½-inch R.
	47791	Needle Cup, 2
	47790	Needle Cup Lid, 2
	130901	Needle, Cutting Unit & Bag, 1
	130563-A	Recordiomatic Unit, 1
	130801	Records, 6½-in. & Envpe.
	MG20-130611	Dial Back Plate
	130138	Pointer Shaft
	41582	Drive Cord
	49829	Lock Spring
	130125	Dial Pointer

PARTS LIST—MODEL 618

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1	W —43567	Dial Light Bulb
	G2 —45398	D. L. Socket Assy.
2	G148—32000	Ant. Coil, B-C.
3	G171—32000	Ant. Coil, H-F.
4	G145—32002	Osc. Coil, B-C.
5	G144—32002	Osc. Coil, H-F.
6	G161—32004	1st I-F. Assy.—455 Kc.
7	G166—32004	2nd I-F. Assy.—455 Kc.
8	W —44438A	Condenser, 40 Mf. 300 V.
9	W —44012	Condenser, 16 Mf. 250 V.
10	G16 —34000	Condenser, 3,800 Mmf. H-F. Osc. Series
11	G14 —34002	Condenser, 400 Mmf. B-C. Osc. Series
12A	G2 —34002	Condenser, .0001 Mf. Molded
12B	G2 —34002	Condenser, .0001 Mf. Molded
13A	G13 —34002	Condenser, .0000035 Mf. Molded
13B	G13 —34002	Condenser, .0000035 Mf. Molded
14		None
15A	W —23142	Condenser, .02 Mf. 400 V. Tub.
15B	W —23142	Condenser, .02 Mf. 400 V. Tub.
16A	W —28621	Condenser, .02 Mf. 200 V. Tub.
16B	W —28621	Condenser, .02 Mf. 200 V. Tub.
16C	W —28621	Condenser, .02 Mf. 200 V. Tub.
17A	W —36541	Condenser, .02 Mf. 160 V. Tub.
17B	W —36541	Condenser, .02 Mf. 160 V. Tub.
17C	W —36541	Condenser, .02 Mf. 160 V. Tub.
17D	W —36541	Condenser, .02 Mf. 160 V. Tub.
18	W —30805	Condenser, .01 Mf. 400 V. Tub.
19	W —30323	Condenser, .01 Mf. 200 V. Tub.
20	W —23615	Condenser, .05 Mf. 400 V. Tub.
21	W —34712	Condenser, .25 Mf. 160 V. Tub.
22	G3 —34002	Condenser, .0005 Mf. Molded
23W		H-F. Osc. Trimmer
23X		B-C. Osc. Trimmer (Temp. Compensated)
	W —45715	
23Y		H-F. Ant. Trimmer
23Z		B-C Ant. Trimmer
24	G42 —33001	2 Section Gang Cond.
	B —45670	Dial Face (Glass)
	W —44085B	Dial Mask (Metal Disc)
	W —44084A	Ring (Cardboard Support)
	C —45689	Bracket (Dial Mounting)
	W —45690	Right Angle (Bracket Mtg.)
	W —44299	Dial Hand (Pointer)
	W —40486	Screw—Dial Hand Mtg.
	—2045	Int. Shakeproof Washer (Pointer)
	W —45644	Pointer Shaft
	W —50325A	Retaining Ring (Pointer Shaft)
	G10 —43564	Pulley and Hub Assy. (Pointer Shaft)
	G11 —43564	Pulley, Gear and Hub Assy.
	W —45632	Spring (Double Gear Takeup)
	MG29—45607	Brkt. and Pulley Assy. (Gang Mtg.)
	W —44500A	Bearing Plate (Drive Shaft)
	W —43542B	Mtg. Brkt. (Drive Shaft)
	W —45686A	Drive Shaft
	W —43549	Retaining Ring (Drive Shaft)
	W —44701C	Grommet (On Drive Shaft)
	—41582	Drive Cord—35" Req.
	W —50573A	Tension Spring (Drive Cord)
25	B —44004	Power Cord
26A	—23785	Resistor, 500,000 Ohm ½W. Carb.
26B	—23785	Resistor, 500,000 Ohm ½W. Carb.
27A	—33344C	Resistor, 400,000 Ohm ½W. Carb.
27B	—33344C	Resistor, 400,000 Ohm ½W. Carb.
27C	—33344C	Resistor, 400,000 Ohm ½W. Carb.
28	—24990	Resistor, 25,000 Ohm ½W. Carb.
29A	—24814	Resistor, 7,000 Ohm ½W. Carb.
29B	—24814	Resistor, 7,000 Ohm ½W. Carb.
30	—21876	Resistor, 10,000 Ohm ½W. Carb.
31	—26577	Resistor, 3 Megohm ½W. Carb.
32A	—33474	Resistor, 10,000 Ohm ½W. Carb.
32B	—33474	Resistor, 10,000 Ohm ½W. Carb.
33	—42401B	Resistor, 99 Ohm ¼W. Ins.
34	—21237A	Resistor, 60,000 Ohm ½W. Carb.
35	—44009	Resistor, 3,000 Ohm ¼W. Ins.
36	W —25937	Resistor, 275 Ohm ½W. Flex.
37	W —23013	Resistor, 1,000 Ohm 1¼W. Flex.
38	W —21965	Resistor, 375 Ohm 1W. Flex.
39	—21454	Resistor, 1 Megohm ½W. Carb.
40	W —28106	Resistor, 500 Ohm ½W. Flex.
41	G103—28807	Socket Speaker
42	G156—36400	Socket, Type 6A8
43	G171—36400	Socket, Type 6U7
44	G160—36400	Socket, Type 6Q7
45AB	G172—36400	Socket, Type 6K6
46	G187—36400	Socket, Type 5W4
	W —40911	Tube Shield
47	465BP15"M"	Speaker, Mfg. Spec. 1-D-1197
	—45186	Cone and V. C. Assy.
	—45187	Field Coil (750 Ohm, 75 M. A.)
	—45188	Output Transformer
	—44681	Speaker Plug
48	—44955	Band Selector Switch
49	—44796	Local-Distance Switch
	MG17—44575	Arm, Sleeve and Clamp Assy.
50	—44024B	Tone Control and Switch
51	—44467	Volume Control (1 Meg.)
52	—44695	Power Trans., 60 Cy.–110 V.
	—44697	Power Trans., 50 Cy.–110 V.
	—44698	Power Trans., 50 Cy.–220 V.
	—44696	Power Trans., 25 Cy.–110 V.
	—44694	Power Trans., 25 Cy.–220 V.
53	G27 —26719	Ant. and Gnd. Terminal Assy.
54	G39 —26719	Phono Terminal Assy.
55	G170— 32004	Wave Trap (455 Kc.)
56	W —45798	Resistor, 75 Ohm 1½W. Flex.

PUSH BUTTON PARTS

Part No.	Description
G2 —45683	Push Button Unit Assy.
G30 —45683	Key and Toggle Assy.
W —50542A	Key Clip (Lock Clamp)
—45718	Screw (Lock Clamp)
W —50607	Return Spring
G31 —45683	Rocker Plate Assy.
W —50561	⅛" No. 40 Screw (Rear Plate Bearing)
W —50547	Rear Guide Plate
W —45646A	Adjust. Clip (Front—5 Req.)
W —45589A	Push Button
W —50551A	Celluloid Cover
B —44960	R. H. Mtg. Plate
B —44961	L. H. Mtg. Plate
7NA	Cabinet
W —44019	Extruded Rubber Spacer (Chassis Mtg.)
—44023	Headed Bushing (Chassis Mtg.)
—44387B	Knob (Large—Tuning)
W —44431	Knob (Large—Loc.-Dist.)
—44386B	Knob (Small—Tuning and Vol. Cont.)
W —44432	Knob (Small—Tone Cont. and Band Sw.)
—45614	Bushing for 44387B Knob
B —44869A	Escutcheon
B —45626B	Push-Button Escutcheon
—50549	Call Letter Sheet
W —45693	Bracket—P. B. Unit Support
W —23880A	Thumb Screw

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THE CROSLEY CORP.

MODEL 618

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(C) SIGNAL INPUT FREQUENCIES

	Minimum Capacity Signal	Shunt Alignment Signal
American Broadcast Band	1,725 Kilocycles	1,400 Kilocycles
High Frequency Band	18,300 Kilocycles	18,000 Kilocycles

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect the output meter to the plates of the two 6K6G Output tubes. Be certain that the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6U7G tube, leaving the tube's grid lead in place. Connect the ground lead from the signal generator to the ground terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Turn the band selector switch to the Broadcast Band.

(d) Turn the Local-Distance switch to the "Distance" position.

(e) Set the signal generator to 455 kilocycles.

(f) Adjust both trimmer condensers located on top of the 2nd I-F transformer for maximum output.

(g) Transfer the signal generator lead to the top cap of the 6A8G tube, leaving the tube's grid clip in place.

(h) Close the middle trimmer of the 1st I-F transformer. Do not force adjustment screw.

(i) Adjust the top and then the bottom trimmers of the 1st I-F transformer for maximum output.

(j) Adjust the middle trimmer of the 1st I-F transformer for maximum output.

DO NOT ADJUST THE TRIMMER CONDENSERS LOCATED ON THE 2ND I-F TRANSFORMER WITH THE SIGNAL GENERATOR LEAD CONNECTED TO THE 6A8G TUBE.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

Aligning The R-F Amplifier.

When aligning the R-F amplifier the output lead from the signal generator is connected to the antenna (A) terminal of the receiver. For the Broadcast Band a 200 mmf. condenser should be connected in series with the output lead of the signal generator and for the High Frequency Band a 250 ohm carbon resistor should be used in place of the condenser.

(a) With the station selector adjusted so that the tuning condenser plates are completely out of mesh and the band selector switch set for the band being aligned, adjust the "OSC" shunt trimmer so that the MINIMUM CAPACITY SIGNAL ¶ (C) is heard (it is not necessary that the receiver tune through this signal).

(b) Adjust the station selector so that the SHUNT ALIGNMENT signal is tuned-in with maximum output. Then adjust the "ANT" shunt trimmer for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and check the adjustment of the "ANT" trimmer. DO NOT READJUST THE OSCILLATOR TRIMMER.

NOTE: When shunt aligning the High Frequency Band care should be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator 10 times, or more, and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly is located on the underneath side of the chassis and consists of a coil, a fixed condenser and a trimmer condenser as illustrated by dotted lines in the Wiring Diagram (item 55).

The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a 200 mmf. condenser into the antenna terminal of the receiver. With the band selector switch turned to the Broadcast Band position, the gang condenser open and the volume control full on, adjust the trimmer condenser on the wave trap for MINIMUM output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal the antenna may be attached to the receiver and the receiver turned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.

SETTING THE PUSH BUTTONS

The push buttons may be quickly and accurately set from the front of the receiver. It is not necessary that all the buttons be set at the same time. Insert a small screw driver in the hole in the front of each push button to be set and loosen (Do not remove) the set screw in the bottom of the hole.

Determine the favorite broadcasting stations whose call letters are to be placed in the push buttons. By means of the conventional tuning knob, tune-in AS ACCURATELY AS POSSIBLE the station having the highest frequency—that is the station nearest the 1500 kilocycle end of the dial. Completely depress and hold the No. 1 push button and SECURELY TIGHTEN THE SET SCREW. No. 1 push button is the one toward the high frequency end of the dial.

The push button system is now correctly set for the 1st station. FFollow through with the same procedure, setting the other stations in the order of their frequency (kilocycles). Detach the call letters of the favorite stations from the list supplied with your receiver and press them into the openings in the front of the push buttons. Thin pieces of clear celluloid are supplied in a small envelope and should be snapped in place over the call letters to protect and hold them in place.

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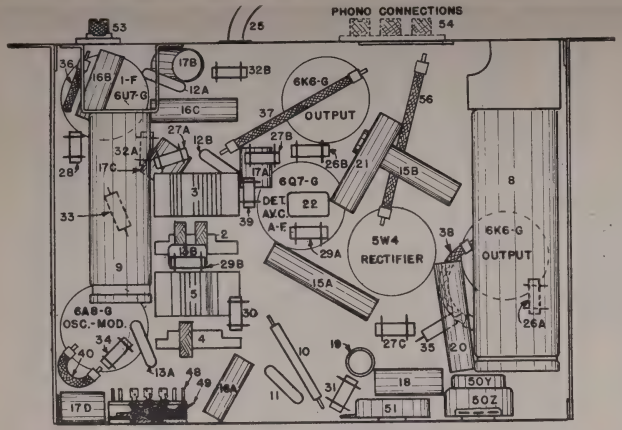


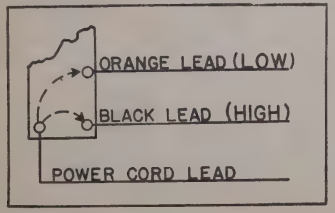
Fig. 3. Bottom View Model 618

SPECIAL POWER TRANSFORMER ADJUSTMENT

In localities where the voltage variation on 50 or 60 cycle power supply lines is greater than customary commercial limits, special 50-60 cycle power transformers are available. These transformers have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections



for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

REPLACING DIAL DRIVE CORD

To replace the dial drive cord, the following procedure should be carefully followed.

(1) Remove the chassis from the cabinet.

(2) Remove the dial glass, pointer and dial mounting bracket.

(3) Remove the broken cord and the tension spring.

(4) Double a 48" length of drive cord. Insert the doubled end through the eyelet (from the outside) in the pulley on the end of the tuning condenser gang. Tie a knot in the cord so as to form a loop about ¾" long. Close the gang so that the eyelet in the pulley will be "down." Hook the looped cord over the catch provided in the pulley opposite the eyelet.

(5) Bring one end of the cord forward and over the top idler pulley. Continue the cord under and around to the top of the pulley on the pointer shaft (¾ turn). With the pointer shaft pulley set so that its eyelet is in the "up" position, thread the cord through the eyelet.

(6) Bring the other end of the cord back and over the condenser gang pulley. Continue it down and over the lower idler pulley to the left-hand side of the rubber grommet and then over the top of the pointer shaft pulley. This lead should cross behind the down lead to the rubber grommet. Make one complete loop around the pointer shaft pulley and back to the eyelet. Thread the lead through the eyelet and tie a knot in the two ends of the cord so that it will be about ½" from the eyelet when the cord is drawn taught. Hook one end of the tension spring over the knot and hook the other end to the catch provided opposite the eyelet. Cut off the excess cord and if bees' wax is available, apply a small amount to the knot as an added protection against slipping.

CIRCUIT DESCRIPTION

The 6Q7G tube serves as the detector and 1st A-F amplifier and supplies AVC voltage to the grids of th 6A8G and 6U7G tubes. The speaker field is located in the negative leg of the power supply. Phase inversion is obtained in the output circuit by the voltage developed across a 3000 ohm resistor, item 35.

SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500-volt D. C. voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A. C. voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	K	Go	Ga
6A8G	Oscillator-Modulator	6.3	220	100	3.	-15	156
6U7G	I-F Amplifier	6.3	206	100	2.5	—	—
6Q7G	Det, AVC & AF Amp.	6.3	68	—	1.5	—	—
6K6G	(2) Output	6.3	216	214	18.	—	—
5W4	Rectifier	5.0	—	—	295	—	—

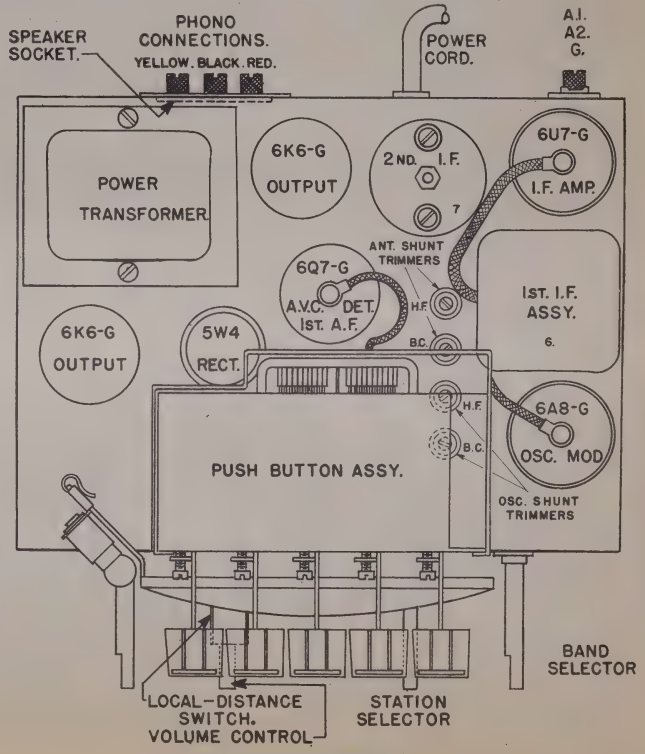


Fig. 2. Top View Model 618

MODEL 629, First, Second and Third Series

THE CROSLEY CORP.

CIRCUIT DESCRIPTION

Six glass (octal) tubes are used and their functions are as follows: one 6A8G as oscillator-modulator, one 6K7G as I-F amplifier, one 6Q7G as diode detector and A. V. C., and 1st audio, one 6P5G as 2nd audio amplifier, one 6AC5G dynamic coupled power output and one 5Y3G as a half-wave rectifier.

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500-volt D. C. voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A. C. voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	K	G	Ga	Go
6A8G	Oscillator-Modulator	6.3	230	68	—	—	68	Neg.
6K7G	I-F Amplifier	6.3	230	68	—	—	—	—
6Q7G	Detector—A. V. C.—1st A-F	6.3	74	—	—	—	—	—
6P5G	Driver	6.3	230	—	+13	—	—	—
6AC5G	Power Output	6.3	225	—	—	+13	—	—
5Y3G	Rectifier	5.0	—	—	—	—	—	—

Voltage drop across speaker field 44 volts.
Maximum power output approximately 5 watts.
Power consumption at 117.5 volts approximately 85 watts with phono operating.

ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

CONNECTING OUTPUT METER

Connect one side of the output meter to the plate of the 6AC5G Output tube and the other to the plate of the 6P5G. Be certain that the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8G tube, leaving the tube's grid lead in place. Connect the ground lead from the signal generator to the ground terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust both trimmers located on top of the 2nd I-F transformer for maximum output. (Item 6, Fig. 2).

(e) Adjust both trimmers located on top of the 1st I-F transformer for maximum output. (Item 5, Fig. 2).

(f) Check operations (d) and (e) for more accurate adjustment.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

Aligning R-F Amplifier.

When aligning the R. F. amplifier the output lead from the signal generator is connected to the antenna lead of the receiver, a 200 mmf. condenser should be connected in series with the output lead of the signal generator.

(a) With the station selector adjusted so that the tuning condenser plates are completely out of mesh adjust the "OSC" shunt trimmer so that the MINIMUM CAPACITY SIGNAL ¶ (C) is heard (it is not necessary that the receiver tune through this signal).

(b) Adjust the station selector so that the SHUNT ALIGNMENT signal is tuned-in with maximum output. Then adjust the "ANT" shunt trimmer for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and check the adjustment of the "ANT" trimmer. DO NOT READJUST THE OSCILLATOR TRIMMER.

If any of the circuits have been re-adjusted it may be necessary to reset the push buttons.

SETTING THE PUSH BUTTONS

Remove push button and with a small screw driver loosen the set screws a turn or two. With the manual tuning knob, tune-in as ACCURATELY AS POSSIBLE the station whose call letters were in the button or that station for which the button is to be set. Then push the key all the way down and while you hold it in that position SECURELY TIGHTEN the set screw.

WAVE TRAP

Some chassis of this model may be equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. (Not in models having a loop antenna). This assembly is located on the underneath side of the chassis and consists of a coil and a trimmer condenser as illustrated by dotted lines in the Wiring Diagram (item 31).

The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a 100 mmf. condenser into the antenna terminal of the receiver. With the band selector switch turned to the Broadcast Band position, the gang condenser closed and the volume control full on, adjust the trimmer condenser on the wave trap for MINIMUM output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal in the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal the antenna may be attached to the receiver and the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.

(C) SIGNAL INPUT FREQUENCIES

I-F Alignment Signal	Minimum Capacity Signal	Shunt Alignment Signal
455 Kilocycles (Models Without Loop)	1,725 Kilocycles	1,400 Kilocycles
455 Kilocycles (Models With Loop)	1,620 Kilocycles	1,400 Kilocycles

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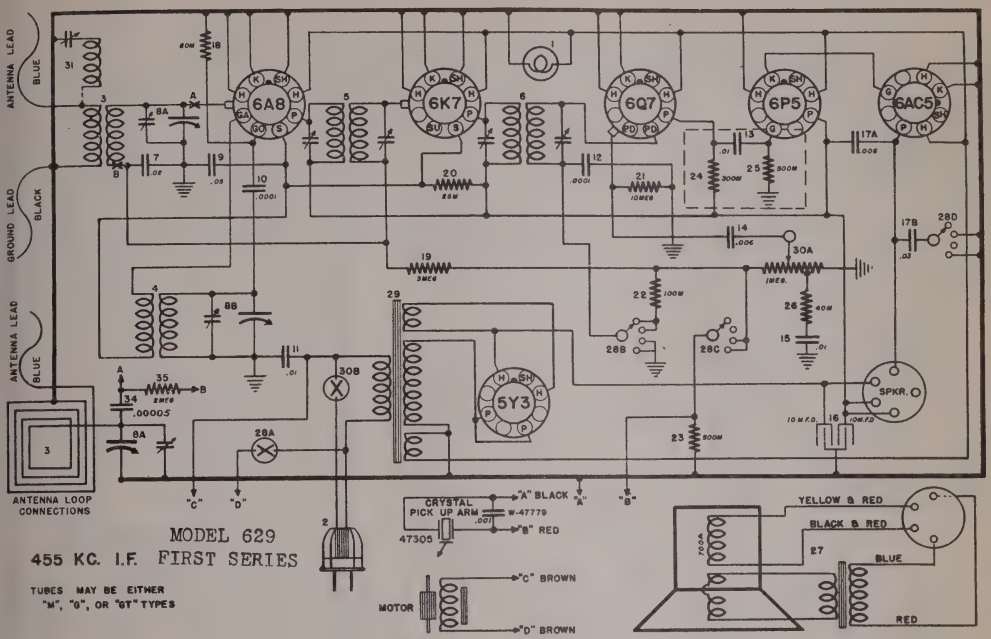
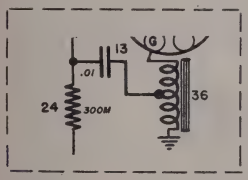
MODEL 629, First, Second and Third Series

THE CROSLEY CORP.





SECOND AND THIRD SERIES

THE SECOND AND THIRD SERIES OF MODEL 629 IS IDENTICAL WITH THE FIRST SERIES BUT WITH THE EXCEPTION THAT THE AUTOTRANSFORMER IN THE FIGURE TO THE LEFT IS USED AS A METHOD OF COUPLING AND REPLACES THE RESISTOR IN THE GRID CIRCUIT OF THE 6P5.

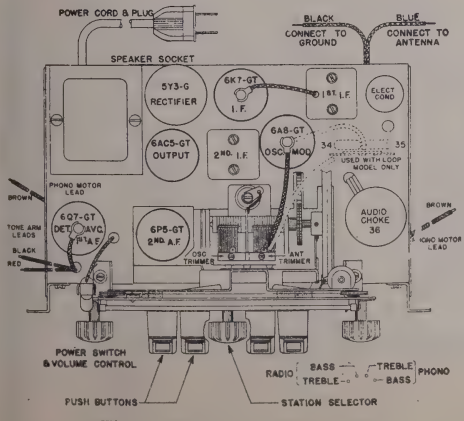


Fig. 2—Top View Model 629

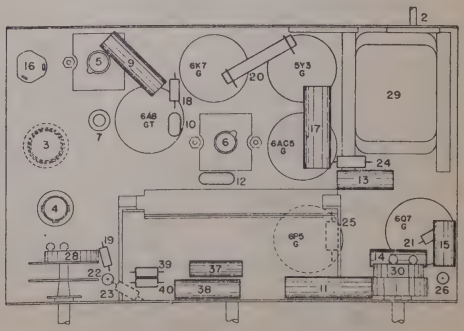


Fig. 3—Bottom View Model 629

MODELS 669, 6669,
6679, 7669

THE CROSLEY CORP.

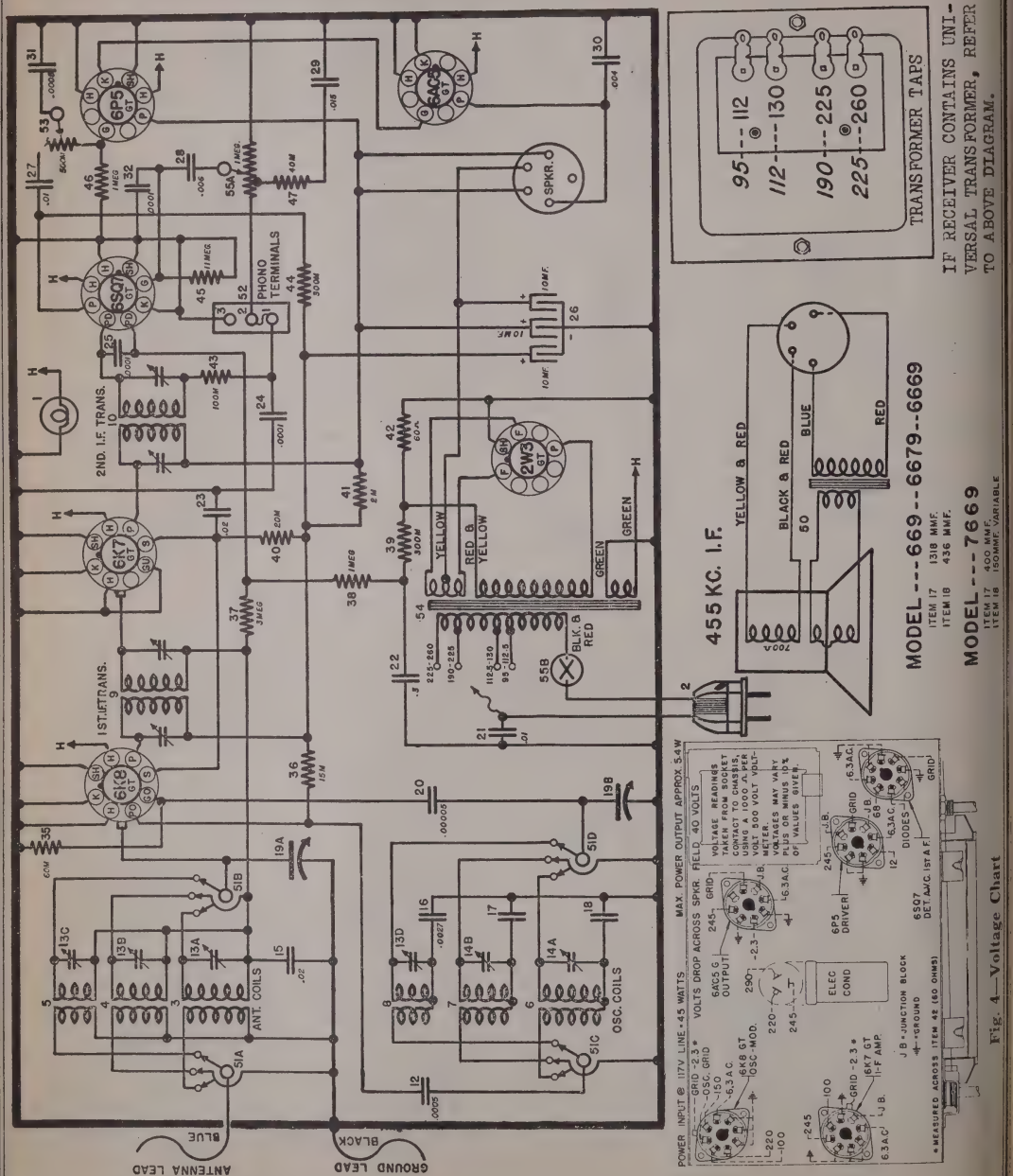


Fig. 4—Voltage Chart

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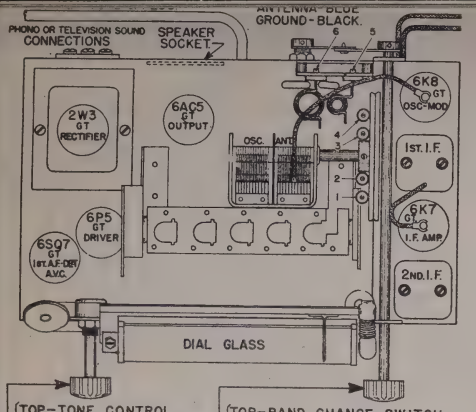


Fig. 2—Top View Model 6669

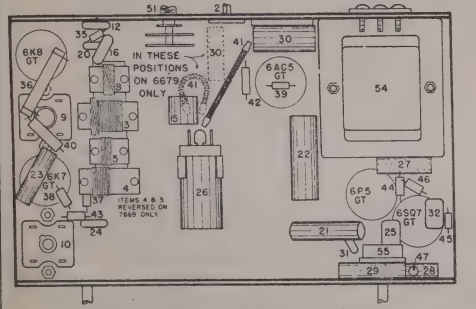


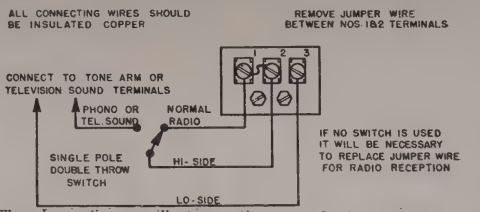
Fig. 3—Bottom View Model 6669

CIRCUIT DESCRIPTION

The circuit is a conventional superheterodyne without regeneration employing the following tubes, one 6K8GT as Oscillator-Mixer (first detector), one 6K7GT as intermediate frequency amplifier, one 6SQ7 as 2nd Detector, A. V. C. and 1st audio amplifier, one 6P5GT as audio driver, one 6AC5GT as dynamic coupled output and one 2W3GT as half wave rectifier.

The initial bias for the 6K8GT and the 6K7GT is developed across item 42, a 60 ohm resistor in series with the negative leg. Items 38, a 1 megohm resistor and 39 a 300,000 ohm resistor, act as filters for this bias voltage and likewise serve as the A. V. C. load resistor.

Fig. 5—Phono or Television Sound Connections


ALL CONNECTING WIRES SHOULD BE INSULATED COPPER
REMOVE JUMPER WIRE BETWEEN NOS. 1&2 TERMINALS
CONNECT TO TONE ARM OR TELEVISION SOUND TERMINALS
PHONO OR TEL. SOUND
NORMAL RADIO
SINGLE POLE DOUBLE THROW SWITCH
HI-SIDE
LO-SIDE
IF NO SWITCH IS USED IT WILL BE NECESSARY TO REPLACE JUMPER WIRE FOR RADIO RECEPTION

The above diagram illustrates the method of connecting a phonograph tone arm (pickup) to this receiver or the connections for Television (sound). The pickup or tone arm should be of the high impedance type (Crystal). The switch illustrated is a single pole double throw type and facilitates the changing over from Radio to Phono reproduction. If no switch is used it will be absolutely necessary to remove the jumper wire for phono operation and it will have to be replaced for radio reception, being very careful to make a good tight connection each time.

ALIGNMENT PROCEDURE

Connect one terminal of the output meter to the plate of the 6AC5GT output tube and the other terminal to the plate of the 6P5GT, audio driver tube. Be certain that the meter is protected from D. C. by inserting a .25 mf. condenser in series with one of the leads.

Tuning the I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6K8GT tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the ground lead (BLACK) of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Set the band selector switch on the Broadcast Band (right).

(d) Set the signal generator to 455 Kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F transformer for maximum output.

(f) Adjust both trimmers located on top of the 1st I-F transformer for maximum output.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING, TO PREVENT A. V. C. ACTION.

Aligning the R-F Amplifier.

When aligning the R-F amplifier the output lead from the signal generator is connected to the "ANT" lead (BLUE) of the receiver. For the American Broadcase band a .0002 mfd. condenser should be connected in series with the output lead of the signal generator and for the Short Wave Bands a 250 ohm carbon resistor should be used in place of the condenser.

The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated for each adjustment, ¶ (D) below.

() With the station selector adjusted so that the tuning condenser plates are completely out of mesh, adjust the "OSC" shunt trimmer until the MINIMUM CAPACITY SIGNAL (D) is heard (it is not necessary that the receiver tune through this signal).

(b) Adjust the station selector so that the SHUNT ALIGNMENT SIGNAL (D) is tuned-in with maximum output. Then adjust the "ANT" shunt trimmer for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and check the adjustment of the "ANT" trimmer. DO NOT READUST THE OSCILLATOR TRIMMER.

NOTE: When shunt aligning the Short Wave Bands, care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times, or more, and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

(D) SIGNAL INPUT FREQUENCIES

	Oscillator Min. Cap. Signal	Trimmer Condenser	Antenna Shunt Align.	Trimmer Condenser
American Broadcast Band	1,725 Kilocycles	No. 6	1,400 Kilocycles	No. 3
Police and Amateur Band (No. 1)	7,250 Kilocycles	No. 5	7,000 Kilocycles	No. 1
Foreign or High Frequency Band (No. 2)	23.0 Megacycles	No. 4	22 Megacycles	No. 2

MODEL 1218

THE CROSLEY CORP.

SPECIFICATIONS

This model Crosley radio is a 12-tube AC receiver designed for Standard Broadcast and Short Wave reception, and incorporates such features as push button electric truning, automatic volume control, Local-Distance switch and push pull parallel output. The tuning range is divided into three bands as follows:

535-1725 Kilocycles or 555-173 Metres (American Broadcast Band)
2.0- 6.8 Megacycles or 150-44.5 Metres (Police & Amateur Band)
6.6- 22 Megacycles or 45.5-13.5 Metres (High Frequency or Foreign Band)

PARTS LIST—MODEL 1218

Figures in first column refer to parts in Diagrams.

Item No.	Part No.	Description
1AB	W —43567	Dial Light Bulb
	G8 —45398	Dial Light Socket Assy.
2	G145—32000	Ant. Coil, B–C.
3	G146—32000	Ant. Coil, Pol.
4	G147—32000	Ant. Coil, H–F.
5	G94 —32001	R–F. Coil, B–C.
6	G95 —32001	R–F. Coil, Pol.
7	G96 —32001	R–F. Coil, H–F.
8	G148—32002	Osc. Coil, B–C.
9	G149—32002	Osc. Coil, Pol.
10	G150—32002	Osc. Coil, H–F.
11	G161—32004	1st I–F. Assy.
12	G166—32004	2nd I–F. Assy.
13	W —44672	Condenser, 40 Mf. 125 V.
14	W —44054	Condenser, 30 Mf. 350 V.
15	W —36057B	Condenser, 40 Mf. 300 V.
16	G1 —44886	Condenser, Temp. Compensating
17	G5 —34002	Condenser, .00005 Mf. Molded
18A	G1 —34002	Condenser, .00025 Mf. Molded
18B	G1 —34002	Condenser, .00025 Mf. Molded
19A	W —35936	Condenser, .05 Mf. 200 V.
19B	W —35936	Condenser, .05 Mf. 200 V.
20A	W —28621	Condenser, .02 Mf. 200 V.
20B	W —28621	Condenser, .02 Mf. 200 V.
20C	W —28621	Condenser, .02 Mf. 200 V.
21A	W —32378	Condenser, .01 Mf. 400 V.
21B	W —32378	Condenser, .01 Mf. 400 V.
22	W —29910A	Condenser, .25 Mf. 200 V.
23	W —24049C	Condenser, .1 Mf. 200 V.
24A	W —35139	Condenser, .004 Mf. 400 V.
24B	W —35139	Condenser, .004 Mf. 400 V.
25	W —30805	Condenser, .01 Mf. 400 V.
26	W —37988	Condenser, .017 Mf. 400 V.
27	G58 —33002	3 Section Var. Tun. Condenser
	B —44815B	Dial Face (Glass)
	W —45587A	Dial Mask (Metal)
	C —44814A	Dial Support Bracket
	W —44262	Ring—Dial Glass Support
	W —44127	Dial Hand (Pointer)
	W —40486	Screw (Hand Mtg.)
	G1 —43564	Pulley and Hub Assy. (Drive Cord)
	—41582	Drive Cord (23 in.)
	W —44908	Idler Stud
	W —44989	Spring—Drive Cord Tension
	W —44907A	Idler Pulley
	W —45448	Drive Belt
	—45449	Friction Tubing—Motor Shaft
28	—40769	B–C Osc. Series Trimmer (.00052 Mf.) Variable
29	G23 —34000	Pol. Osc. Fixed Series Condenser (.00156 Mf.)
30	G24 —34000	H–F. Osc. Fixed Series Condenser (.005525 Mf.)
31	W —35951A	3 Section Shunt Trimmer Assy.
32		
33	B —33906A	Power Cord and Plug
34	—35930	Resistor, 200,000 Ohm ½W. Ins.
35	—34883	Resistor, 2 Megohm ½W. Carb.
36	—21237A	Resistor, 60,000 Ohm ½W. Carb.
37	—44008	Resistor, 10,000 Ohm 2W. Carb.
38	—23616	Resistor, 15,000 Ohm 1W. Carb.
39A	—35600	Resistor, 100,000 Ohm ½W. Ins.
39B	—35600	Resistor, 100,000 Ohm ½W. Ins.
40	—37583	Resistor, 2.5 Megohm ½W. Carb.
41	—37245	Resistor, 1.5 Megohm ½W. Carb.
42A	—23785	Resistor, 500,000 Ohm ½W. Carb.
42B	—23785	Resistor, 500,000 Ohm ½W. Carb.
42C	—23785	Resistor, 500,000 Ohm ½W. Carb.
43	—21455	Resistor, 300,000 Ohm ½W. Carb.
44	—37472	Resistor, 50,000 Ohm ½W. Carb.
45	W —28589	Resistor, 350 Ohm ½W. Flex.
46	W —44456	Resistor, 250 Ohm 3W. Flex.
47	W —37630	Resistor, 21 Ohm ½W. Flex.
48	W —23013	Resistor, 2,000 Ohm 1½W. Flex.
49A	—42401B	Resistor, 99 Ohm ½W. W. W. Ins.
49B	—42401B	Resistor, 99 Ohm ½W. W. W. Ins.

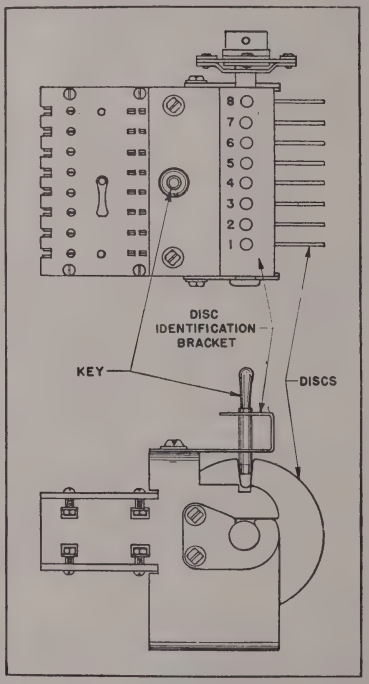


Fig. 5

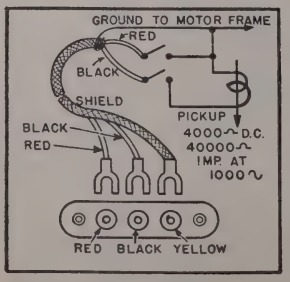


Fig. 4 Phonograph Pickup

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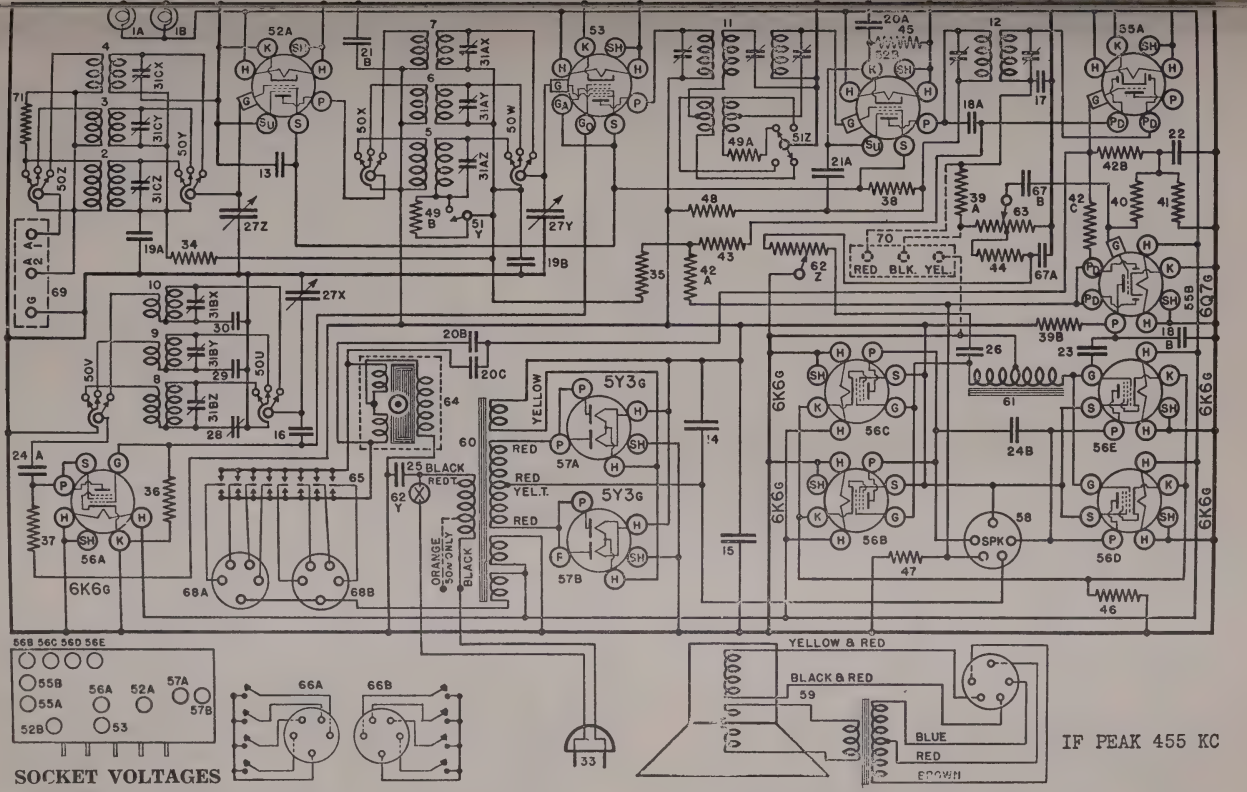


SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500 volt D. C. voltmeter (except filaments) with the receiver in operating condition and no signal input. The volume control should be turned full "ON," the tone control should be turned to the "TREBLE" position (counter-clockwise), the Local-Distance switch should be turned to the "Distance" position and the condenser gang should be rotated to the minimum capacity position. The filament voltages should be measured with an accurate low range A. C. voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

TUBE SOCKET VOLTAGE READINGS

Tube	Function	H	P	S	Su	K	Gn	Ga
6U7G	R. F. Amplifier	6.3	255	95	0	0	—	—
6A8G	Modulator	6.3	255	95	—	0	95	95
6K6G	Oscillator	6.3	125	125	—	0	—	—
6U7G	I. F. Amplifier	6.3	255	95	3	3	—	—
6Q7G	Det., AVC & "Squelch"	6.3	0	—	—	0	—	—
6Q7G	1st A. F. Amplifier	6.3	185	—	—	0	—	—
6K6G	(4) Output	6.3	245	255	—	22	—	—
5Y3G	(2) Rectifier	5.0	—	—	—	255	—	—

Power consumption approximately 120 watts at 117.5 volts.
Power output approximately 12 watts.
Voltage drop across speaker field 72 volts.

MODEL 1218

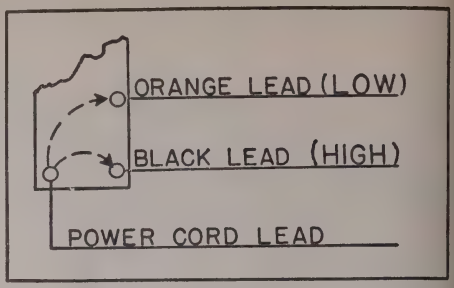
THE CROSLEY CORP.

SPECIAL POWER TRANSFORMER ADJUSTMENT

In localities where the voltage variation on 50 or 60 cycle power supply lines is greater than customary commercial limits, special 50-60 cycle power transformers are available. These transformers have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.



NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

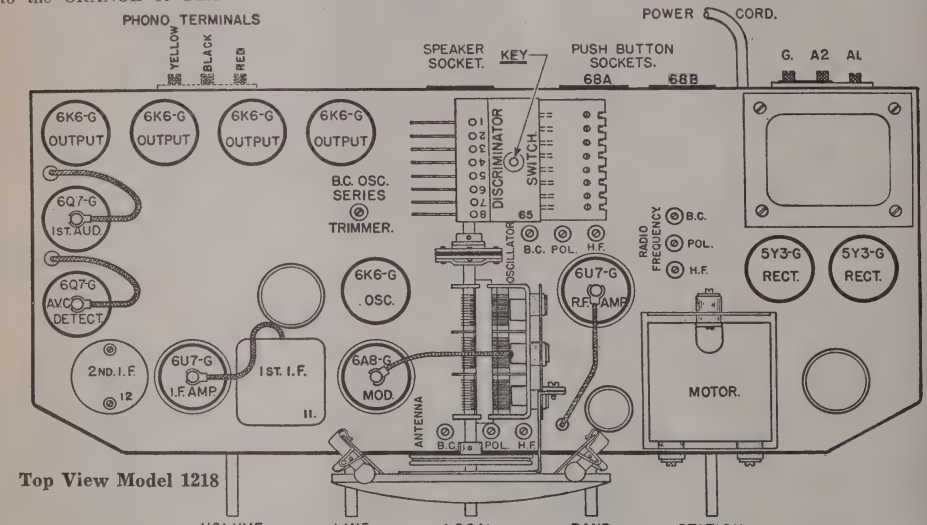


Fig. 2. Top View Model 1218

Fig. 3. Bottom View Model 1218

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MODEL 7V2
MODEL 1218

THE CROSLEY CORP.

CHASSIS MO. 1218

ALIGNMENT PROCEDURE
CONNECTING OUTPUT METER

Connect the output meter to the plates of the two 6K6G Output tubes. Be certain that the meter is protected from D. C. by a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6U7G 1st I-F Amp. tube, leaving the tube's clip in place. Connect the ground lead from the signal generator to the ground terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Set the band selector switch on the Broadcast Band.

(d) Turn the Local-Distance Switch to the "Distance" position (Right).

(e) Set the signal generator to 455 kilocycles.

(f) Adjust both trimmer condensers located on top of the 2nd I-F transformer for maximum output.

(g) Transfer the signal generator lead to the top cap of the 6A8G tube, leaving the tube's grip clip in place.

(h) Close the middle trimmer of the 1st I-F transformer. (Do not force adjustment screw).

(i) Adjust the top and then the bottom trimmers of the 1st I-F transformer for maximum output.

(j) Adjust the middle trimmer of the 1st I-F transformer for maximum output.

DO NOT ADJUST THE TRIMMER CONDENSERS LOCATED ON THE 2ND I-F TRANSFORMER WITH THE SIGNAL GENERATOR LEAD CONNECTED TO THE 6A8G TUBE.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

Aligning The R-F Amplifier.

When aligning the R-F amplified the output lead from the signal generator is connected to the "ANT" terminal of the receiver. For the Broadcast Band a 200 mmf. condenser should be connected in series with the output lead of the signal generator and for the High Frequency and Police Bands a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be SHUNT ALIGNED and then SERIES ALIGNED where provision is made for series alignment (Broadcast Band). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated for each adjustment, ¶ (b) below.

(a) With the station selector adjusted so that the tuning condenser plates are completely out of mesh, adjust the "OSC" shunt trimmer until the MINIMUM CAPACITY SIGNAL (D) is heard (it is not necessary that the receiver tune through this signal).

(b) Adjust the station selector so that the SHUNT ALIGNMENT SIGNAL (D) is tuned-in with maximum output. Then adjust the "R-F" and "ANT" shunt trimmers for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and check the adjustment of the "R-F" and "ANT" trimmers. DO NOT READJUST THE OSCILLATOR TRIMMER.

NOTE: When shunt aligning the Police and High Frequency Bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this increase the output of the signal generator ten times, or more, to try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

(c) To align the series trimmer (See Fig. 2), set the signal generator to the frequency indicated below (D) and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer, it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output. Minor tolerance variations in series alignment at 2500 kilocycles in the Police Band and at 7000 kilocycles in the High Frequency Band may be compensated for by slight repositioning of the grid lead of the antenna coil in the Band affected.

PUSH BUTTON TUNING SYSTEM

The push button electric tuning system employed in this receiver incorporates eight push buttons, a selector switch and an electric motor. The discriminator switch, item 65—also Fig. 5, incorporates eight metallic discs, each of which operates in conjunction with a different push button to tune-in some favorite station. That is, the 1st push button on the left as you face the front of the cabinet works with No. 1 disc, and the 2nd push button works with No. 2 disc, etc.

SETTING PUSH BUTTONS

To set the electric tuning system, turn the receiver "ON" and depress No. 1 push button. When the dial pointer stops rotating, the key slot in No. 1 disc on the selector switch will be in the "UP" position. Remove the key from its mounting and place it (knob up) through No. 1 hole in the disc identification bracket. If it does not drop into the slot in the disc, push it in with the fingers.

Turn the Local-Distance switch to the "Distance" position. By means of the station selector knob, tune-in AS ACCURATELY AS POSSIBLE, the station whose call letters have been placed in No. 1 push button. Then remove the key.

NOTE: The push button which will ordinarily be used for POLICE calls does not lock in the depressed position. It serves as a release for all other push buttons and should be depressed before operating the manual tuning control.

By means of the manual tuning knob, turn the dial pointer to some other position. Then check the setting by pressing the button which has been set. If the pointer stops too soon or goes too far, a second setting will be necessary.

To make the second setting, observe how far the pointer stops from the second position for that station. Replace the key in the disc and tune far enough to one side of the correct position to make allowance for the difference noted in the first setting.

The electric tuning system is now correctly set for the 1st station. Follow through with this same procedure until the proper adjustments have been made for all eight of the favorite stations. When tuning the receiver by means of the push buttons, the Local-Distance switch should be turned to the "Local" position.

Tuning Motor

Should the clutch on the tuning motor fail to operate satisfactorily, either by not engaging or not releasing when it should, the two tension springs located on the back of the motor should be readjusted.

With the receiver sitting in its normal operating position, bend both tension springs until the clutch will not engage. Slowly decrease the tension on both springs until the clutch engages and releases satisfactorily. Check the operation of the motor several times to be certain that the tension is correct.

(D) SIGNAL INPUT FREQUENCIES

	Min. Cap. Signal	Shunt Align.	Series Align.
American Broadcast Band	1850 Kilocycles	1700 Kilocycles	600 Kilocycles
Police & Amateur Band	6600 Kilocycles	6000 Kilocycles	
High Frequency Band	22 Megacycles	18 Megacycles	

CHASSIS 7V2

General Description . . .

Chassis 7V2 is used in the Dual Seventy and Dual Seventy Lowboy. It is a seven tube dual range receiver covering the regular broadcast band and the next higher frequency band to 5000 Kc. The actual ranges are 535 to 1700 and 1650 to 5000. The chassis is a three gang superheterodyne employing a tuned radio frequency stage in both frequency bands. It has automatic volume control and continuous stepless tone control. The actual tone quality is greatly enhanced through the use of an 8" speaker in the table model and a 10" in the console. The intermediate frequency is 181.5 Kc.

Tubes Used and Their Function . . .

The tubes used are type 58 R.F. amplifier, type 58 oscillator modulator, type 58 I.F. amplifier, type 56 diode, type 56 A.F. amplifier, type 2A5 output and type 80 rectifier. The tube voltages are shown in the table below:

All voltages are plus or minus 10%. All D.C. voltages are measured to chassis at 117.5 line with 1000 ohms per volt, 250 volt voltmeter. Power demand is 65 watts at 110 volt, 60 cycles.

Type	Where Used	Ef	Ep	Eg	Ek	Esg	Esup
58	R.F.	2.5	260	0	0	125	0
58	Osc-Mod	2.5	260	31	34	125	0
58	I.F.	2.5	260	0	4	125	4
56	Diode	2.5	0	0	0	—	—
56	A.F.	2.5	50	0	4	—	—
2A5	Output	2.5	250	0	15	260	—
80	Rectifier	4.8	400AC	—	370	—	—

Power Supply System . . .

The power supply system consists of a power transformer, part No. 58 for 110 volt, 60 cycle, part No. 59 for 110 volt, 25 cycle, and part No. 60 for 220 volt, a rectifier tube type 80, wet electrolytic condenser, part No. 26, the speaker field as a filter choke, and dry electrolytic condenser, part No. 27.

Alignment Procedure . . .

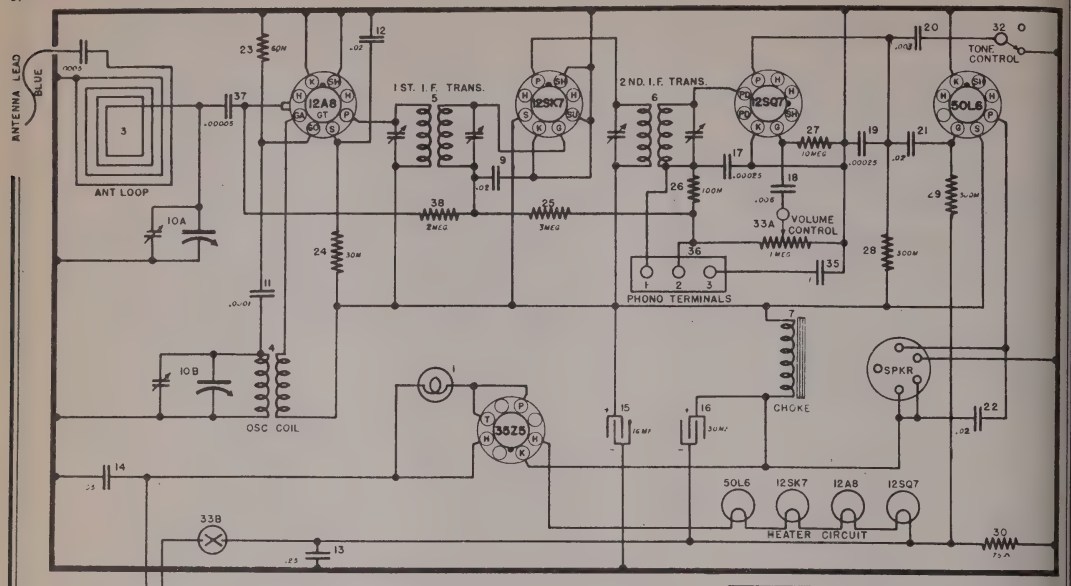
To align the I.F. amplifier, it is necessary that there be available a suitable modulated oscillator capable of adjustment to 181.5 Kc. with good accuracy. This oscillator should have an attenuator so that the strength of the oscillator output can be adjusted. Connect the high side of the output of the oscillator, which has been adjusted to 181.5 Kc., to the control grid connection on the top of the 58 oscillator modulator tube through an .02 Mfd. series condenser. The low side of the oscillator is to be connected to chassis. Set the oscillator to a convenient level and adjust the I.F. trimmers for maximum signal output. These I.F. trimmer adjustments are located on the side and top of the chassis, as indicated in the diagram. To make the I.F. adjustment, it is necessary that a standard ¼" (across flats) hexagon socket wrench be used. The wrench should be insulated. Always make these I.F. adjustments very carefully and go over the adjustments several times to be sure that the peak has been reached

To align the receiver at broadcast frequencies, it is necessary that an adjustable oscillator having frequencies of 1400 and 600 Kc., together with a suitable attenuator and dummy antenna, be available. Set the oscillator to 1400 Kc. and connect the high side of the oscillator to the receiver antenna terminal through a .0002 Mfd. (dummy antenna) condenser. Turn the tuning control of the receiver to 140 on the dial. THERE ARE TWO SERIES OF THE 7V2 CHASSIS. IN ONE SERIES THE OSCILLATOR TRIMMER IS LOCATED ON THE TOP OF THE GANG CONDENSER, WHILE IN THE OTHER SERIES A DOUBLE TRIMMER IS LOCATED UNDER THE CHASSIS ALONG WITH THE ANTENNA AND R.F. TRIMMERS. IN THE SECOND SERIES THERE ARE NO TRIMMERS AT ALL ON TOP OF THE GANG CONDENSER SO THAT IT IS VERY EASY TO DISTINGUISH WHICH TYPE OF SET IS BEING SERVICED. For the first series, align the oscillator trimmer on top of the gang for best signal. For the second series, align the oscillator trimmer under the chassis for the broadcast band for best signal In either case then go on and align the antenna and other trimmers located under the chassis for maximum signal. Always work with the weakest possible signal from the modulated oscillator for best accuracy. The performance of the receiver may now be checked at 600 Kc. by setting the modulated oscillator to 600 and the receiver dial to that point around 60 which gives best reception. Sometimes it is possible to make a slight improvement in the performance at this point by bending some of the gang condenser plates. This operation should be done very carefully so that no short circuiting of the condenser plates results.

To align a receiver in the high frequency band, it is necessary that a suitable modulated oscillator capable of covering frequencies of 1700 and 4000 Kc., together with an attenuator, be available. Set the oscillator to 4000 Kc., and for the first series of receivers adjust the dial in the region of 4000 Kc., for best signal. For the second series of receivers, set the dial to 4000 Kc, and adjust the oscillator trimmer located under the chassis for the high frequency band for maximum signal. With either series now go on and adjust the antenna and R.F. trimmers for the high frequency band located under the chassis for best signal. Set the modulated oscillator to 1700 Kc. and the receiver may then be checked at this point.

MODEL 5539
MODEL J5539

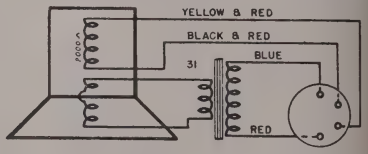
THE CROSLEY CORP.

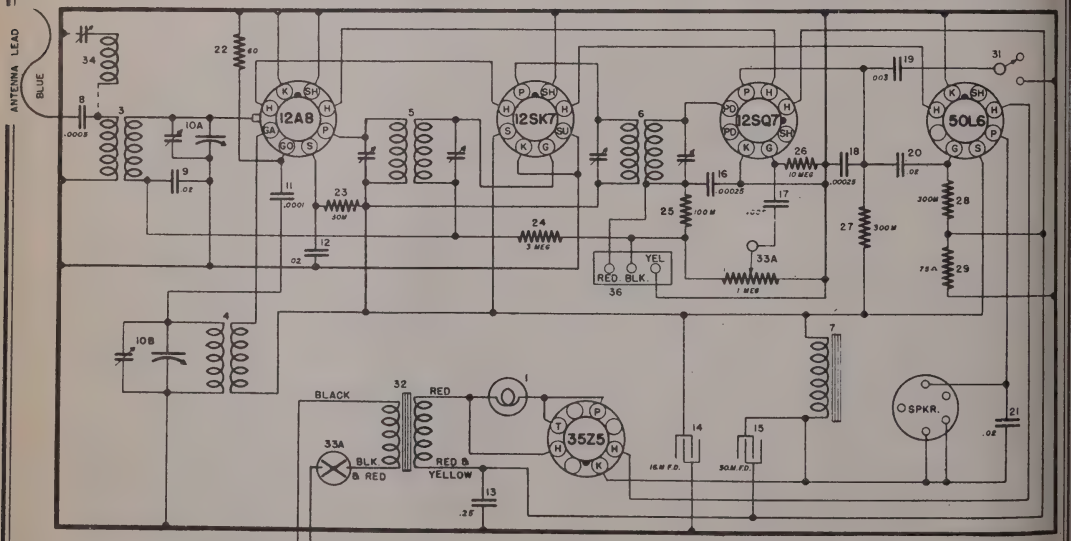


MODEL---5539

TUBES MAY BE METAL OR GT TYPES EXCEPT 12A8

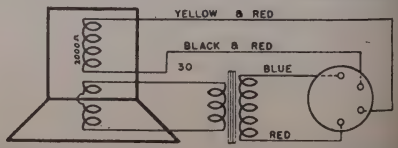
455 KC. I.F.





455 KC. I.F.

MODEL J-5539



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The filaments of the 1.4 volt tubes are connected in series and have plate current compensating resistors one, item 36, a 250 ohm resistor across the 1A7GT filament and the other, item 37, a 1,400 ohm resistor from the negative leg of the 1A5GT to chassis.

When used on 110 volt power circuits one half the 117Z6GT supplies the filament voltage and the other half the B voltage. The rectified voltage for the filament string is well filtered by the following, item 35, which is a 7½-watt 110-volt miniature lamp and does triple duty—, 1, regulates the voltage—2, acts as a filter—3, as an ON-OFF indicator; item 28 a 375 ohm resistor and item 32A, the relay coil which serves as a choke and their associated electrolytic condensers, i. e., item 15, 16 mf.—item 38, 16 mf. and item 16, 125 mf. The above mentioned miniature lamp (item 35) should always be replaced with an exact duplicate should replacement become necessary.

2,600 ohm resistor and item 11—a 16 mf. electrolytic and one section of item 15 (twin electrolytic) 16 mf. condenser.

The relay automatically disconnects the batteries from the circuit when the receiver is operated on 100-volt circuits.

TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1,000 or more ohm per volt, 50 volt voltmeter with the volume control full "ON" and no signal input. The filament voltages should be measured with an accurate high resistance, low range voltmeter. When measured on a 117.5 volt A.C. line voltage limits may vary plus or minus 10% of values given.

VOLTAGE READINGS—WITH 90 VOLTS "B" AND 6 VOLTS "A"

Tube	Tube Socket Function	PIN NUMBER No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
1A7GT	Oscillator-Modulator	0	1.5	95	54	Neg.	95	—	—
1N5GT	I-F Amplifier	0	4.5	95	95	—	—	3.0	—
1H5GT	Det, AVC, 1st Audio	0	3.0	15	15	—	—	1.5	8 J.B.
1A5GT	Output	0	6.0	92	95	—	8 J.B.	4.5	—
117 Z6GT	Rectifier	0	0	0	95	0	0	0	6.0

VOLTAGE READINGS—@ 117.5 VOLT LINE (A. C.)

Tube	Tube Socket Function	PIN NUMBER No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
1A7GT	Oscillator-Modulator	0	1.4	104	62	-3	104	—	—
1N5GT	I-F Amplifier	0	4.5	104	104	—	—	3.0	—
1H5GT	Det, AVC, 1st Audio	0	3.0	17	17	—	Diode	1.5	50 J.B.
1A5GT	Output	0	6.0	100	104	—	30	4.5	—
117 Z6GT	Rectifier	58.5 A.C.	117.5 A.C.	117.5 A.C.	135	117.5 A.C.	0	0	124

ALIGNMENT PROCEDURE

The chassis of this receiver is connected to one side of the power supply and for this reason all test equipment should be thoroughly insulated in order that the power supply will not become short circuited while aligning the receiver.

To align the receiver it will be necessary to remove the screws which fasten the Phono-board and carefully lift up front end to gain access to trimmer condensers.

CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 1A5GT output tube. Be certain that the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

Tuning the I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mf. condenser to the grid cap of the 1A7GT oscillator-modulator tube leaving the tube's grid cap in place. Do not use a ground return from the signal generator unless it is found to be absolutely necessary. If it is found to be necessary, a small condenser (approximately .001 mfd.) should be connected in series with the ground terminal of the signal generator and the receiver chassis. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust the 2nd I-F trimmer condensers for

(e) Adjust the trimmer condensers located on the 1st I-F transformer for maximum output.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

When aligning the R-F amplifier the output lead from the signal generator should be connected through a .0001 mf. condenser to RED wire connecting to the loop and the ground lead to the receiver chassis (through a condenser).

Before aligning receiver check the position of the pointer by opening gang all the way, the pointer should then split the 1600 kilocycle calibration point.

(a) Set the signal generator to 1400 kilocycles.

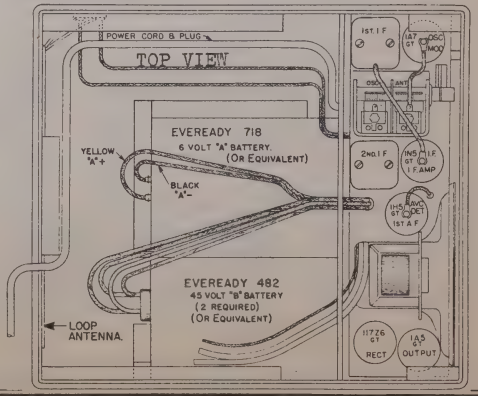
(b) Tune gang to 140 on the dial, then adjust oscillator trimmer (rear section of gang) for maximum output.

(c) Adjust antenna trimmer (front section gang) for maximum output.

RELAY

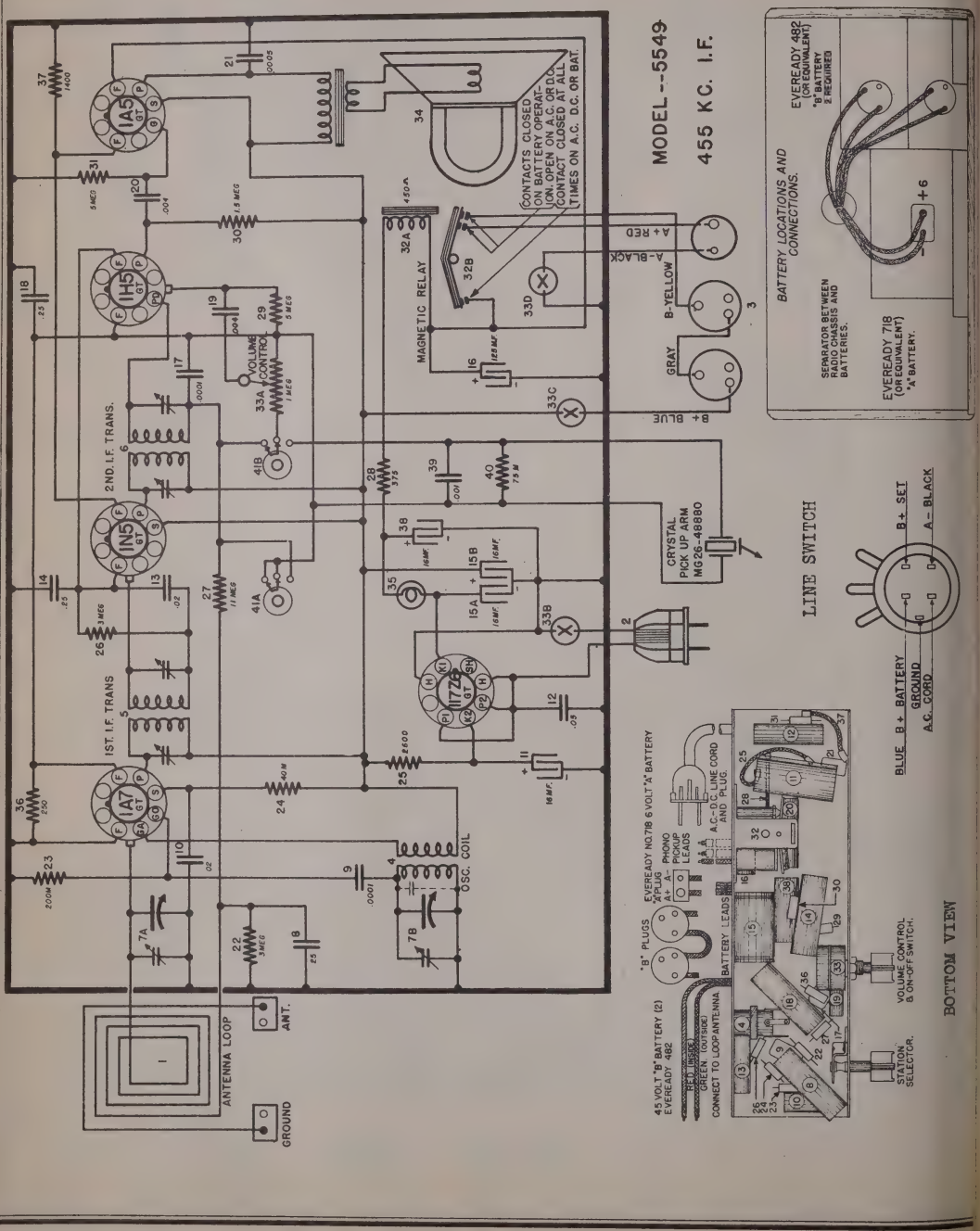
The receiver, when plugged into 110 volt circuit, will operate on the batteries until rectifier arms up and trips the relay. When relay trips there should be no decrease or dead spot in output as rectifier should be warmed up sufficiently to carry load and give a slight increase in output due to higher plate voltage available.

In earlier models the relays have three sets of contacts and the single side must make contact at all times. The double side must make contact when batteries are used and both contacts (double contact side) must break when operated on 110 volt circuits. Later models the single contact side was omitted and a flexible braid connection used instead.



MODEL 5549

THE CROSLEY CORP.



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DETROLA CORP.

MODEL 397

MODEL 397
MODEL 408
MODEL 428

DETROLA CORP.

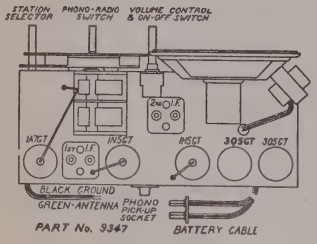
MODELS 400, 401, 402, Series

MODEL 428 ALIGNMENT PROCEDURE

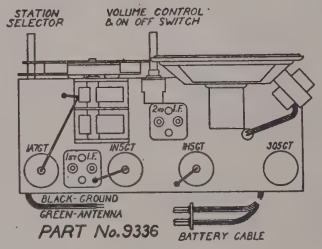
Output meter connection.....Across speaker voice coil
Phono Radio Switch.....Radio Position
Connection of generator ground lead.....To Chassis
Connection of generator output lead.....See chart below
Dummy antenna value to be used in series with generator.....See chart
Position of volume control.....Full on (Clockwise)
Position of Tone Control.....In Brilliant Position

POSITION OF TUNING DIAL	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED
High Frequency end	455 kc.	.1 mfd.	6SA7 Grid	Align IF. Four Trimmers
Low Frequency end	535 kc.	.1 mfd.	6SA7 Grid	Oscillator Trimmer Set limit of Band
1400 kc.	1400 kc.	200 mmf.	Antenna Lead—with built-in antenna connected	Antenna Trimmer Tune to max.
10 mc.	10 mc.	400 ohms	Antenna Lead—with built-in antenna connected	Short wave oscillator trimmer Set limit of band
9.6 mc.	9.6 mc.	400 ohms	Antenna Lead—with built-in antenna connected	Short wave antenna trimmer Tune to max.

FOR RECORD CHANGER SEE MODELS N-100 AND N-200
IN RIDER'S "AUTOMATIC RECORD CHANGER AND RECORDER" BOOK

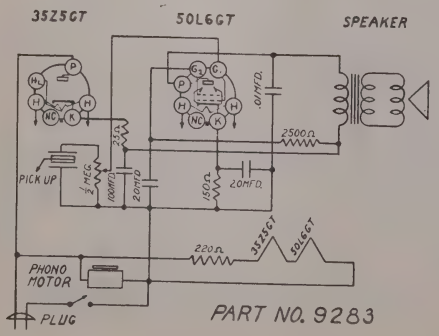


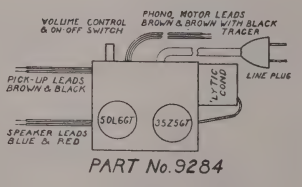
MODEL 408



MODEL 397

FOR OTHER DATA SEE INDEX





PHONO MODELS
400 SERIES
401 SERIES
402 SERIES

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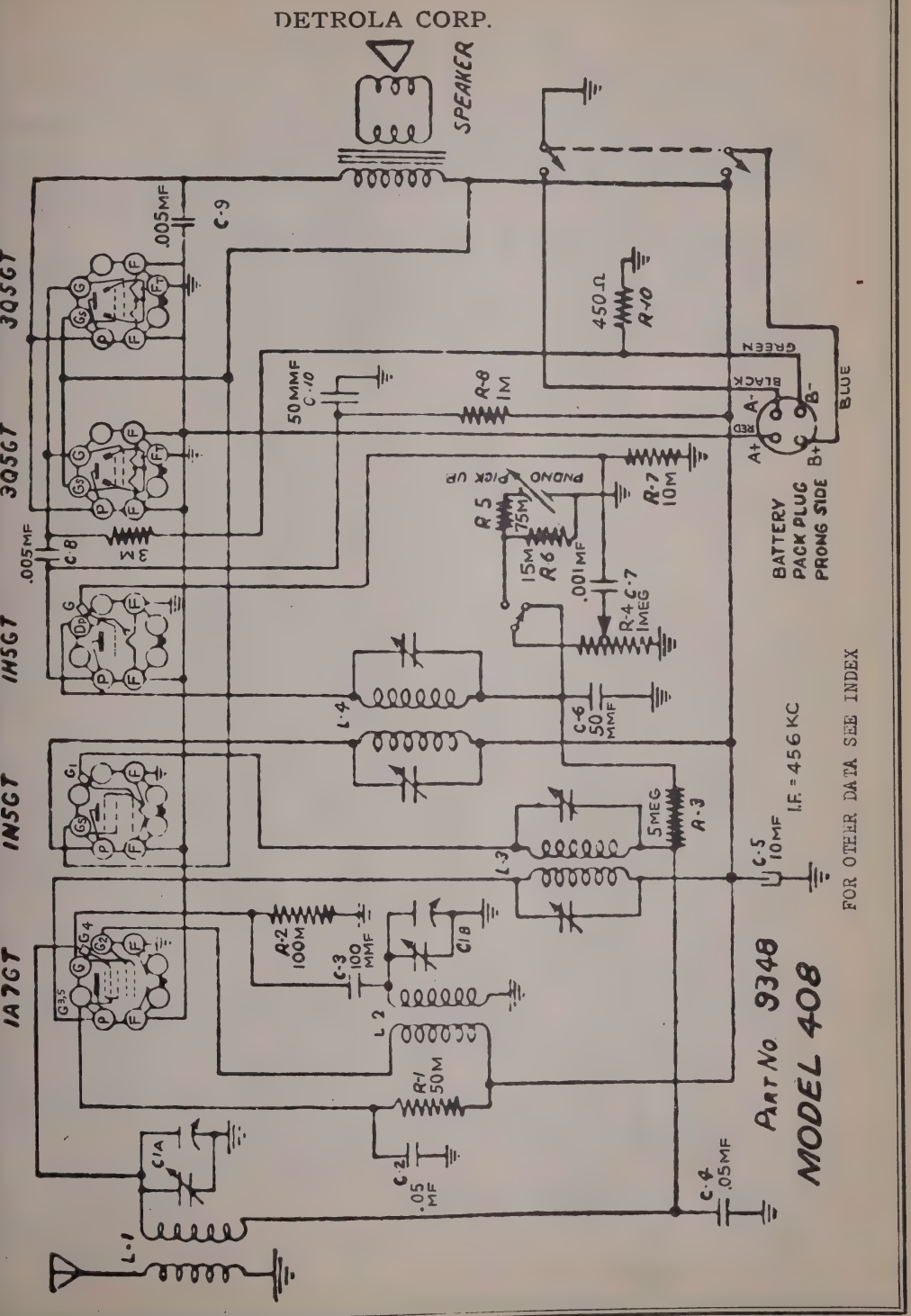
MODEL 408

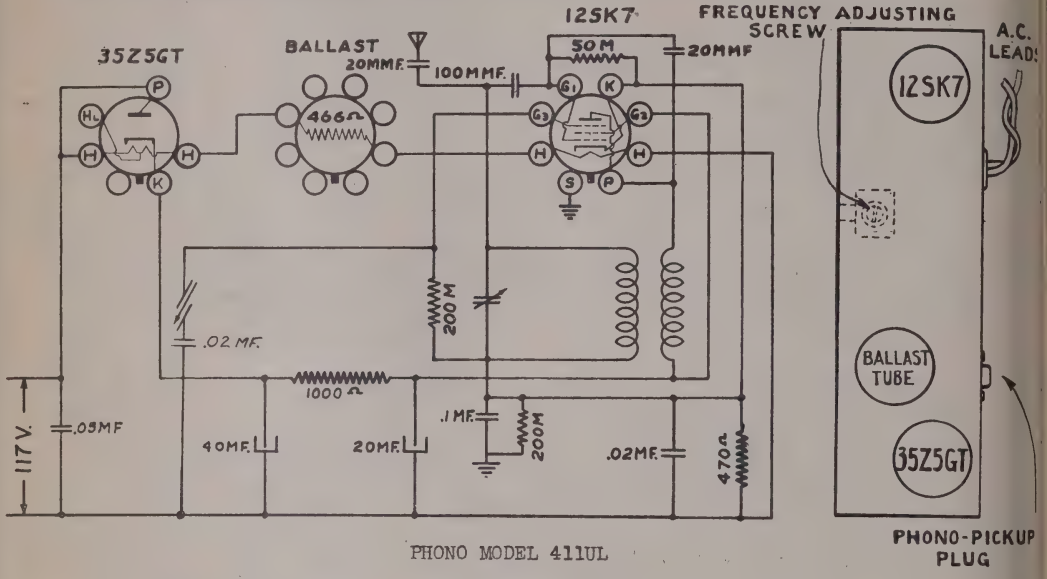

DETROLA CORP.
SPEAKER
1A7GT
1N5GT
1N5GT
3Q5GT
3Q5GT
.005MF
C-9
50MMF C-10
R-8 1M
450Ω R-10
R-7 10M
R-5 175M
15M R-6
.001MF
R-4 C-7 1MEG
PHONO PICK UP
C-6 50 MMF
L-4
L-3
5MEG R-3
C-5 10MF
I.F. = 456 KC
R-2 100M
C-3 100 MMF
C1B
L-2
R-1 50M
C1A
C-2 .05 MF
C-4 .05MF
L-1
GREEN
BLACK
RED
BLUE
A-
B-
A+
B+
BATTERY PACK PLUG PRONG SIDE
FOR OTHER DATA SEE INDEX
ART NO 9348
MODEL 408

MODEL 411-UL, MODEL 417 Series,
MODELS 419, 421 Series, 421-1 DETROLA CORP.

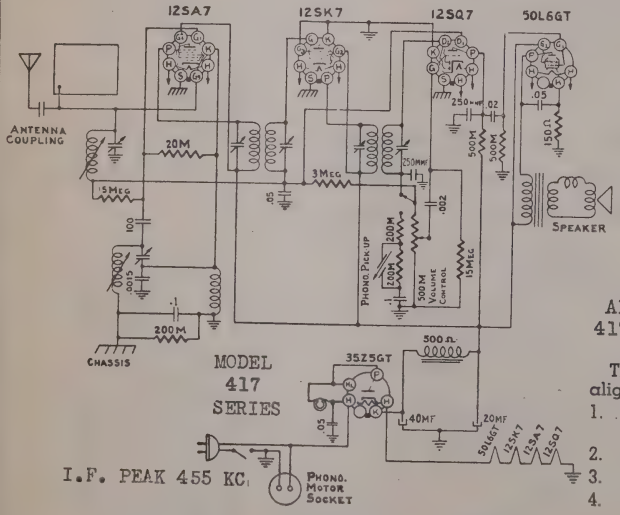
TO CHANGE THE FREQUENCY

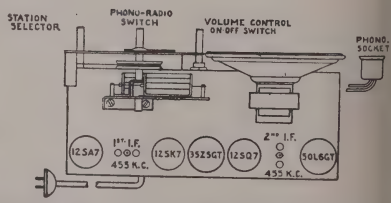
If a broadcast station is received at the same frequency as the wireless record changer, reset the frequency of the wireless record changer as follows:

1. Tune your radio to any frequency between 1250 and 1700 kilocycles that is free of interference.
2. Let the wireless record changer overhang the edge of a table for enough to reach the **frequency adjusting screw** through slot in the bottom cover.
3. While the wireless record changer is playing a record, tune the **frequency adjusting screw** until the recording is heard through your radio.



PHONO MODEL 411UL





SOCKET LAY-OUT MODEL 417 SERIES

ALIGNMENT PROCEDURE FOR MODELS 417 SERIES, 419, 421 SERIES, 421-1

The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screw driver.
4. Dummy antennae—.1 mfd., 200 mmf.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TRIMMER TO TUNE	REMARKS
I. F. 455 kc	12SA7 Grid	.1 mfd	H. F. end	I. F. Transformers	Tune to Max.
1720 kc	Ext. Ant. Wire	200 mmf	H. F. end	Oscillator Trimmer	Set Limit of band
1400 kc	Ext. Ant. Wire	200 mmf	1400	Antenna Trimmer	Tune to Max.

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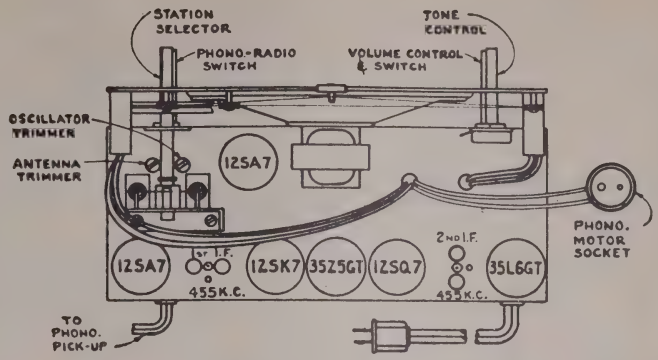
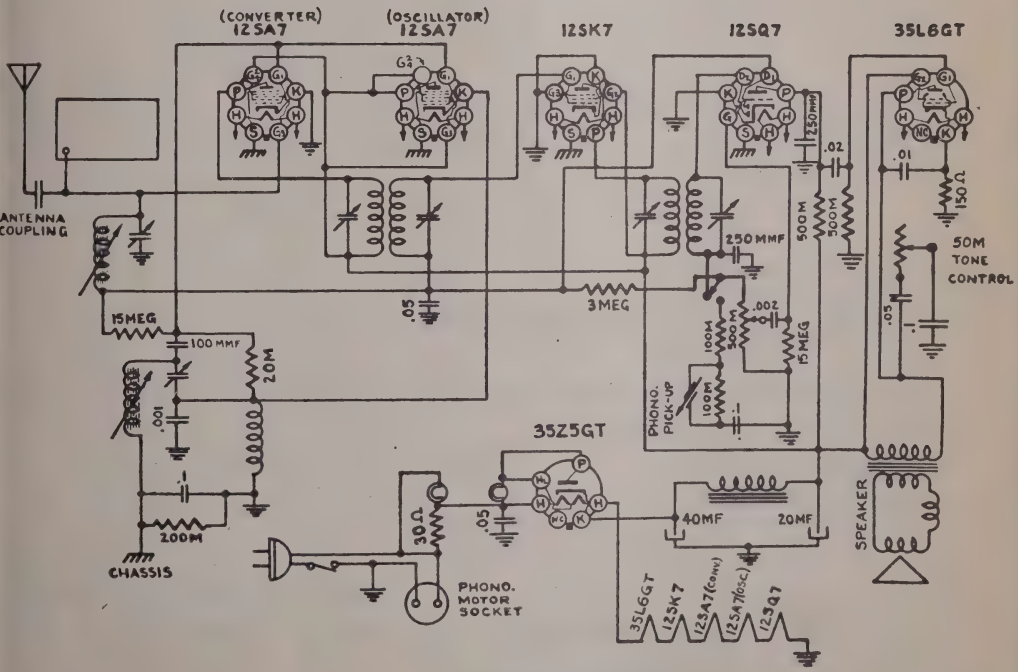
DETROLA CORP. MODEL 419

SEE INDEX FOR ALIGNMENT



SOCKET LAYOUT

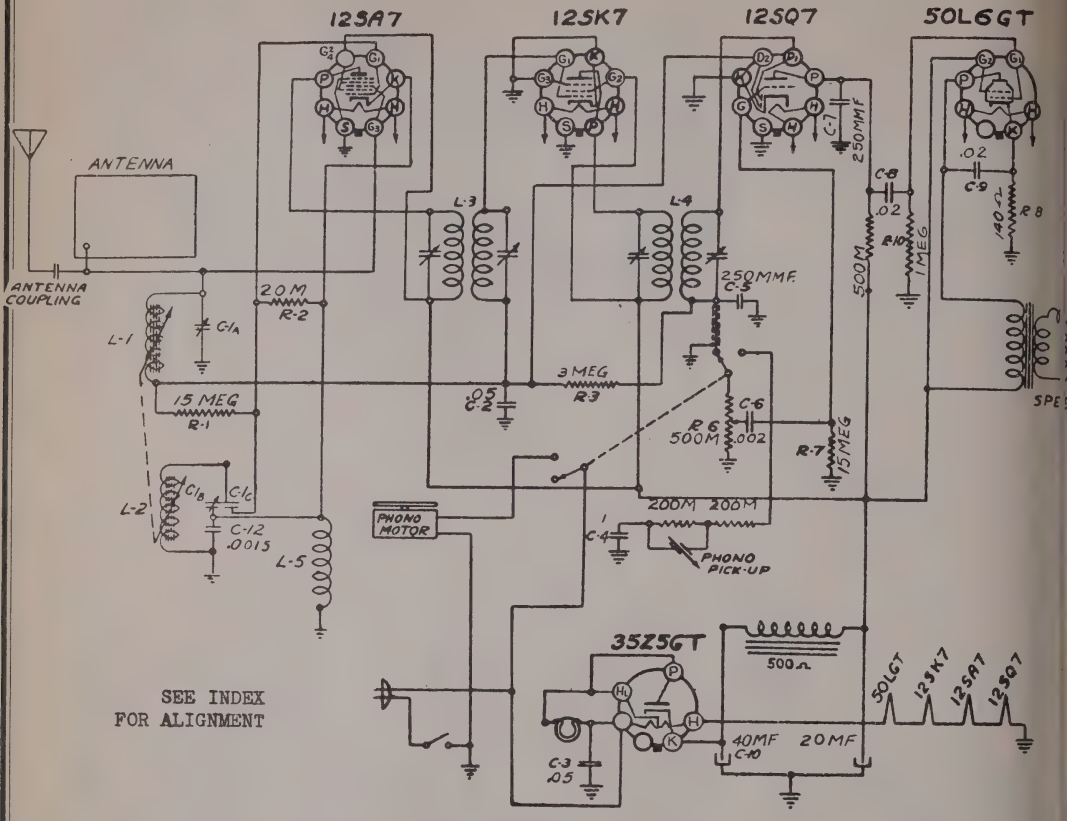
IF PEAK 455 KC

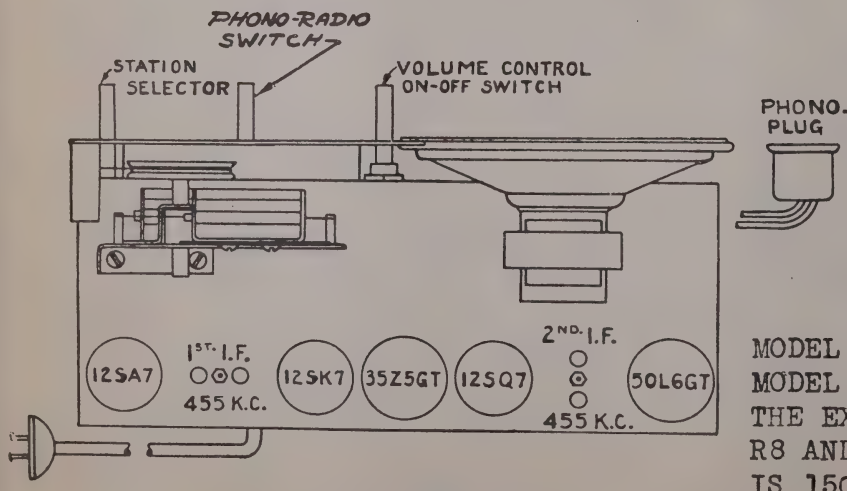


MODEL 419

MODELS 421 Series,
421-1

DETROLA CORP.





I.F. PEAK 455 KC

MODEL 421 SAME AS MODEL 421-1 WITH THE EXCEPTION OF R8 AND R10 WHICH IS 150Ω AND 500M Ω RESPECTIVELY

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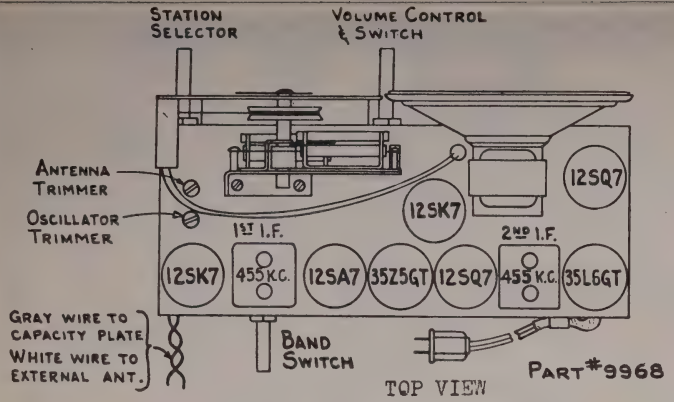
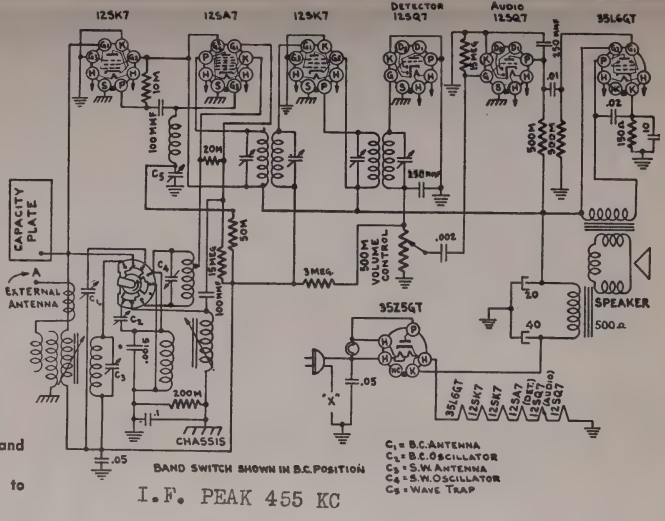


TOP VIEW



I.F. PEAK 455 KC

ALIGNMENT PROCEDURE

WARNING! This information is to be used by a COMPETENT SERVICE MAN ONLY and not by an untrained person.

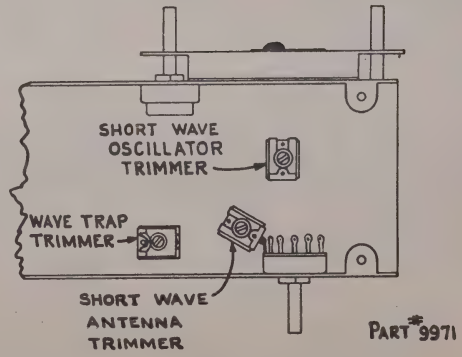
TUBES:

1—12SK7—R.F.
1—12SA7—Oscillator—Converter
1—12SK7—I.F. Amplifier
1—12SQ7—Detector A.V.C.
1—12SQ7—Audio Amplifier
1—35L6GT—Power Output
1—35Z5GT—Rectifier

The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screw driver.
4. Dummy Antennae—.1 mfd., 200 mmf, 400 ohm.

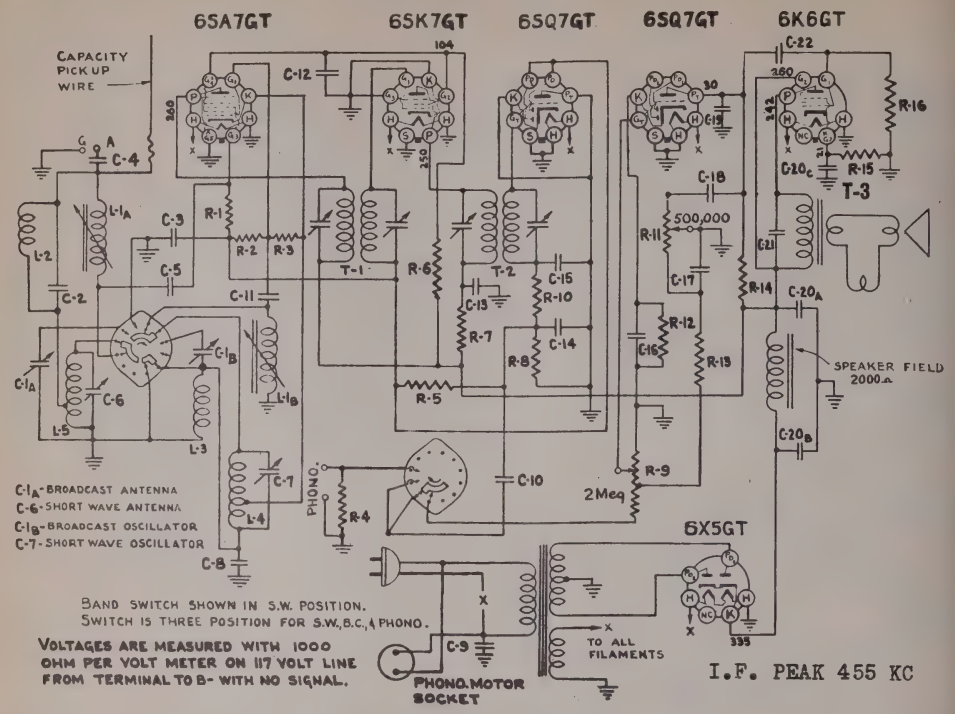
POSITION OF TUNING DIAL	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED
High Freq. End	455 K.C.	.1 mfd.	12SA7 Grid	Align I.F. 4 Trimmers
High Freq. End	455 K. C.	.1 mfd.	12SK7 RF	Wave Trap Trimmer Adjust to Min.
Low Freq. End	540 K.C.	.1 mfd.	12SK7 Grid	Oscillator Trimmer Set limit of band
1400 K.C.	1400 K.C.	200 mmf.	Antenna Lead with capacity plate in operating position.	Antenna Trimmer Tune to Max.
10 M.C.	10 M.C.	400 ohms.	Antenna Lead Capacity Plate in position.	Oscillator Trimmer Set limit of band
9.6 M.C.	9.6 M.C.	400 ohms.	Antenna Lead Capacity Plate in position.	Antenna Trimmer Tune to Max.



TRIMMER LOCATION

MODEL 428

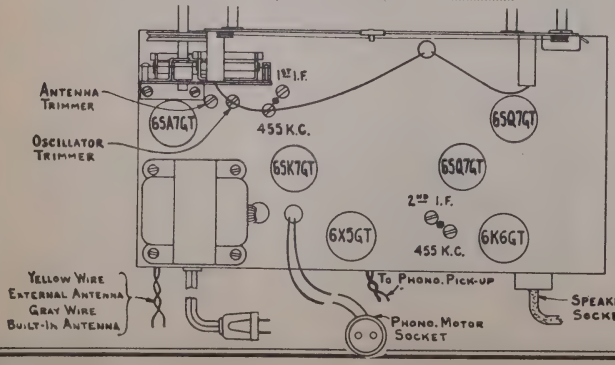
DETROLA CORP.

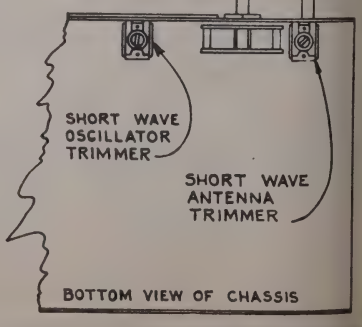


CHASSIS PARTS

Schematic Location	Part Number	Description
C-4	D5399	Condenser—Mica 20 mmf.
C-5, 11, 14, 15,	D1285	Condenser—Mica 100 mmf.
C-2	D9627	Condenser—Mica 150 mmf.
C-19	D1286	Condenser—Mica 250 mmf.
C-1a, b	D9719	Condenser—Dual Trimmer
C-6, 7	D9704	Condenser—Trimmer
C-8	D9672	Condenser—Paper .0015 mfd.—400V
C-21	D824	Condenser—Paper .002 mfd.—600V
C-10, 17, 18	D2782	Condenser—Paper .005 mfd.—600V
C-22	D568	Condenser—Paper .01 mfd.—400V
C-3	D580	Condenser—Paper .05 mfd.—200V
C-9, 13	D563	Condenser—Paper .05 mfd.—400 V.
C-12	D575	Condenser—Paper.1 mfd.—400V
C-20a,b,c	D9657	Condenser—Elect. (b15 mf.-400) (a10 mf-330) (c10mf-50)
	D3915	Cord—Line
	D6158	Lamp—Pilot—No. 47 Mazda
	D9660	Pointer
	D6244	Pulley—Wood

Schematic Location	Part Number	Description
R-15	D9661	Resistor—1W—500 ohm
R-7	D8965	Resistor—1/3W—1M
R-12	D7125	Resistor—1/3W—5M
R-6	D10056	Resistor—1/3W—12M
R-3	D7121	Resistor—1/3W—20M
R-10, 13	D8580	Resistor—1/3W—50M
R-4	D7123	Resistor—1/3W—400M
R-16, 8, 14	D6722	Resistor—1/3W—500M
R-1	D6723	Resistor—1/3W—1 meg.
R-5	D7959	Resistor—1/3W—3 meg.
R-2	D8402	Resistor—1/3W—15 meg.
	D10203	Socket—Pilot Lamp
	D6247	Studs—Pulley
	D9662	Switch—Wave Band
L-La, L-1b	D9663	Tuner—Permeability
	D9664	Transformer—Power
T-1	D9993	Transformer—1st. I. F.
T-2	D9893	Transformer—2nd I. F.
T-3	D10055-1	Output Transformer





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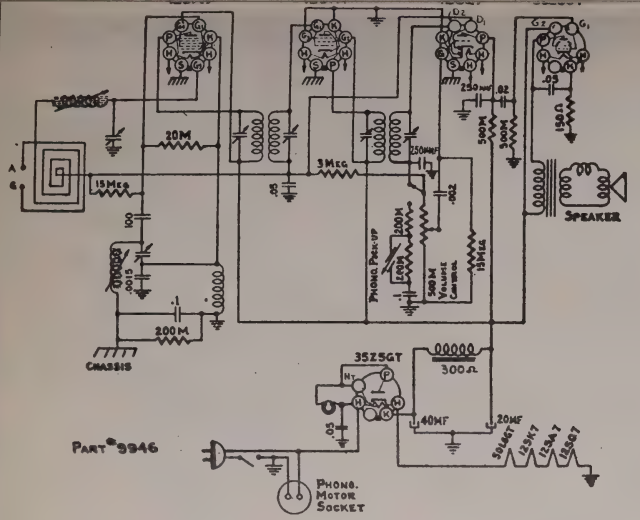
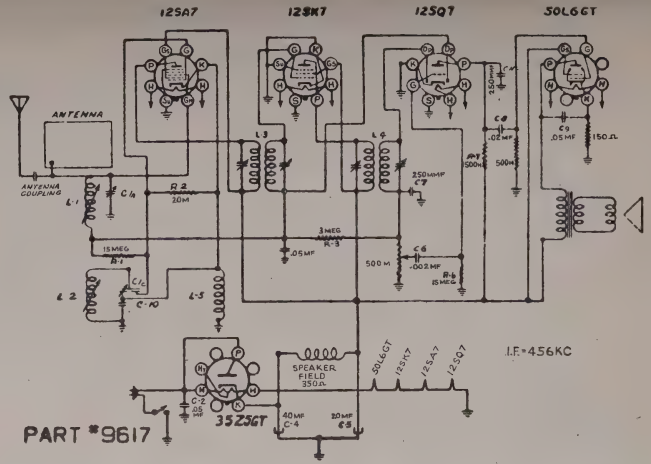


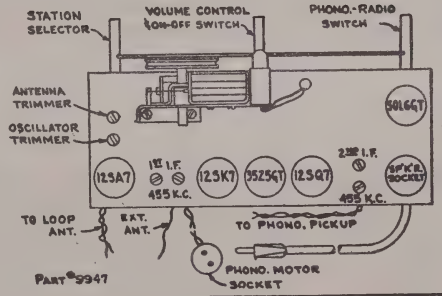


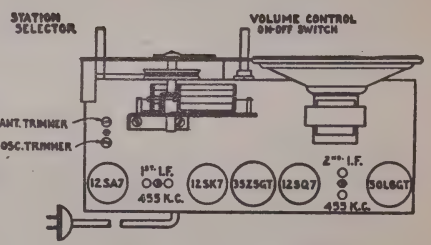
MODEL 442

Alignment Procedure

The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screw driver.
4. Dummy antennae—.1 mfd., 200 mmf.





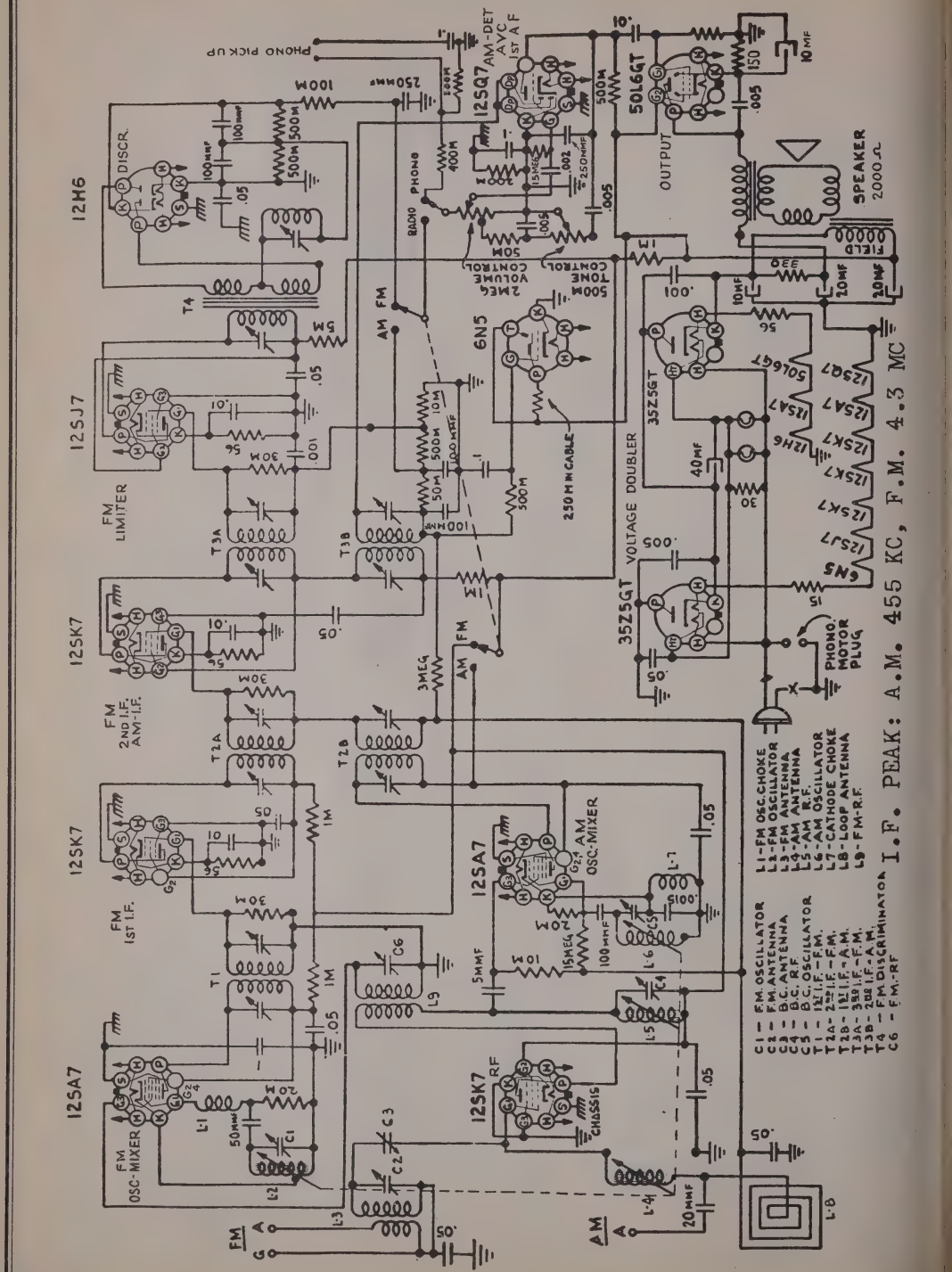
SOCKET LAY-OUT
MODEL 429 SERIES

GENERATOR	CONNECTION AT RADIO		DUMMY ANTENNA	DIAL	TRIMMER TO TUNE	REMARKS
I. F. 455kc	12SA7 Grid		.1 mfd.	H. F. End	I. F. Transformers	Tune to Max.
1620kc.	Ext. Ant. Wire	Loop Ant. Connected	200 mmf.	H. F. End	Oscillator Trimmer	Set Limit of Band
1400kc.	Ext. Ant. Wire		200 mmf.	1400	Antenna Trimmer	Tune to Max.

INTERMEDIATE FREQUENCY PEAK
455 KC

MODEL 446

DETROLA CORP.



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DETROLA CORP.

LIGNMENT PROCEDURE

The alignment of this receiver is one of the most portant operations performed by a service man. llow all instructions and read all notes.

QUIPMENT REQUIRED

Signal generator which will provide an accurately calibrated signal at the frequencies listed.

An output meter: Must be vacuum tube voltmeter or a high impedance microampere indicating device.

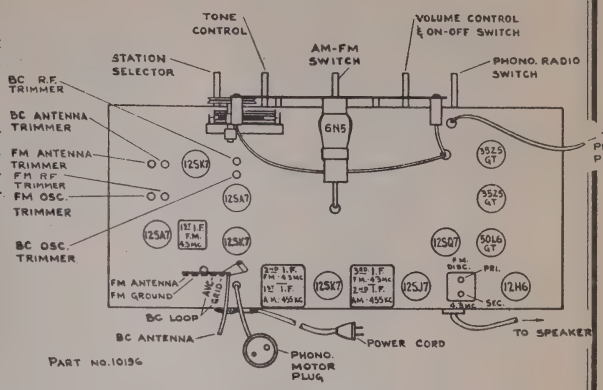
A non-metallic screw driver.

Dummy antenna as specified.

★ Connection is (B—) to No. 6 pin 12H6

• Connection is (B—) to No. 6 pin 12H6

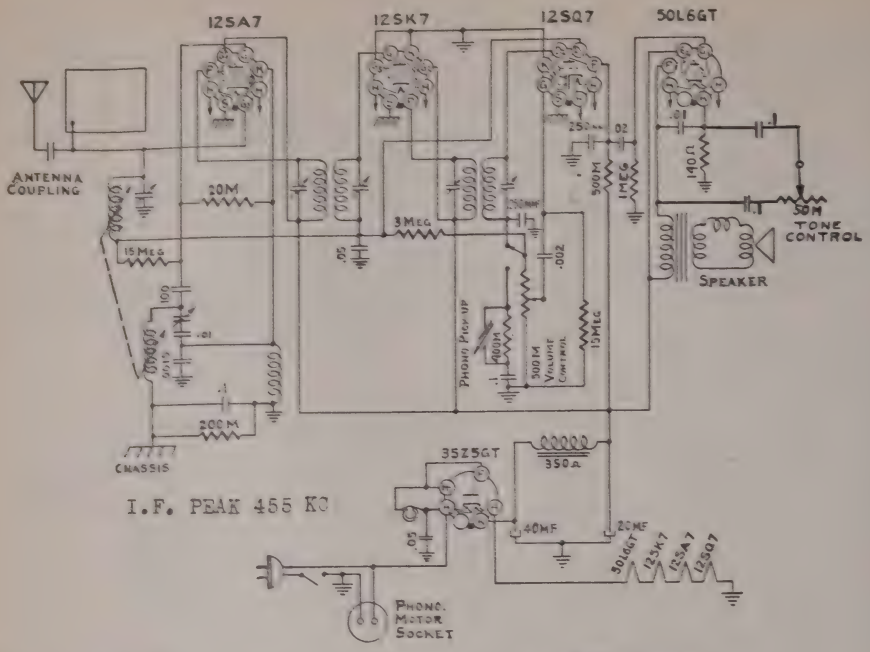
‡ Coil adjusted by loosening screws and sliding coil.



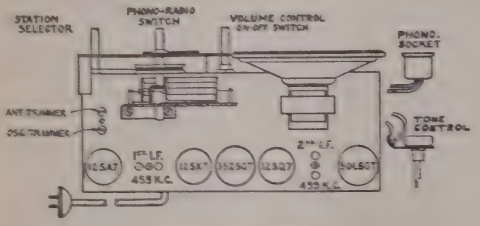
Operation Sequence	Generator Frequency	Output Meter Connection	Function	A.M. F.M. Switch	Dial Position	Dummy	Generator Connection	Trimmer
1	455 K.C.	Across Voice Coil	Tune to Maximum	A.M.	H.F. End	.1 Mfd.	A.M. 12SA7 Grid	A.M. I.F. 4 Trimmers
2	4.3 Meg.	A ★	Tune to Maximum	F.M.	H.F. End	.1 Mfd.	12SJ7 Grid	Disc Pri.
3	4.3 Meg.	B •	Tune to Minimum	F.M.	H.F. End	.1 Mfd.	12SJ7 Grid	Disc Sec.
4	Repeat Operations No. 2 and No. 3							
5	4.3 Meg.	A	Tune to Maximum	F.M.	H.F. End	.1 Mfd.	2nd I.F. 12SK7 Grid	3rd F.M. I.F. Trimmers
6	4.3 Meg.	A	Tune to Maximum	F.M.	H.F. End	.1 Mfd.	1st I.F. 12SK7 Grid	2nd F.M. I.F Trimmers
7	4.3 Meg.	A	Tune to Maximum	F.M.	H.F. End	.1 Mfd.	F.M. Conv. 12SA7 Grid	1st F.M. I.F. Trimmers
8	540 K.C.	Across Voice Coil	Set Osc. To Scale	A.M.	L.F. End	.1 Mfd.	A.M. 12SA7 Grid	A.M. Osc. Trimmer
9	1000 K.C.	Across Voice Coil	ToCalibrate Osc. Coil	A.M.	1000 K.C.	.1 Mfd.	A.M. 12SA7 Grid	Move Osc. Coil To Correct Calibration
10	Repeat Operation No. 8							
11	1400 K.C	Across Voice Coil	Tune to Maximum	A.M.	1400 K.C.	.1 Mfd.	R.F. 12SK7 Grid	A.M. R.F. Trimmer
12	600 K.C.	Across Voice Coil	Move R.F. Coil to Track	A.M.	600 K.C.	.1 Mfd.	R.F. 12SK7 Grid	Move R.F. Coil ‡
13	Repeat Operation No. 11							
14	1400 K.C.	Across Voice Coil	Trim Ant. Loop Con. in Position	A.M.	1400 K.C.	200 Mmf.	A.M. Antenna	A.M. Ant. Trimmer
15	600 K.C.	Across Voice Coil	Move Ant. Coil to Track	A.M.	600 K.C.	200 Mmf.	A.M. Antenna	Move Ant. Coil To Track
16	Repeat Operation No. 14							
17	47. Meg.	A	Set Osc. To Scale	F.M.	47. Meg.	100 Ohms	F.M. Antenna	F.M. Osc. Trimmer
18	47. Meg.	A	Tune to Maximum	F.M.	47. Meg.	100 Ohms	F.M. Antenna	F.M. R.F. Trimmer
19	45 M.C.	A	Tune to Maximum	F.M.	45 M.C.	100 Ohms	F.M. Antenna	F.M. Ant. Trimmer

MODEL 448

DETROLA CORP.



I.F. PEAK 455 KC



SOCKET LAY-OUT

MAIN PARTS

#	DESCRIPTION
559	Reel—Antenna
1207	Retainer—Shaft
9546	Shaft—Drive
9073	Switch—Phono-radio
9473	Transformer 2nd I.F.
9472	Transformer 1st I.F.
9581	Tuner—Permeability
9733	Speaker—5" Dynamic
10179	Book—Instruction
9823	Book—Changer Instruction
7084	Crystal—Dial

ALIGNMENT PROCEDURE

Output meter connection.....Across speaker voice coil

Connection of generator ground lead.....To Chassis

Connection of generator out put lead.....See chart below

Dummy antenna value to be used in series with generator.....See chart

Position of volume control.....Full on (Clockwise)

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TRIMMERS TO TUNE	REMARKS
IF 455 KC	12SA7 GRID	.1 mfd.	H. F. End	IF Transformers 4 Trimmers	Tune to Max.
1720 KC	Antenna	200 mmf.	H. F. End (1720)	Oscillator Trimmer	Set Limit of Band
1400 KC	"	"	1400	Antenna Trimmer	Tune to Max.

Repeat above Alignment Procedure at least once.

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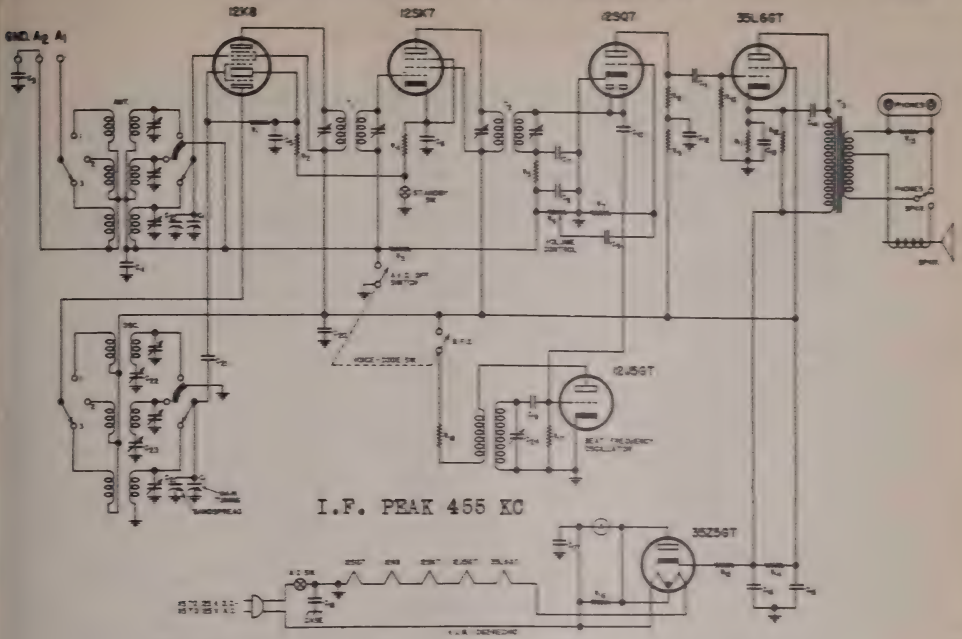
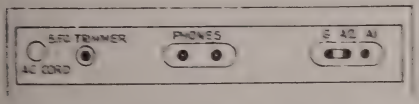
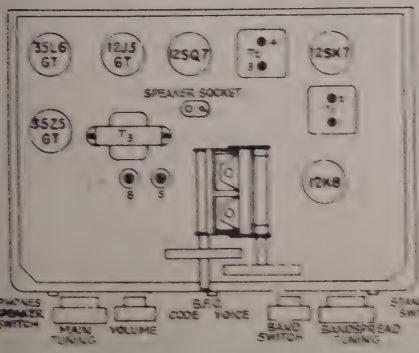
MODEL EC-1

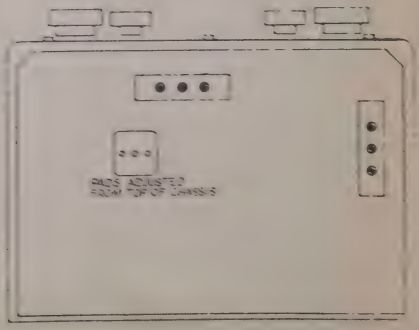


	530 mmf	Main tuning	16	40.	mfd	150	4	400
		Band Spread	17	.02	mfd	400	5	50,000
	.01 mfd	400	18	.25	mfd	200	6	500,000
	.05 mfd	200	19	150	mmf	Section of C24	7	10,000,000
	.02 mfd	400	20	.05	mfd	200	8	250,000
	.05 mfd	200	21	50	mmf		9	100,000
	100 mmf		22	600	mmf	Pad	10	500,000
	100 mmf		23	1,900	mmf	Pad	11	150
	.005 mfd	200	24	450	mmf	BFO Trimer	12	7,500
	10 mmf						13	15
	.01 mfd	400					14	750
	.05 mfd	200	R1			50,000	15	25
	20. mfd	25	2			300	16	300
	.01 mfd	400	3			2,000,000	17	50,000
	30. mfd	150					18	500



TRIMMER LOCATION

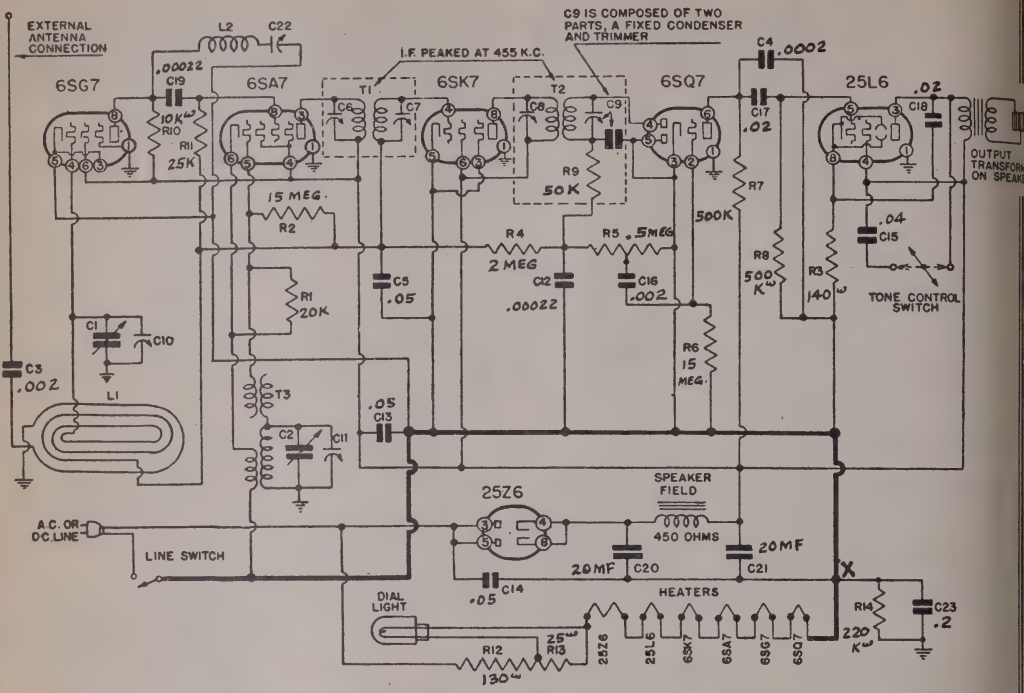




MODELS GA-439, GA-441
Chassis GA

EMERSON RADIO & PHONOGRAPH CORP.

MODELS GA1-439, GA1-441
Chassis GA1



SCHEMATIC DIAGRAM FOR MODELS GA AND GA1

Note: 1—On Model GA R14 and C23 are omitted and point "X" as indicated in schematic is connected to chassis.

SEE NOTES ON ALTERNATE TUBES USED.
FOR OTHER DATA SEE INDEX

REPLACEMENT PARTS LIST

*Item	Part No.	DESCRIPTION
L1	7BW-179	Loop assembly
L2	9LT-619A	455 k.c. wave-trap (GA)
L2	9LT-619B	455 k.c. wave-trap (GA1)
T1	8CT-566E	Double-tuned 455 k.c. first i-f transformer (GA1).
T1	8CT-566D	Double-tuned 455 k.c. first i-f transformer (GA)
T2	9HT-638B	Double-tuned 455 k.c. second i-f transformer
T3	10BT-666A	Oscillator coil (GA1)
T3	10BT-666	Oscillator coil (GA)
R1	LR-60	20,000 ohm ½ watt carbon resistor
R2, R6	4XR-327	15 megohm ½ watt carbon resistor
R3	3FR-293	140 ohm ½ watt wire-wound resistor
R4	HR-42	2 megohm ¼ watt carbon resistor
R5	9PR-447	Volume control .5 meg. (Model 431)
R5	9PR-447A	Volume control .5 meg. (Model 439)
R7, R8	KR-56	500,000 ohm ½ watt carbon resistor
R9		50,000 ohm ½ watt carbon resistor, part of T2.
R10	LR-65	10,000 ohm ½ watt carbon resistor
R11	OR-73	25,000 ohm ½ watt carbon resistor
R12, R13	9HR-489	Ballast resistor: R12—130 ohm, 12.5 watt; R13—25 ohm, 2.5 watt
R14	10TR-485	220,000 ohm ½ watt carbon resistor
C1, C2	9PC-533	Two-gang variable condenser
C3, C16	3HC-274	0.002 mf, 600 volt tubular condenser
C4	5AC-384	0.0002 mf, 600 volt tubular condenser
C5	BC-12	0.05 mf, 200 volt tubular condenser
†C6, C7, C8, C9		Trimmers, part of i-f transformers.
†C10, C11		Trimmers, part of variable condenser.
†C12, C19	4XC-394A	0.00022 mica condenser
C13	BC-12	0.05 mf, 200 volt tubular condenser
C14	LC-64	0.05 mf, 400 volt tubular condenser
C15	9PC-554	0.04 mf, 200 volt tubular condenser
C17, C18	LC-65	0.02 mf, 400 volt tubular condenser
C19	4XC-394A	0.00022 mica condenser
C20, C21	6JC-426Q	Dual 20 mf, 150 volt, dry electrolytic condenser
†C22		Trimmer, part of L2.
C23	2CC-208	0.2 mf, 200 volt tubular condenser
	9HS-541	5" dynamic speaker (GA-439)
	9HS-549A	4"x6" oval dynamic speaker (GA-441)
	9PS-602	5" dynamic speaker (GA1-439)
	9PS-601	4"x6" oval dynamic speaker (GA1-441)
	9PS-551A	Tone control switch (GA-439, GA1-439)
	9PS-551	Tone control switch (GA-441, GA1-441)
	9PS-550B	Line switch (GA-439, GA1-439)
	9PS-550	Line switch (GA-441, GA1-441)
		DIAL PARTS
	9PB-80B	Pilot light socket
	6JL-104	Pilot light, 6.3 volt, .15 amp., Mazda No. 47
	9HH-83A	Drive shaft (GA-439, GA1-439)
	9HH-83	Drive shaft (GA-441, GA1-441)
	6QZ-863	Drive cord
	6QW-169	Drive cord spring
	9PD-145B	Glass dial (GA-439, GA1-439)
	9PD-145A	Glass dial (GA-441, GA1-441)

*Item number locates the article on the schematic diagram.
†Not supplied separately.

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MODELS GA-439, GA-441
Chassis GA
MODELS GA1-439, GA1-441
Chassis GA1

ADJUSTMENTS

An oscillator with frequencies of 455, 600 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck next to the loop antenna. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis next to the 25L6 tube. The trimmers are accessible through holes in the top of the can.

The trimmers for the antenna loop and the oscillator coil are located on the variable condenser. The front section is for the oscillator. The rear section is for the antenna loop. The oscillator coil is located beneath the chassis deck.

The 455 kc wave-trap is located below the chassis deck.

I-f and Wave-trap Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid of the 12SA7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

Feed 455 kc to the external antenna lead and adjust the wave-trap for minimum response.

R-f Alignment

Set the dial pointer at 140. Feed 1400 kc from the signal generator into a loop of wire about one foot in diameter. Hold this radiating loop about 12 inches away from and parallel to the receiver loop antenna. Advance the input to the loop until a satisfactory deflection is obtained on the output meter. Adjust first the oscillator trimmer then the antenna trimmer for maximum response. If the loop antenna has been replaced it may be necessary to retrack the loop inductance. With the dial set at 60 feed 600 kc to the antenna lead. A portion of the outside may be swung to either side of the center to give maximum response. Repeat the trimmer alignment at 140.

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (line witch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All eadings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than hose given below.

Tube	Plate	Screen	Cathode	Fil.
SG7 or 7H7	87	39	0	6.3
6SA7	87	87	0	6.3
SK7 or 7A7	87	87	0	6.3
6SQ7 or 7B6	32	—	0	6.3
25L6	79	87	6.0	25

Voltage at 25Z6 cathode—120 volts.
Voltage across speaker field—32 volts.
Voltage across pilot light—4.5 volts.

DESCRIPTION

PE: Single-band superheterodyne.

EQUENCY RANGE: 540-1630 kc.

MBER OF TUBES: Six.

PE OF TUBES:

1—6SG7 or *7H7, r-f amplifier
1—6SA7, pentagrid oscillator-modulator
1—6SK7 or *7A7, i-f amplifier
1—6SQ7 or *7B6, diode detector, a-f amplifier, a.v.c.
1—25L6, beam power output
1—25Z6, half-wave rectifier.

WER SUPPLY: A.C. or D.C.

LTAGE RATING: 105-125 volts.

WER CONSUMPTION: 30 watts.

me receivers use lock-in tubes instead of equivalent octal s. Due to different socket requirements these tubes are not tly interchangeable.

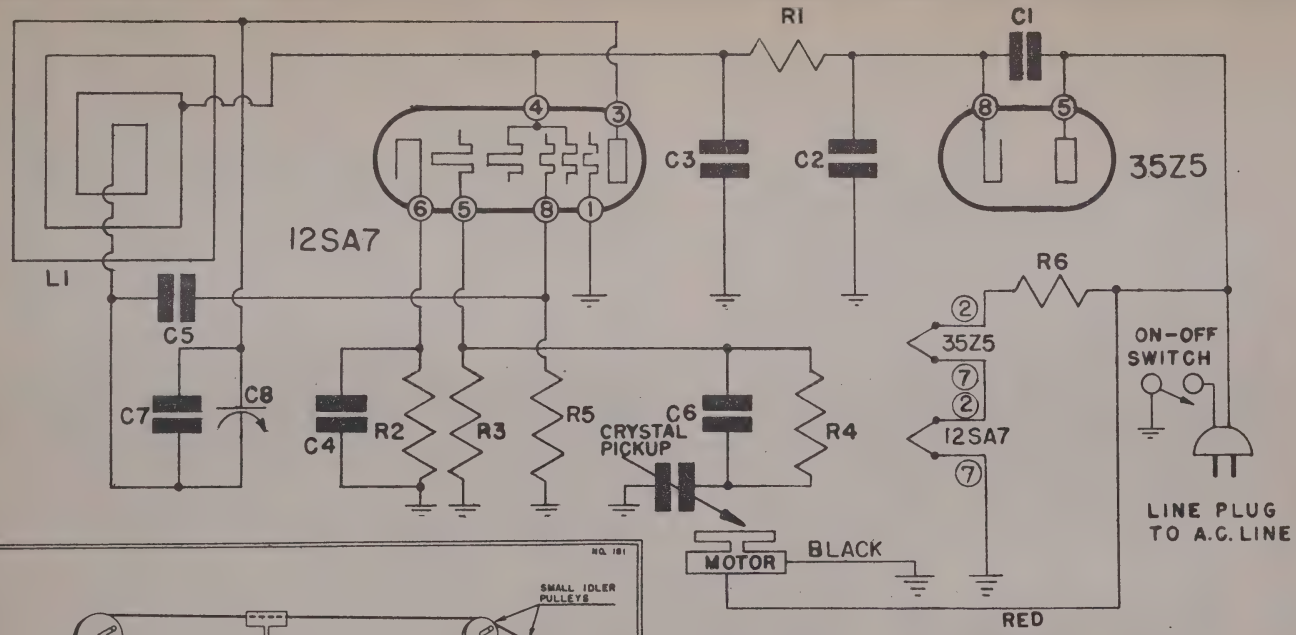
GENERAL NOTES

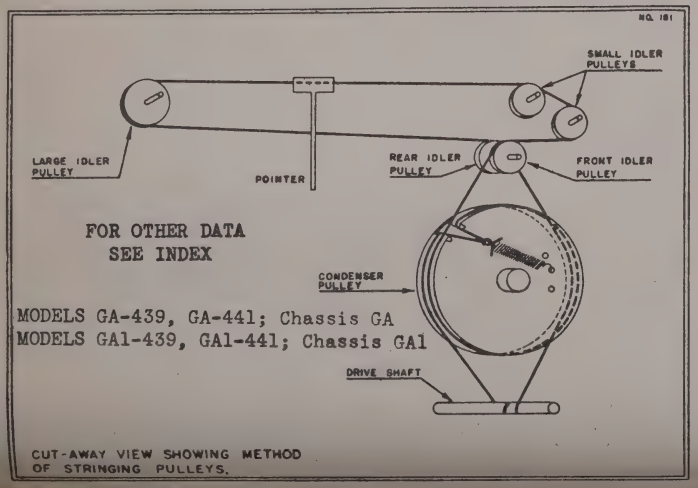
1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.

2. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.

3. The receiver has a self-contained antenna and does not require additional antenna connections. For permanent home installations, however, if it is desired to improve reception of weak stations, an additional outdoor antenna should be used. For this purpose a lead has been brought out of the rear near the line cord.

4. The self-contained loop antenna has directional properties. It is important, therefore, once the station is tuned in, that the cabinet be rotated on its base back and forth through a quarter of a circle (90 degrees), and left at the position where the station is received with maximum volume.





ITEM	PART NO.	DESCRIPTION
C1	EEC-132	.1 MF. 400 VOLT TUBULAR CONDENSER
C2	2CC-208	.2 MF. 200 VOLT " "
C3	6YC-450	40 MF. 135 VOLT ELECTROLYTIC COND.
C4	1C-43A	5 MF. 25 VOLT " "
C5	GRC-441	.00045 MICA CONDENSER TYPE "W"
C6	75C-500	.000 025 MF. MICA CONDENSER TYPE "O"
C7	5LC-410A	.000 11 MF. " " " "
C8	10JC-567	TRIMMER CONDENSER
R1	LR-64	5000 OHM 1/4 WATT
R2	KR-50	500 OHM 1/4 WATT
R3	KR-56	500,000 OHM 1/4 WATT
R4	3RR-274	5 MEGOHM 1/4 WATT
R5	LR-60	20,000 OHM 1/4 WATT
R6	10JR-467	METAL CLAD BALLAST RESISTOR

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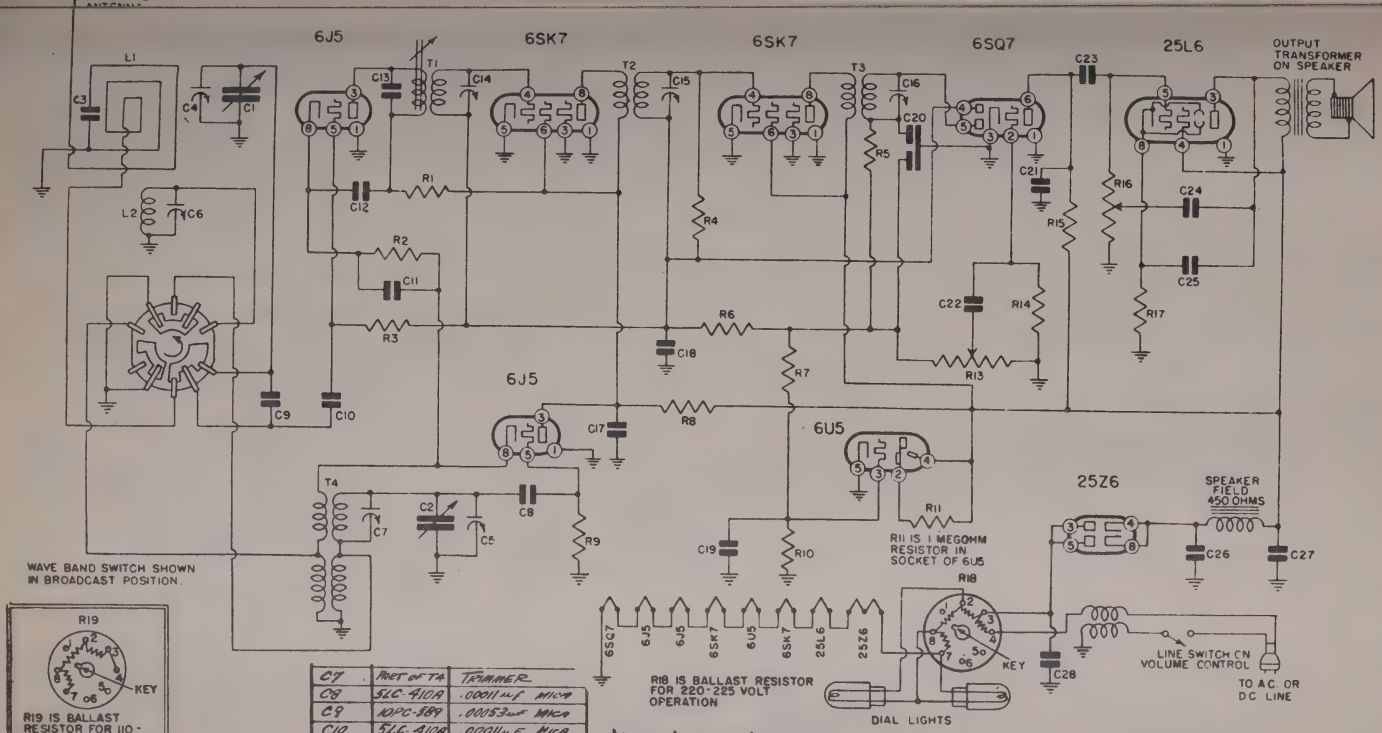

ITEM	PART NO.	DESCRIPTION
L1	10PW-390	Loop Antenna
L2	10PT-649	S.W. Antenna Coil
T1	10PT-651	1st I.F. Trans.
T2	10PT-652	2nd I.F. Trans.
T3	10PT-653	3rd I.F. Trans.
T4	10PT-650	Osc. Coil
C1, C2	10PC-578	Variable
C3	3HC-274	.002 mf 600V.
C4	Part of C12	Trimmer
C5	Part of C12	Trimmer
C6	Part of L2	Trimmer

C7	Part of T4	Trimmer
C8	5LC-410A	.00011 mf Mica
C9	10PC-589	.00053 mf Mica
C10	5LC-410A	.00011 mf Mica
C11	BC-12	.05 mf 200V.
C12	KC-58	.01 mf 400V.
C13	Part of T1	
C14	Part of T1	Trimmer
C15	Part of T2	Trimmer
C16	Part of T3	Trimmer
C17	BC-12	.05 mf 200V.
C18	BC-12	.05 mf 200V.
C19	BC-12	.05 mf 200V.
C20	Part of C6	
C21	5AC-384	.0002 mf 600V.
C22	3HC-274	.002 mf 600V.
C23	LC-65	.02 mf 400V.
C24	5AC-384	.0002 mf 600V.
C25	KC-58	.01 mf 400V.

C26	69C-437E	20 mf 150V. Dual
C27		40 mf 150V.
C28	LC-64	.05 mf 400V.
R1	LR-65	10,000 1/4 w.
R2	7UR-399	2200 1/4 w.
R3	9ZR-480	3.3 meg 1/4 w.
R4	10TR-485	220,000 1/4 w.
R5	Part of T3	47,000
R6	9ZR-480	3.3 meg 1/4 w.
R7	9ZR-480	3.3 meg 1/4 w.
R8	PR-79	1,000 1/4 w.
R9	10TR-486	47,000 1/4 w.
R10	3ER-275	10 meg 1/4 w.
R11	Part of 6U5 socket	1 meg

R12		
R13	10NP-471	Volume Control
R14	4XR-327	15 meg 1/4 w.
R16	9ZR-478	470,000 1/4 w.
R16	10NP-472	Tone Control
R17	3FP-293	140 1/2 w.
R18	10UR-511	Ballast Res. 220-225
R19	10UR-510	Ballast Res. 110-125

I.F. PEAK 455 KC

EMERSON PAGE 14-5

MODEL GU-446
Chassis GU

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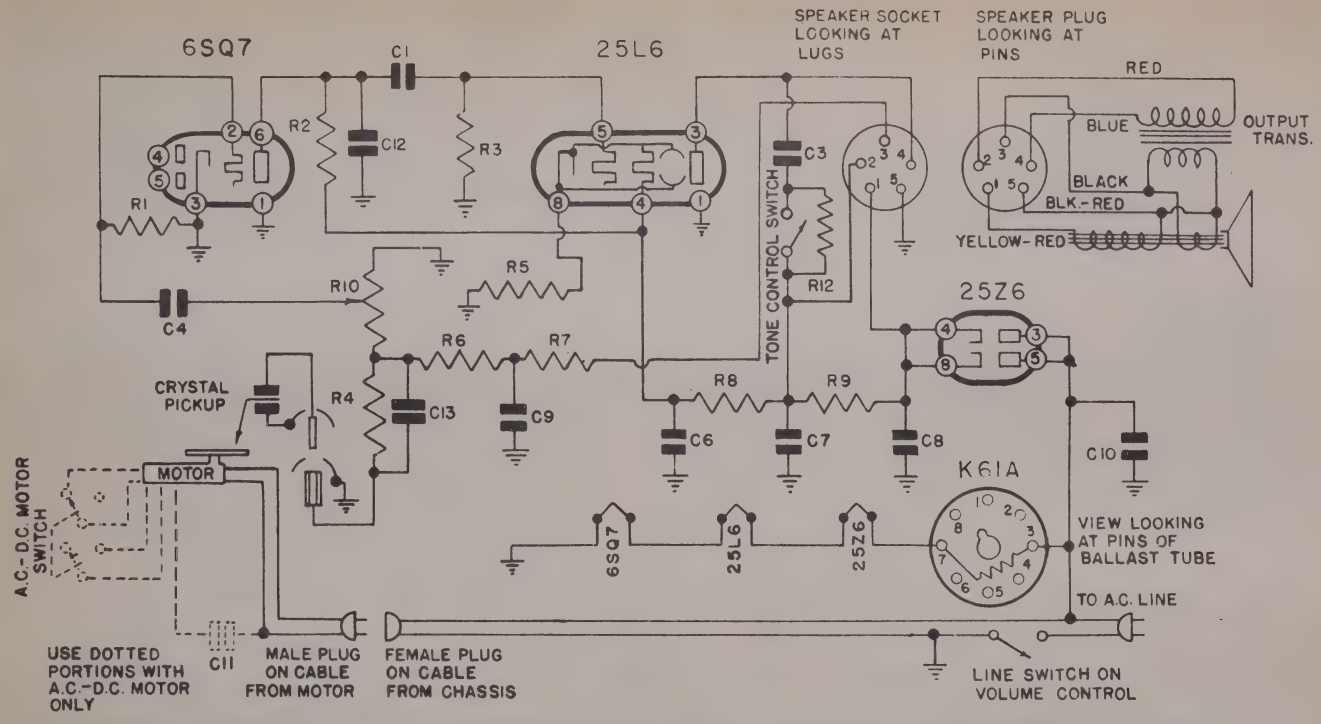


ITEM	PART NO.	DESCRIPTION
R1	4XR-327	15 MEG. 1/4W
R2	9ZR-478	470,000 1/4 W
R3	9ZR-478	470,000 1/4 W
R4	9ZR-479	2.2 MEG 1/4 W
R5	9ZR-481	150Ω 1/2W W.W.
R6	KR-57	1 MEG. 1/4W
R7		47,000 1/4W

R8	7UR-394	2,200	1/4 W
R9	9YR-495	180	1 W
R10	9YR-459	VOLUME CONTROL	
R11	K-61-A	BALLAST TUBE	
R12	7UR-394	2,200	1/4W
C1	LC-65	.02 MFD. 400V.	
C3	BC-12	.05 MFD. 200V.	
C4	3HC-27A	.002 MFD. 600V	

C6	BJC-513D	20 MFD. 150V.
C7	"	40 MFD. 150V.
C8	"	20 MFD. 150V.
C9	FC-29	.02 MFD. 200V.
C10	LC-64	.05 MFD. 400V
C11	BC-12	.05 MFD. 200V.
C12	IC-47	.0005 MFD MICA
C13	4XC-394A	.00022 MFD MICA
SW1	9YS-569B	TONE CONTROL SWITCH

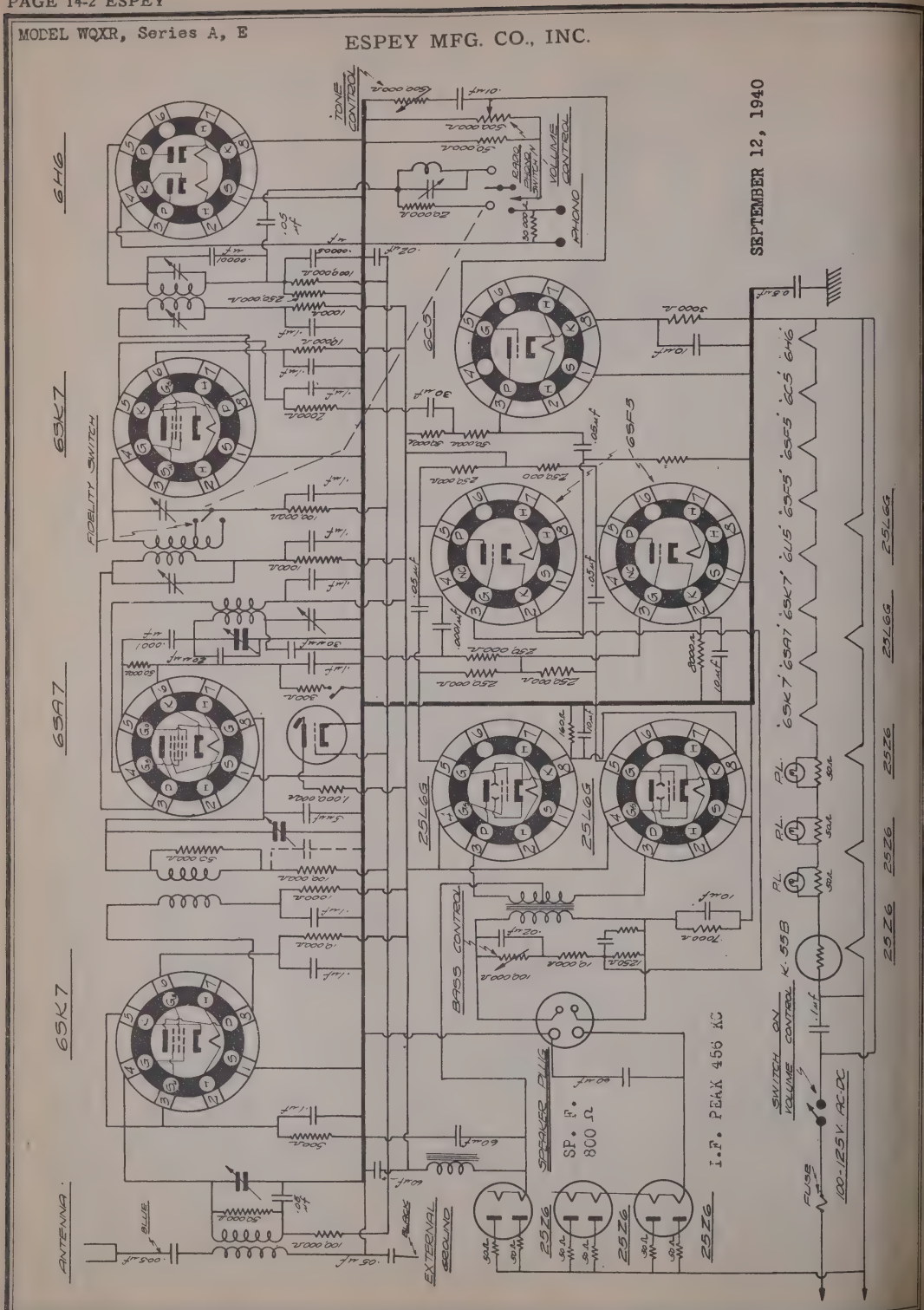
ESPEY MFG. CO., INC.

MODEL WQXR

MODEL WQXR, Series A, E

ESPEY MFG. CO., INC.

SEPTEMBER 12, 1940



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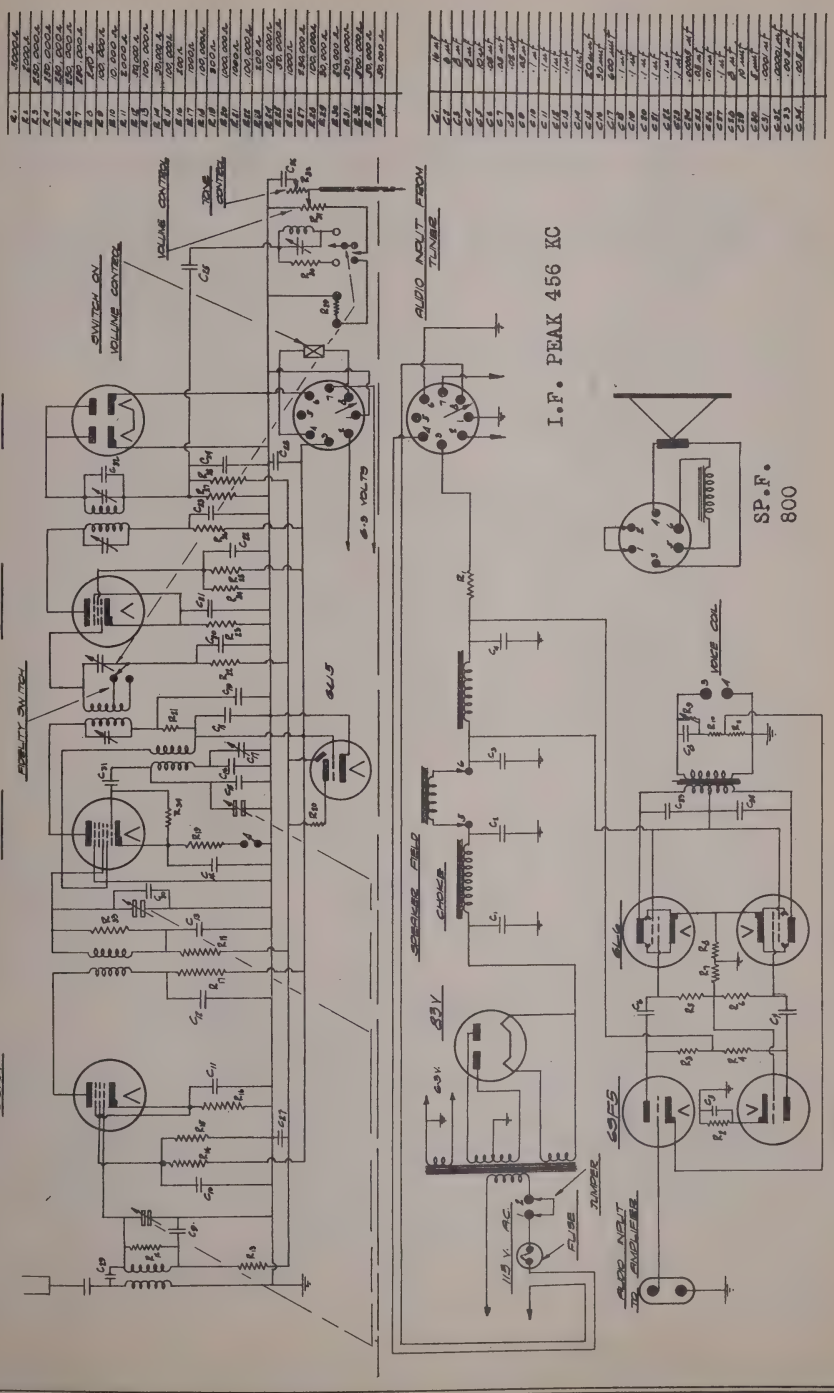

MODEL 851

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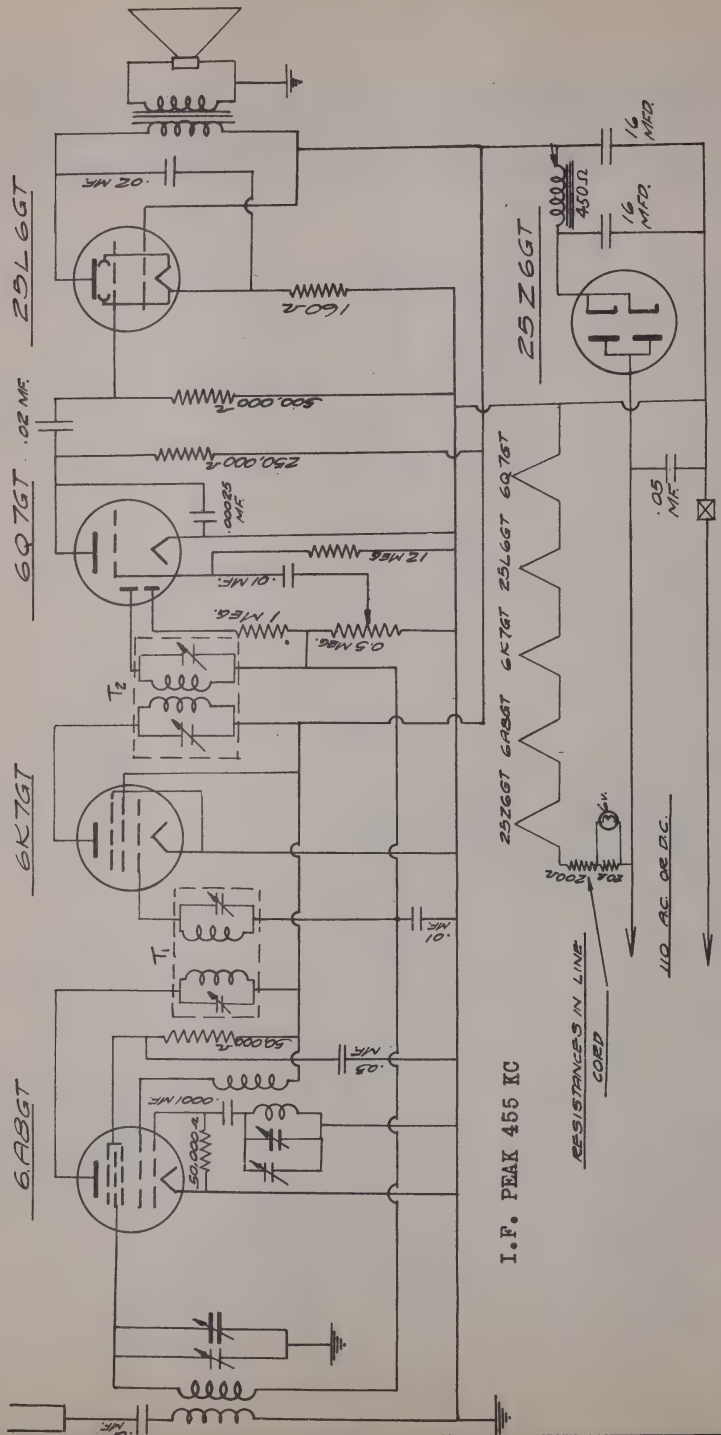

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MODEL 958

MODEL 964

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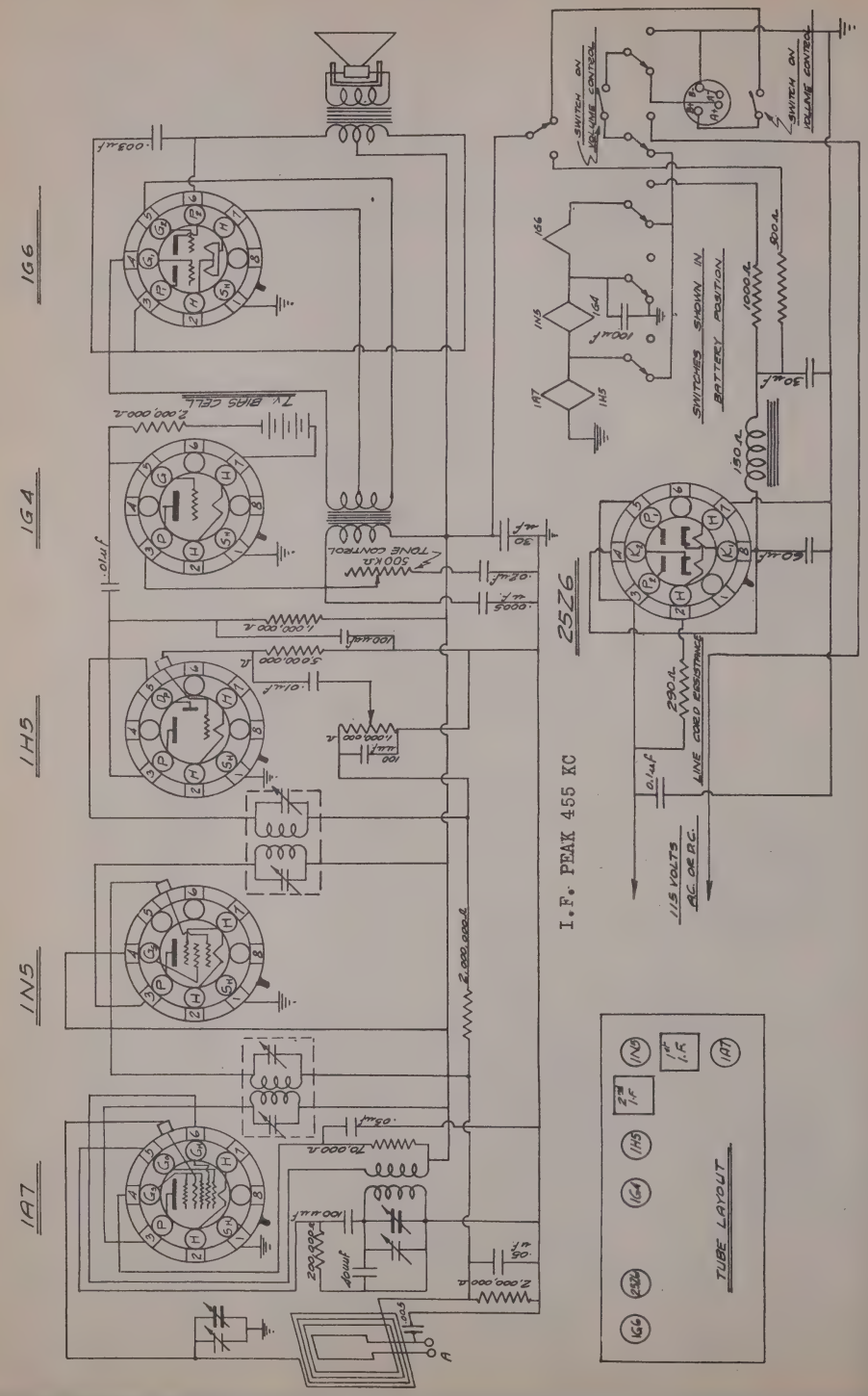

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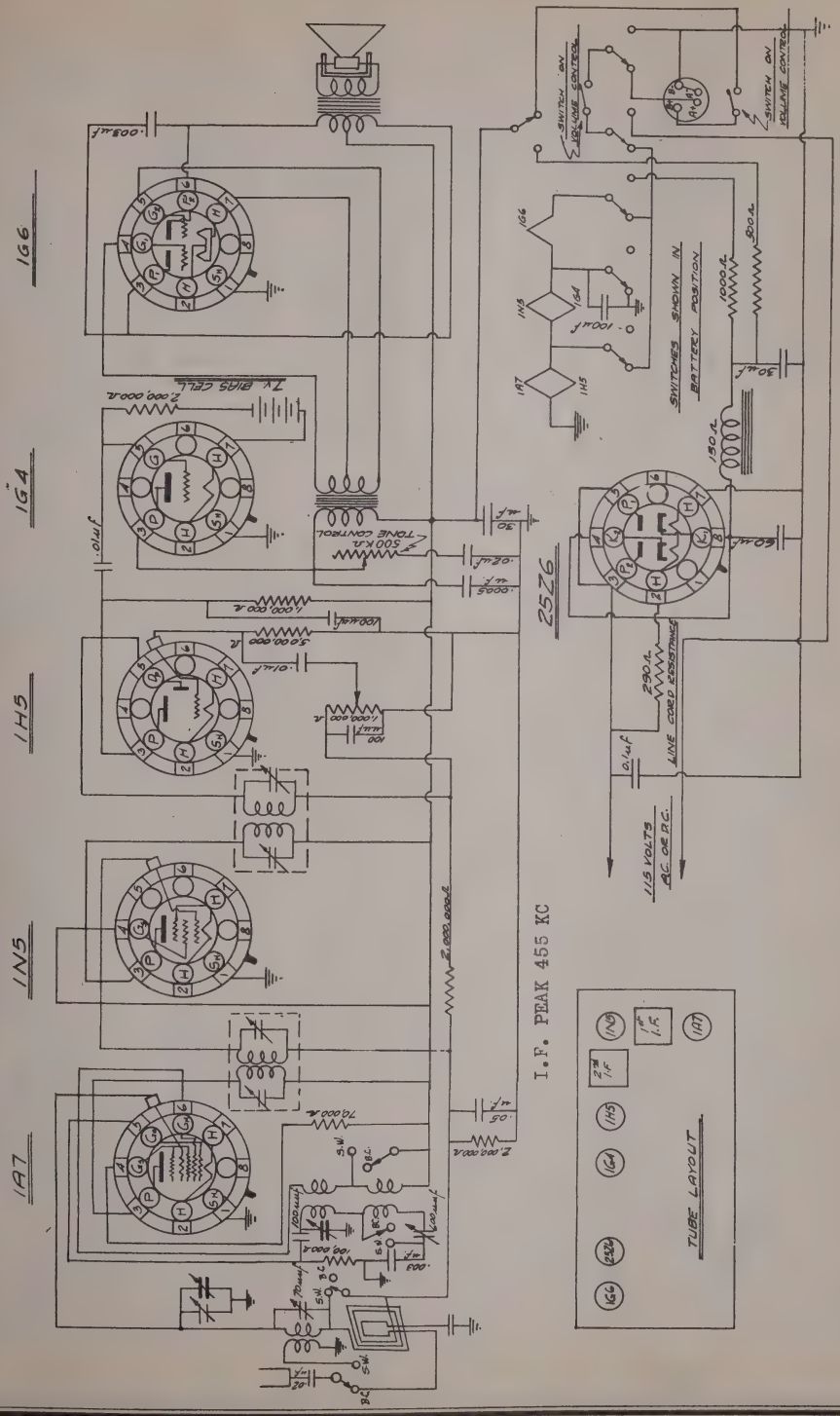
MODEL 965



MODEL 2111

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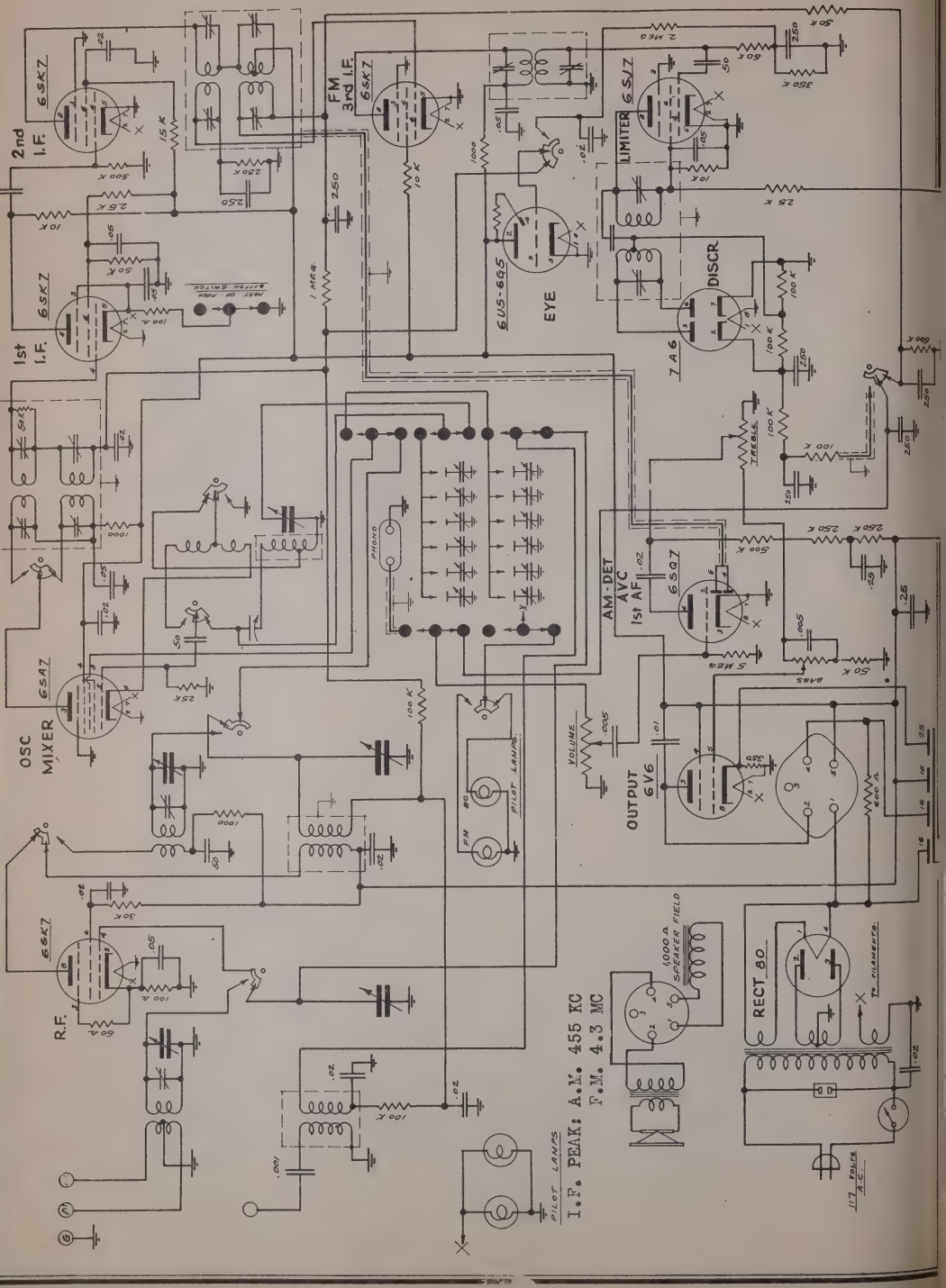

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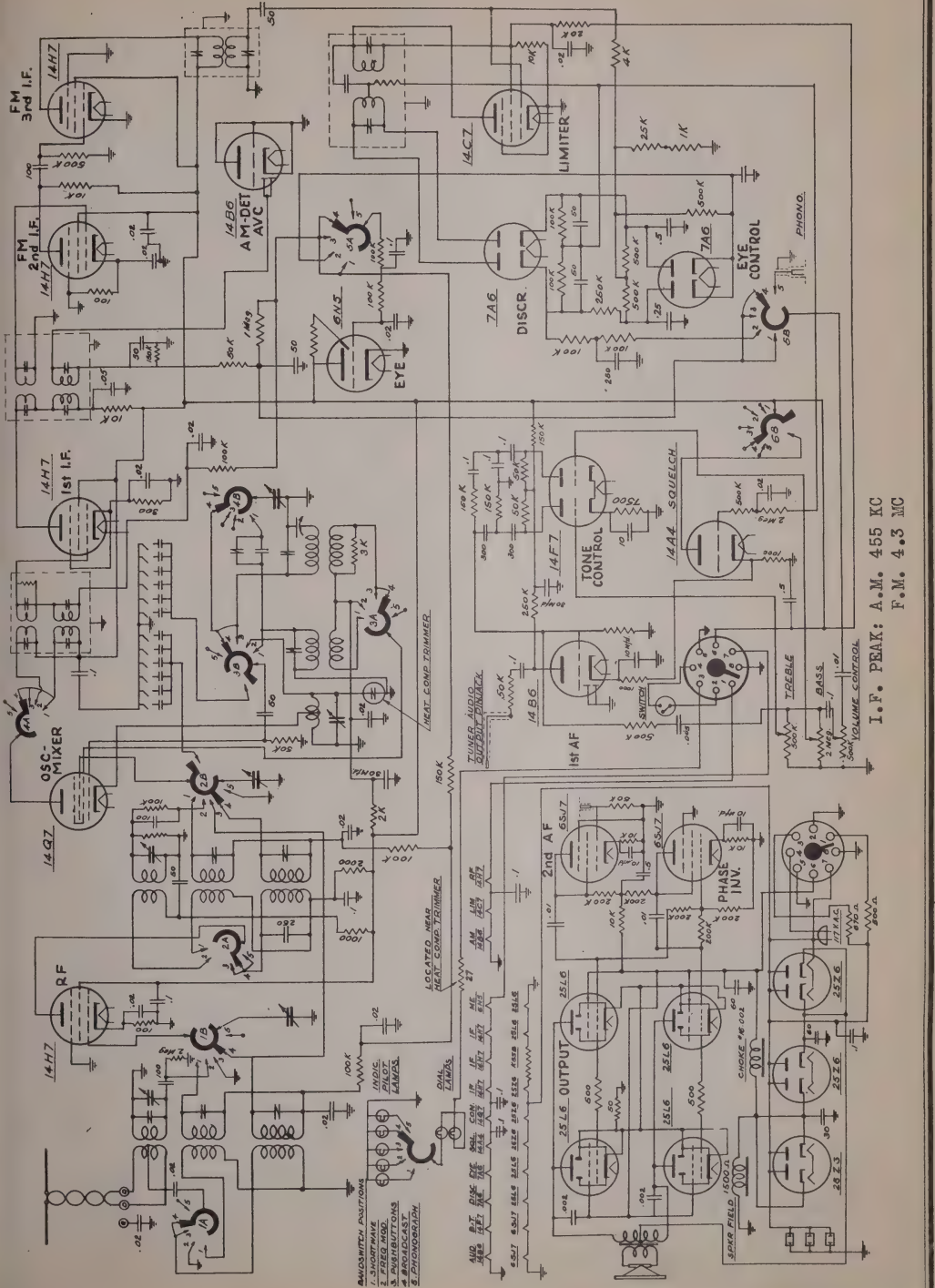
MODEL 2221



MODEL 9161

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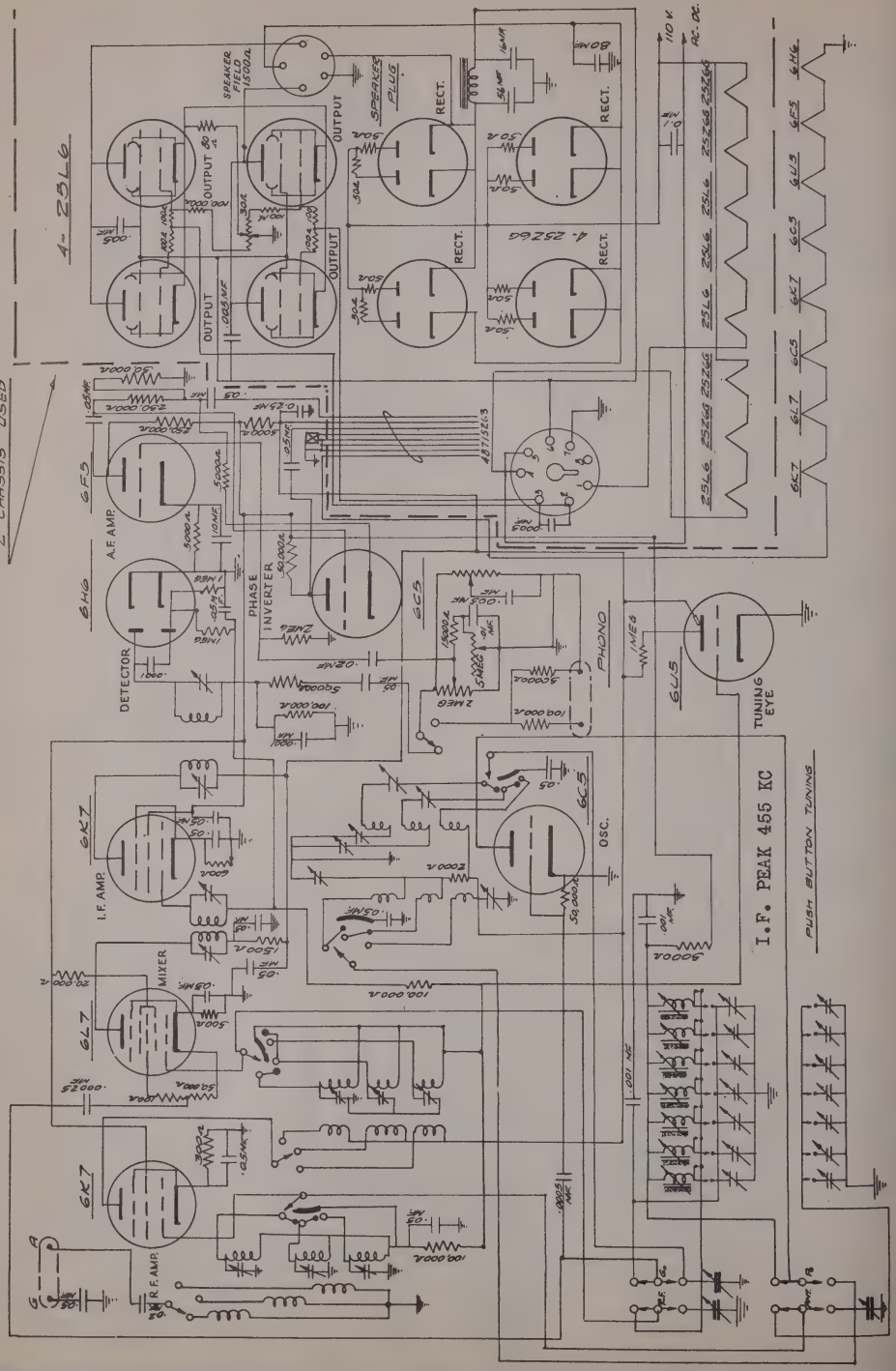

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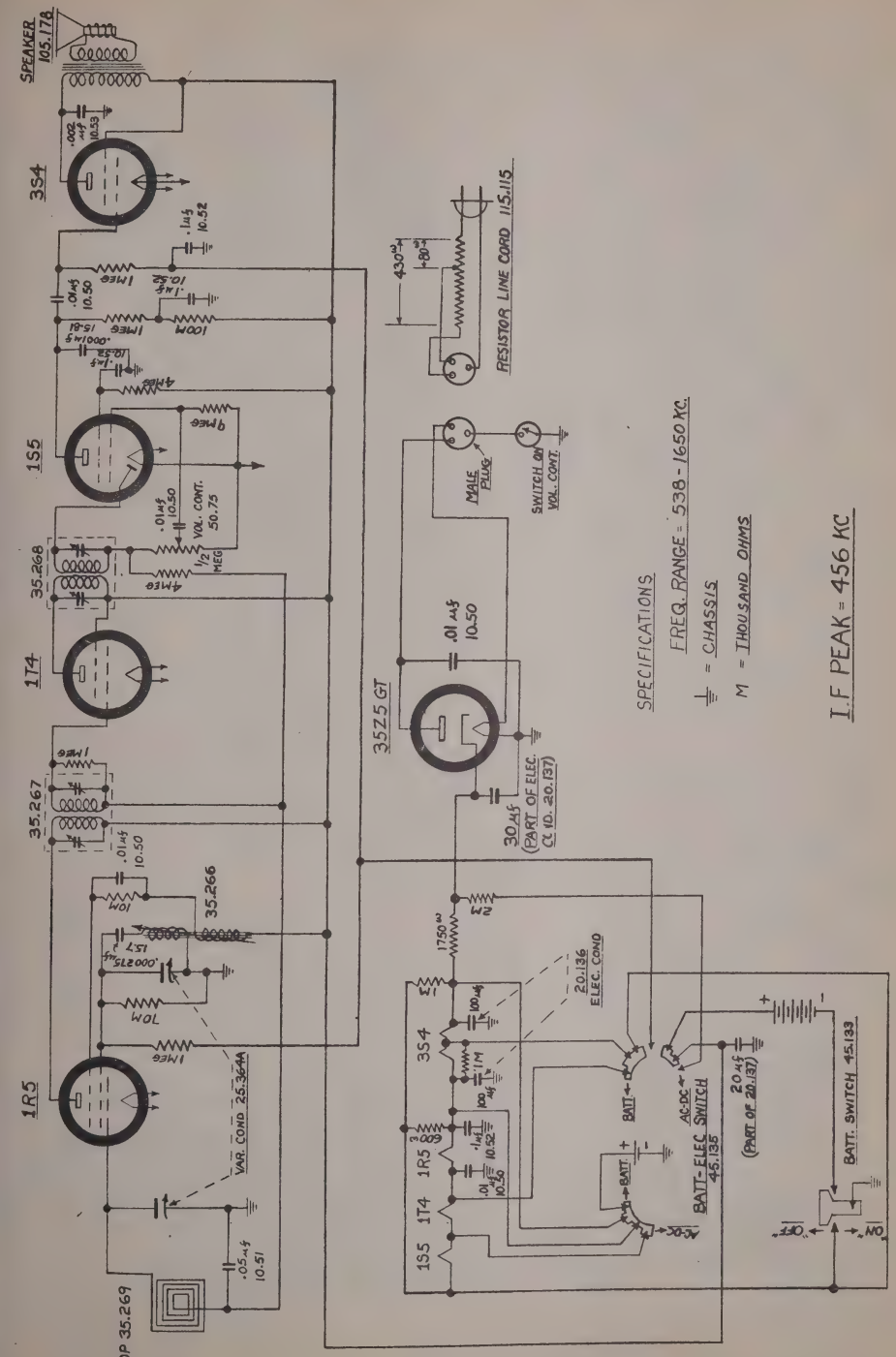
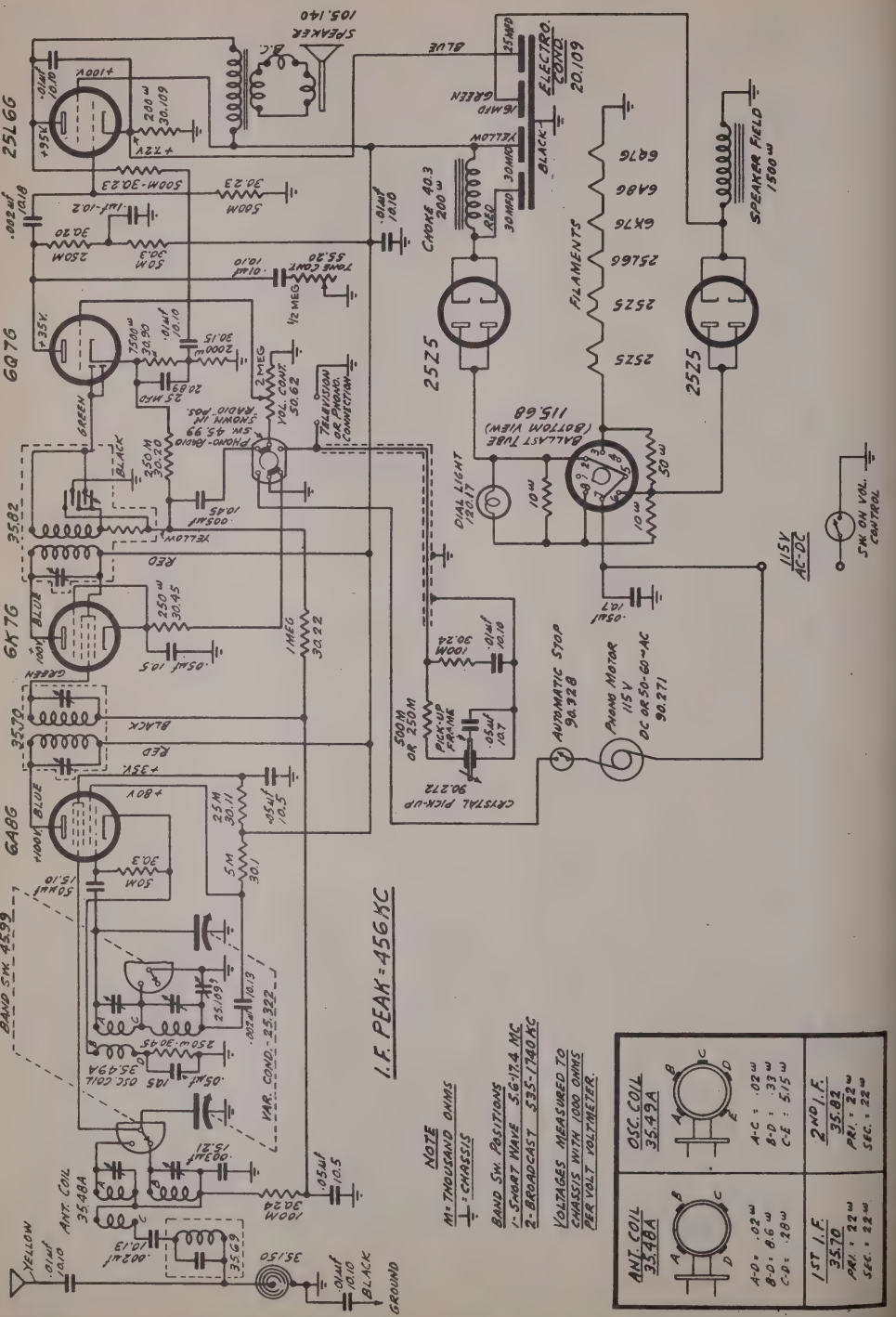
MODEL C34



MODEL 75PC

FADA RADIO & ELECTRIC CO



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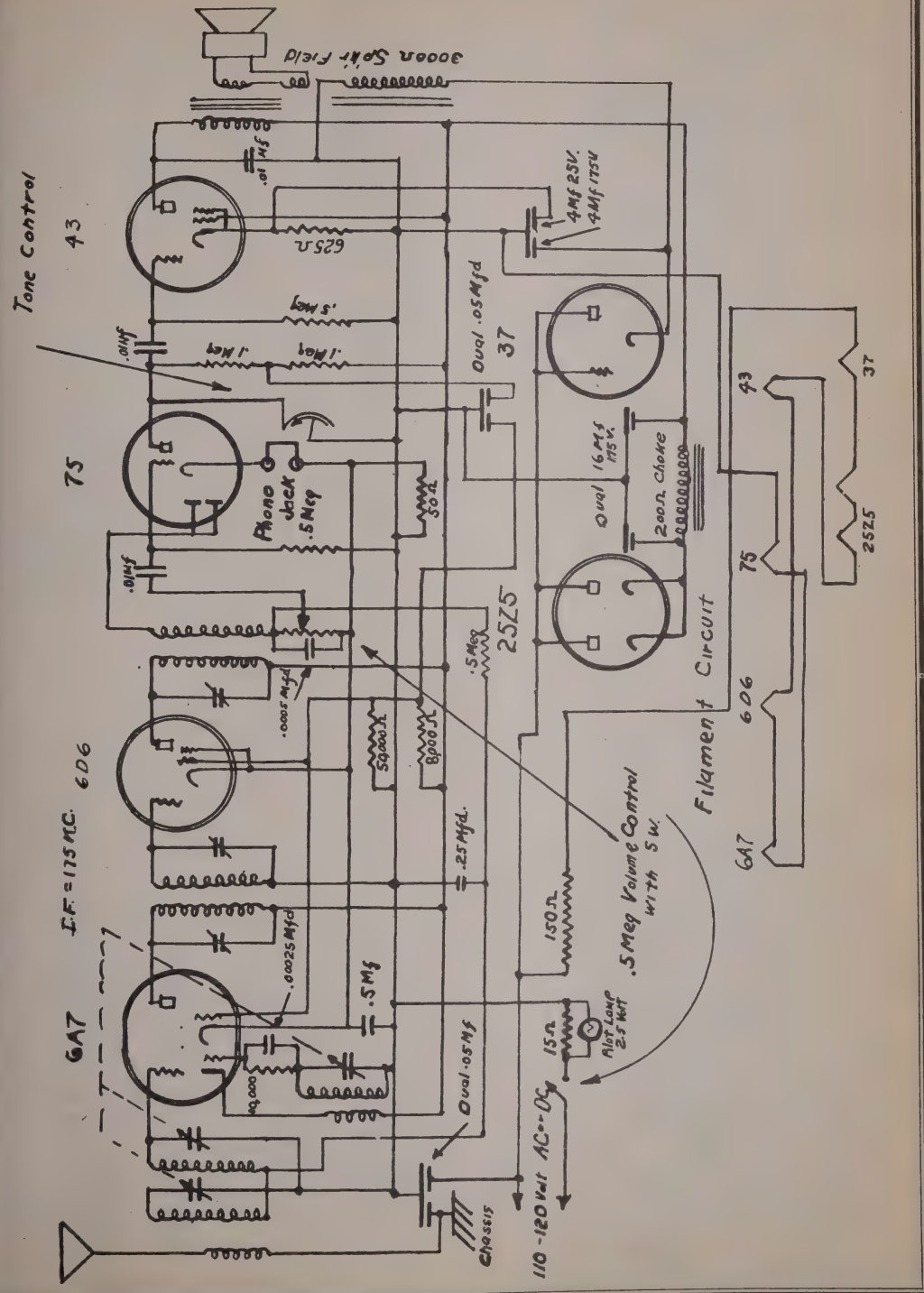
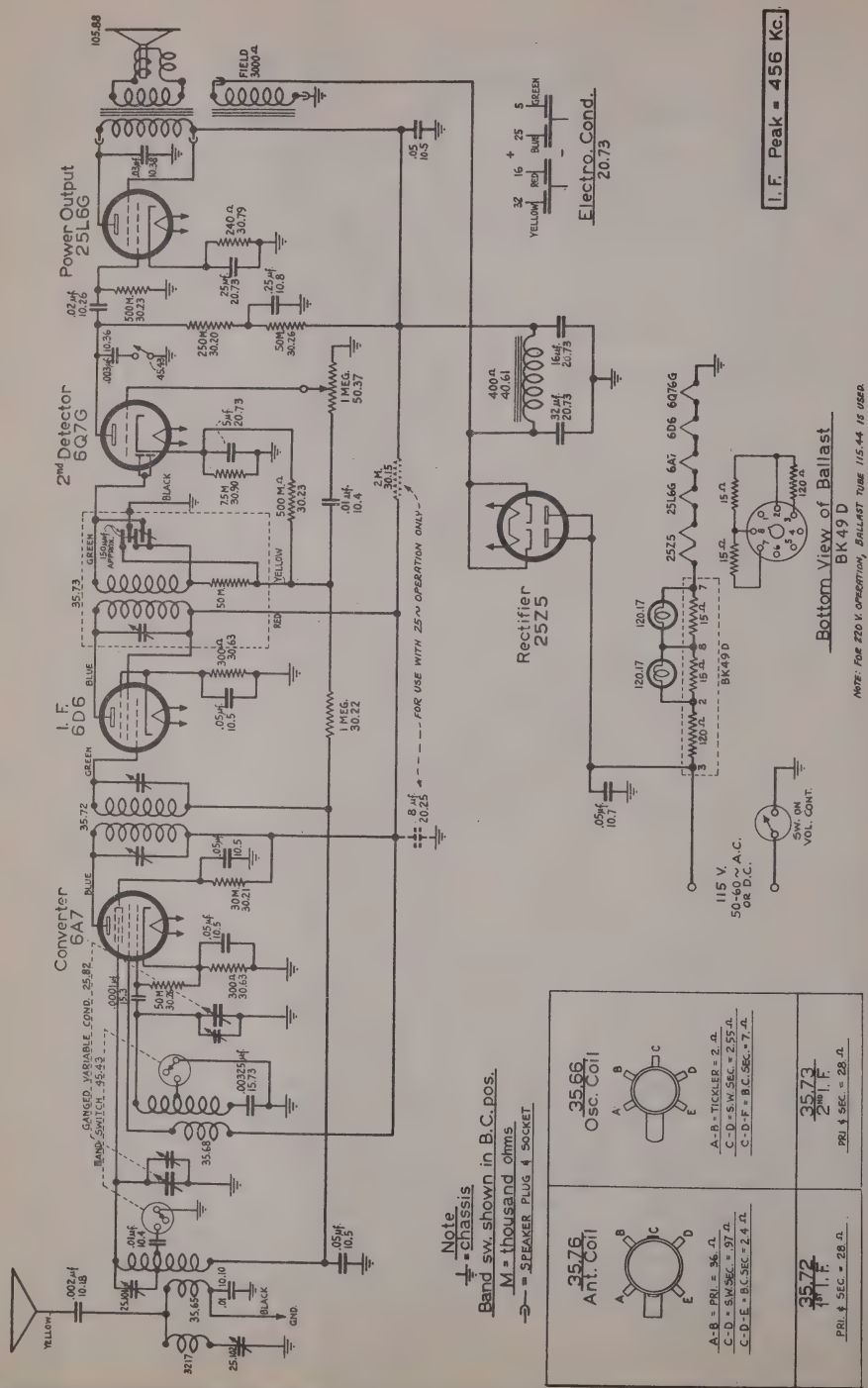
MODEL 140



MODEL 361

FADA RADIO & ELECTRIC CO


Converter 6A7
I. F. 6D6
2nd Detector 6Q7G
Power Output 25L6G
Rectifier 25Z5
Electro Cond. 20.73
Bottom View of Ballast BK49D
I. F. Peak = 456 Kc.
Note
⏚ = chassis
Band sw. shown in B.C. pos.
M = thousand ohms
= SPEAKER PLUG 4 SOCKET
35.76 Ant. Coil
35.66 Osc. Coil
35.72 1st I. F.
35.73 2nd I. F.
FOR USE WITH 25~ OPERATION ONLY
115 V. 50-60 ~ A.C. OR D.C.
SW. ON VOL. CONT.
NOTE: FOR 220 V. OPERATION, BALLAST TUBE 115-44 IS USED.

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FADA RADIO & ELECTRIC CO

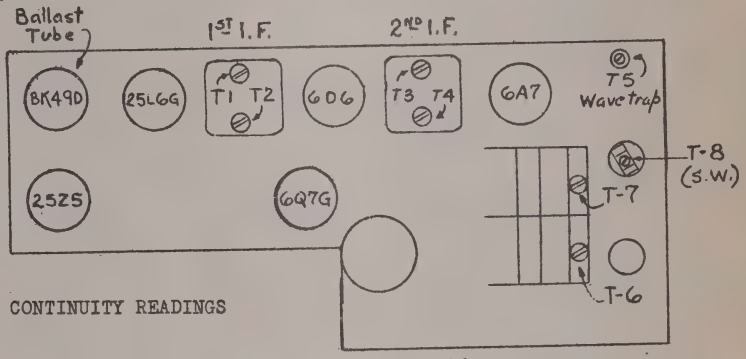
MODEL 361

ALIGNMENT TABLE

WAVE BAND	DIAL FREQUENCY	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTED TO	ADJUST TRIMMER
B.C.	1000 KC	456 KC	.001 mfd. 50,000 ohms	Control grid of 6A7 tube	T-1, T-2, T-3, T-4
B.C.	550 KC	456 KC	200 mmfd. condenser	Yellow antenna lead	T-5*
B.C.	1500 KC	1500 KC	200 mmfd. condenser	Yellow antenna lead	T-6, T-7
S.W.	2.4 MC	2.4 MC	400 ohm resistor	Yellow antenna lead	T-8
B.C.	1500 KC	1500 KC	200 mmfd. condenser	Yellow antenna lead	T-7

*This is a wave trap alignment. Adjust for minimum signal (lowest deflection on output meter).

VOLTAGE READINGS TAKEN WITH 1000 OHMS PER VOLT METER.



VOLTAGE AND CONTINUITY READINGS

Line voltage 116 A.C. - Input watts - 52

TYPE OF TUBE	POSITION OF TUBE	PLATE VOLTS	PLATE MA CURRENT	CATHODE VOLTS	SCREEN GRID VOLTS
6A7	1st Detector	105	1.6	1.5	52
	Oscillator	105	2.2	---	---
6D6	I.F. Amp.	105	7.4	3.0	105
6Q7G	2nd Detector	42	.2	.8	---
25L6G	Pwr. Pentode	92	30.0	8.2	97
25Z5	Rectifier	---	90.0 TOTAL	---	---

VOLTAGES ACROSS ELECTROLYTIC CONDENSER (PART #20.73)

1st SECTION	2nd SECTION
125	105

Voltage across 3,000 ohm speaker field - - - - - - - - - - - - - - - - - - 125 volts
" " 400 " filter choke - - - - - - - - - - - - - - - - - 20.0 "

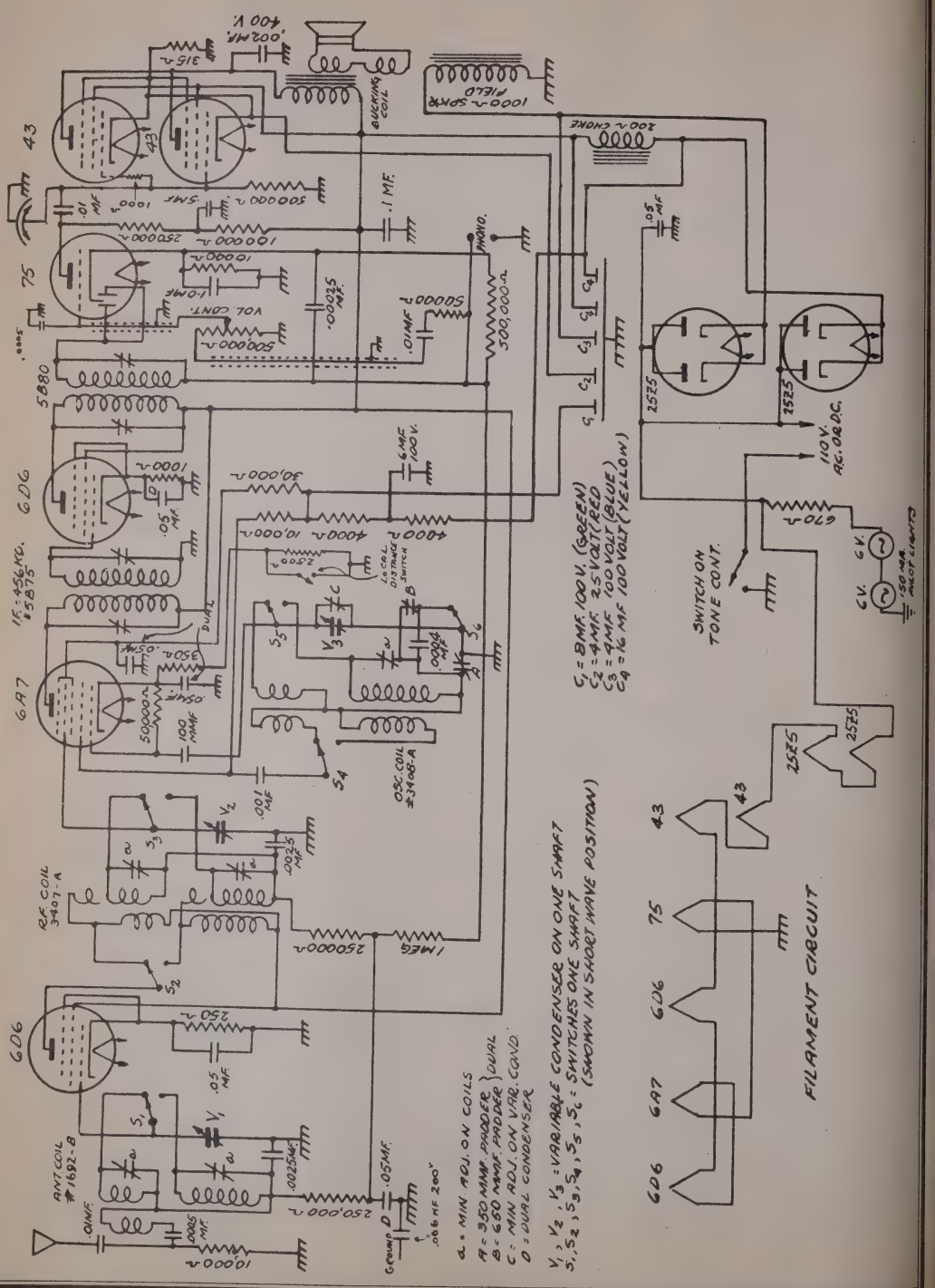
SPEAKER D.C. RESISTANCE VALUES

PART NO.	FIELD COIL	AUDIO TRANS. PRI.	AUDIO TRANS. SEC.	V.C.
105.88	3,000*	130 ohms*	.8 ohms*	3.2

*These are cold D.C. resistance values.

MODEL 1480

FADA RADIO & ELECTRIC CO



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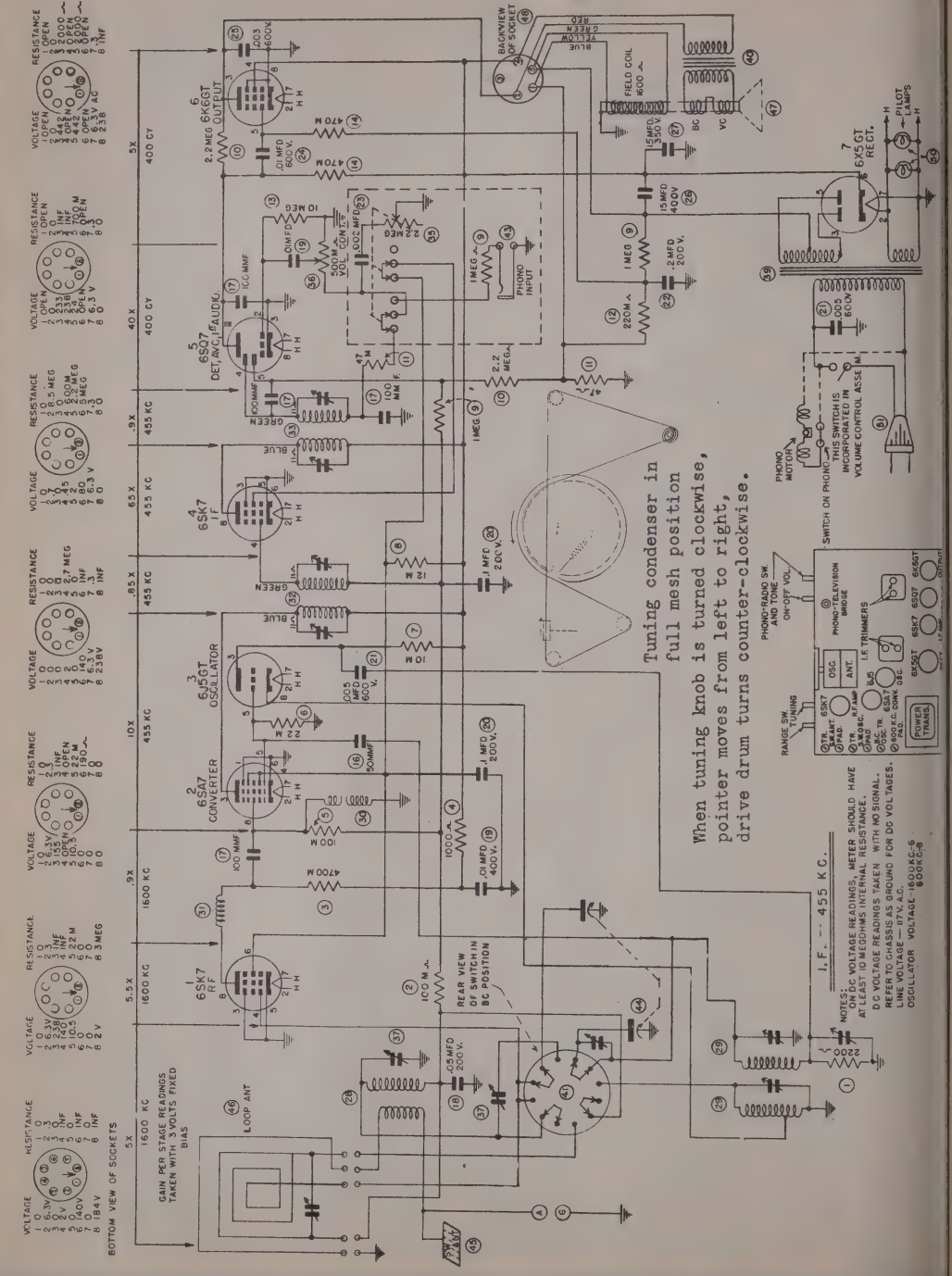
FARNSWORTH TELEV. & RADIO CORP. MODELS BC-72, BC-80, BC-81, BK-86

INTERMEDIATE FREQUENCY 455 KC
D.C. RESISTANCES
LOOP ANTENNA
SPEC. SERV. ANT. COIL
S.S.R.F. GRID COIL
" " OSC. "
" " PLATE "
S.W. ANTENNA "
S.W. R.F. GRID "
LESS THAN 1"
1.2"
1.2"
LESS THAN 1"
S.W. OSC. COIL 1"
S.W. PLATE COIL LESS THAN 1"
BROADCAST OSC. COIL 9.5"
SPEAKER FIELD 360" SEC. COLD.
" " " 340" SEC. HOT.
1ST I.F. PRI. 14" SEC. 14"
2ND I.F. " " "
POWER TRANS. C.T. H.V. SEC. TO PLATE 4-185"; PLATE 6-175"
NOTE 1- ABOVE CIRCUIT VARIATION APPLIES TO COMBINATION MODEL AK-76 ONLY.
BOTTOM VIEW OF SOCKETS
†- VOLTAGE READING WILL VARY WITH SENSITIVITY OF METER.
*- RESISTANCE WILL DEPEND ON CONDITION OF ELECTROLYTIC CONDENSER
†- RECTIFIER FILAMENT VOLTAGE 5 VOLT A.C. PIN 2 TO PIN 8.
1 6SK7 R.F. AMP.
2 6SA7 MIXER
3 6J5GT OSCILLATOR
4 6SK7 I.F. AMP.
5 6J5GT DETECTOR
6 6S07 1ST AUDIO - A.V.C.
7 6V6G POWER-OUTPUT
8 5Y3G RECTIFIER.
TELEV.-PHONO. JACK
SEE NOTE 1
HUM BUCKING COIL
VOICE COIL
SPEAKER FIELD
JUMPER CONNECTS THESE TERMINALS WHEN SET IS USED WITH LOOP ANTENNA. DISCONNECTED WHEN USED WITH EXTERNAL ANTENNA.
TO EXTERNAL ANTENNA
REVISION: TUBE #'s PREVIOUSLY GIVEN. 2-2-38

MODELS DK-73, DK-75
Ch. C-140-1, C-140-2

FARNSWORTH TELEV. & RADIO CORP.


When tuning knob is turned clockwise, pointer moves from left to right, drive drum turns counter-clockwise.
Tuning condenser in full mesh position
I.F. -- 455 KC.
1600 KC
GAIN PER STAGE READINGS TAKEN WITH 3 VOLTS FIXED BIAS
LOOP ANT
REAR VIEW OF SWITCH IN BC POSITION
BOTTOM VIEW OF SOCKETS
1 6SK7 RF
2 6SA7 CONVERTER
3 6J5GT OSCILLATOR
4 6SK7 IF
5 6SQ7 DET. AVC. 1ST AUDIO
6 6K6GT OUTPUT
7 6X5GT RECT.
PILOT LAMPS
FIELD COIL 600 Ω
BACKVIEW OF SOCKET
PHONO MOTOR
SWITCH ON PHONO
THIS SWITCH IS INCORPORATED IN VOLUME CONTROL ASSEM.
PHONO-RADIO SW AND TONE
ON-OFF VOL.
PHONO-TELEVISION BRIDGE
I.F. TRIMMERS
RANGE SW. TUNING
POWER TRANS.
NOTES: DC VOLTAGE READINGS, METER SHOULD HAVE AT LEAST 10 MEGOHMS INTERNAL RESISTANCE.
DC VOLTAGE READINGS TAKEN WITH NO SIGNAL.
REFER TO CHASSIS AS GROUND FOR DC VOLTAGES.
LINE VOLTAGE — 117 V. A.C.
OSCILLATOR VOLTAGE-1600 KC-6
600 KC-8

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FARNSWORTH TELEV. & RADIO CORP.

MODELS DK-73, DK-75
Ch. C-140-1,
C-140-2

EQUIPMENT AND PROCEDURE FOR ALIGNMENT

WHEN ALIGNING THIS RECEIVER A SIGNAL GENERATOR CALLIBRATED AT 455 Kc, 600 Kc, 1500 Kc, 1720 Kc, 9.5 Mc, 12 Mc, AND 12.1 Mc, ALSO AN OUTPUT INDICATOR ARE REQUIRED. ALL ADJUSTMENTS SHOULD BE MADE WITH THE VOLUME CONTROL SET FOR MAXIMUM VOLUME, KEEPING THE GENERATOR OUTPUT AS LOW AS POSSIBLE TO PREVENT A.V.C. ACTION AND FALSE READINGS. BEFORE RE-ALIGNING THE SET BE SURE ALL ADJUSTING SCREWS FOR THE IRON CORE OSCILLATOR COILS ARE FLUSH WITH OR INSIDE THE CHASSIS BASE.

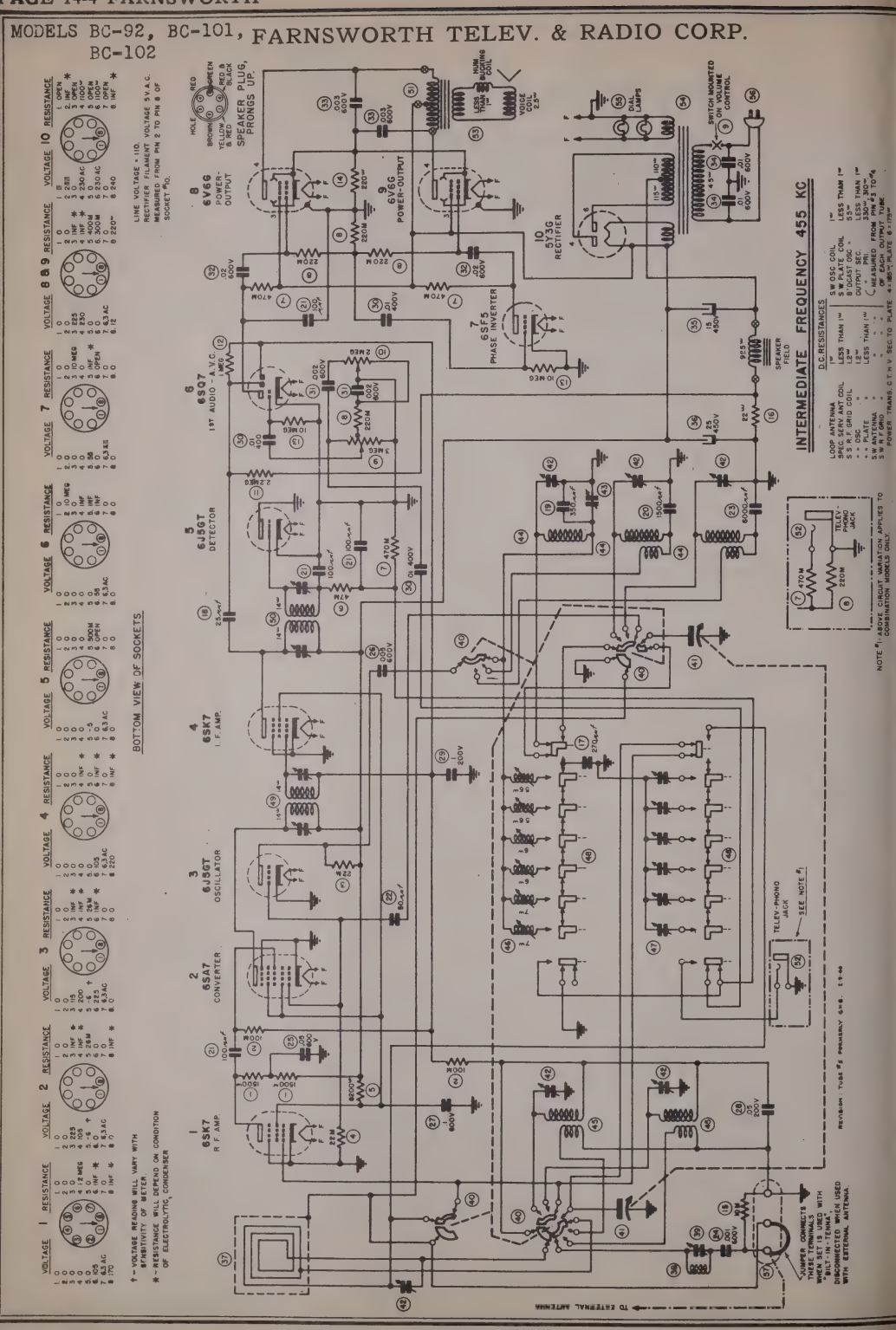
CONNECT THE LOW SIDE OF THE SIGNAL GENERATOR TO THE TERMINAL MARKED G. (GROUND), AND THE HIGH SIDE OF THE GENERATOR TO THE TERMINAL MARKED A. (ANTENNA). (SEE FIG.A).

CAUTION—OFTEN TWO PEAKS ARE FOUND AT 12.1 Mc. USE THE ONE FOUND AT THE MAXIMUM SETTING OF THE OSCILLATOR TRIMMER.

CAUTION—BE SURE AND REMOVE THE DIAL POINTER BEFORE REMOVING THE SET FROM THE CABINET.

STEPS	USE IN SERIES WITH ANTENNA	SET GENERATOR AT	SET GANG AT	ADJUST	LOCATED	TO OBTAIN
1.	SET VOLUME CONTROL AT MAXIMUM					
2.	250 MMFD.	455 Kc.	NOTE A	2ND I.F. TRIMMERS	TOP 2ND I.F. TRAN.	MAXIMUM OUTPUT
3.				1ST I.F. TRIMMERS	TOP 1ST I.F. TRAN.	
4.		1720 Mc.	1720	B.C. R.F. TRIMMER	SEE FIG.	
5.		1500 Kc.	1500	B.C. R.F. TRIMMER	ON THE LOOP	
6.		600 Kc.	600 Kc. ROCK GANG	B.C. PADDER	SEE FIG.	
7.	RECHECK 1600 Kc.					
8.	400 OHMS	12.1 Mc.	12.1 Mc.	S.W. OSC. TRIMMER		
9.		12.1 Mc.	12.1 Mc.	S.W. R.F. TRIMMER		
10.		9.5	9.5 Mc. ROCK GANG	S.W. PADDER		

MODELS BC-92, BC-101, BC-102 FARNSWORTH TELEV. & RADIO CORP.


BOTTOM VIEW OF SOCKETS
1 6SK7 R.F. AMP.
2 6SA7 CONVERTER
3 6J5GT OSCILLATOR
4 6SK7 I.F. AMP.
5 6J8GT DETECTOR
6 6SQ7 1ST AUDIO - A.V.C.
7 6SF5 PHASE INVERTER
8 6V6G POWER-OUTPUT
9 6V6G POWER-OUTPUT
10 5Y3G RECTIFIER
SPEAKER PLUG, PRONGS UP.
INTERMEDIATE FREQUENCY 455 KC
LINE VOLTAGE - 115
RECTIFIER FILAMENT VOLTAGE 5 V A.C. MEASURED FROM PIN 2 TO PIN 8 OF SOCKET #10.
TO EXTERNAL ANTENNA
TELEV-PHONO JACK
SEE NOTE #1
SPEAKER FIELD
SWITCH MOUNTED ON VOLUME CONTROL
LOAD LAMPS
VOICE COIL 2.5Ω
HUM BUCKING COIL
JUMPER CONNECTS THESE TERMINALS WHEN SET IS USED WITH BUILT-IN ANTENNA
DISCONNECT WHEN USED WITH EXTERNAL ANTENNA
NOTE #1 ABOVE CIRCUIT VARIATION APPLIES TO COMBINATION MODELS ONLY.

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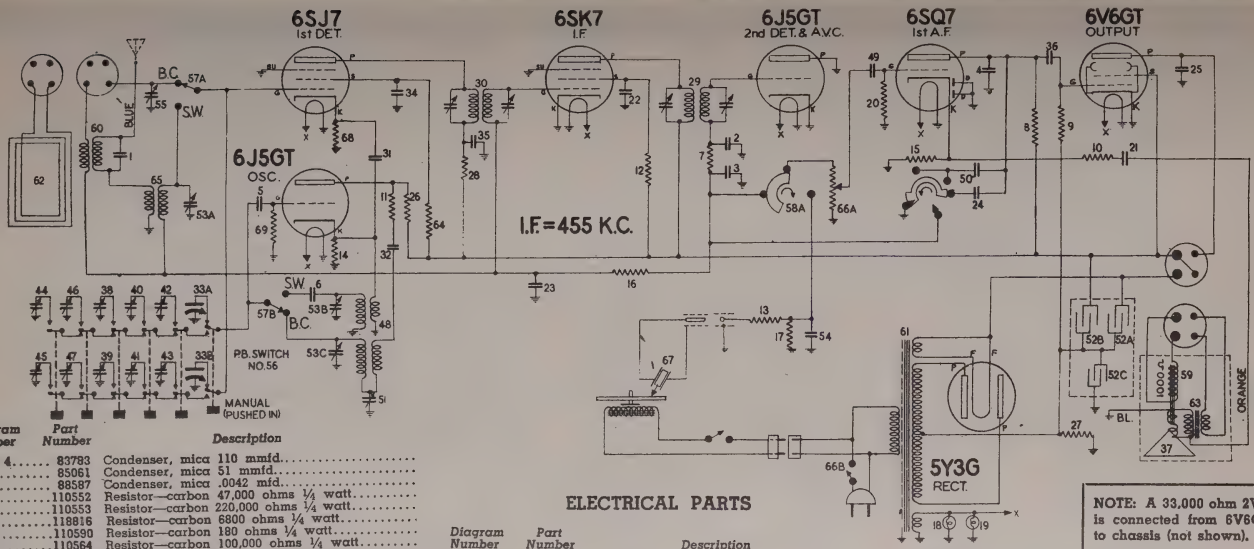
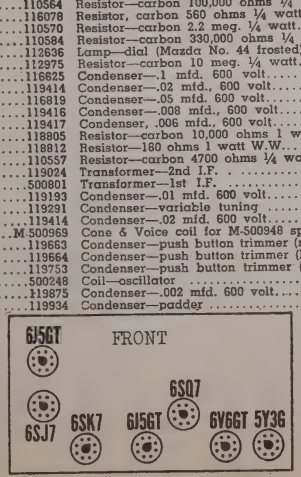


ELECTRICAL PARTS

Diagram Number	Part Number	Description
1 to 4	83783	Condenser, mica 110 mmfd.
5	85061	Condenser, mica 51 mmfd.
6	88587	Condenser, mica .0042 mfd.
7	110552	Resistor—carbon 47,000 ohms ½ watt
8-9	110553	Resistor—carbon 220,000 ohms ½ watt
10	118816	Resistor—carbon 6800 ohms ¼ watt
11	110590	Resistor—carbon 180 ohms ¼ watt
12-13	110564	Resistor—carbon 100,000 ohms ½ watt
14-15	116078	Resistor, carbon 560 ohms ¼ watt
16	110570	Resistor—carbon 2.2 meg. ¼ watt
17	110584	Resistor—carbon 330,000 ohms ¼ watt
18-19	112636	Lamp—dial (Mazda No. 44 frosted)
20	112975	Resistor—carbon 10 meg. ¼ watt
21	116825	Condenser—.1 mfd. 600 volt
22	119414	Condenser—.02 mfd., 600 volt
23	116819	Condenser—.05 mfd. 600 volt
24	119416	Condenser—.008 mfd., 600 volt
25	119417	Condenser, .006 mfd., 600 volt
26	118805	Resistor—carbon 10,000 ohms 1 watt
27	118812	Resistor—180 ohms 1 watt W.W.
28	110557	Resistor—carbon 4700 ohms ¼ watt
29	119024	Transformer—2nd I.F.
30	500801	Transformer—1st I.F.
31-32	119193	Condenser—.01 mfd. 600 volt
33A-33B	119291	Condenser—variable tuning
34-35-36	119414	Condenser—.02 mfd. 600 volt
37	M-500969	Cone & Voice coil for M-500948 speaker
38 to 41	119663	Condenser—push button trimmer (med. freq.)
42-43	119664	Condenser—push button trimmer (high freq.)
44 to 47	119753	Condenser—push button trimmer (low freq.)
48	500248	Coil—oscillator
49-50	119875	Condenser—.002 mfd. 600 volt
51	119934	Condenser—padder
52	501060	Condenser—electrolytic Section A—20 mfd. 400 volt Section B—15 mfd. 400 volt Section C—20 mfd. 25 volt
53A to 53C	160415	Condenser—trimmer (3 section)
54	160430	Condenser—.001 mfd. 600 volt
55	160449	Condenser—trimmer
56	500056	Switch—push button
57A-57B	500057	Switch—Band
58A-58B	501028	Switch—Radio-Phono tone
59	M-500948	Speaker—Dynamic (10")
60	500255	Coil—compensating
61	500116 / 160780	Transformer—power (50-60 cycle) / Transformer—power (25 cycle)
62	500939	Loop antenna complete
63	M-500968	Transformer—output for M-500948 speaker.
64	112962	Resistor—carbon 150,000 ohms ½ watt
65	500147	Coil—short wave antenna
66A-66B	501027	Volume control—1 meg. (with switch)
67	161289	Crystal cartridge
68	112952	Resistor—carbon 3300 ohms ½ watt
69	110552	Resistor—carbon 47,000 ohms ½ watt

NOTE: A 33,000 ohm 2W. resistor is connected from 6V6GT screen to chassis (not shown).



SOCKET VOLTAGES—ALL D.C. POTENTIAL MEASURED TO CHASSIS

NO SIGNAL CONDITION — DIAL TUNED TO 540 KC.

TUBE	FUNCTION	H	K	G	S	SU	P	D_1	D_2
6SJ7	1st Det.	6.0 A.C.	9.0	0	105	0	220		
6J5GT	Osc.	6.0 A.C.	0	—3			165		
6SK7	I.F.	6.0 A.C.	0	0	46	0	230		
6J5GT	2nd Det.—A.V.C.	6.0 A.C.	0	0			0		
6SQ7	1st A.F.	6.0 A.C.	1	0			75	0	0
6V6GT	Output	6.0 A.C.	0	Note A	230		220		
5Y3G	Rectifier	5.0 A.C.					Plates 350 V.A.C. to C.T.		

NOTE A: The 6V6GT grid bias voltage is —13.5 volts measured across resistor No. 27.
Use a high resistance voltmeter of at least 1000 ohms per volt.

MODEL S-7393-1,
Code A-400
MODEL S-7400-1

FIRESTONE TIRE & RUBBER CO.

TO SET UP THE BUTTONS FOR AUTOMATIC TUNING:

1. Turn the set on and allow it to operate at least fifteen minutes before attempting to set up the buttons.
2. Make a list of the frequencies of five nearby stations to which you wish to set up the buttons. Be sure to select the most powerful nearby stations, since weak signals will not give as satisfactory results.
3. Turn the set around so that the back of the set is facing you. Through the ten holes in the plate just under the dial will be seen ten adjusting screws (see Fig. 1). These screws are used to tune in the stations that the buttons are to be set to.
4. Each of the push buttons can be made to tune in stations in a definite frequency range as shown in Fig. 1. It is imperative that in setting up the buttons, you select stations whose frequency is in the indicated range of that button.
5. Turn the BAND SWITCH to the "AM" position, push in the button labeled "MANUAL," then using the tuning knob (see Fig. 1) tune in the station you wish to set to button No. 1.

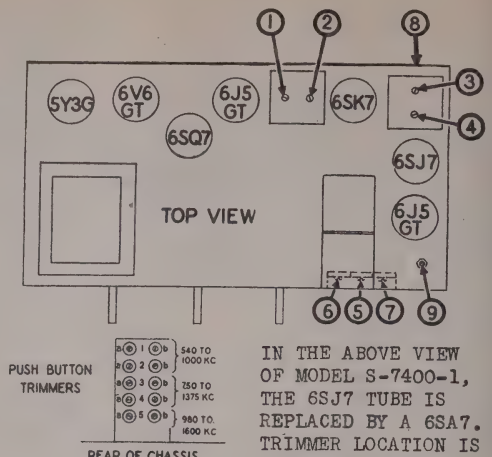


Fig. 1

IN THE ABOVE VIEW OF MODEL S-7400-1, THE 6SJ7 TUBE IS REPLACED BY A 6SA7. TRIMMER LOCATION IS THE SAME IN BOTH MODELS.

6. Push in button No. 1 and using a screwdriver turn adjusting screw No. 1a until the station you had previously tuned in is again heard. If it is not heard, advance the volume control and adjust the screw again. Be sure to adjust screw No. 1a to the point where the program is heard with the deepest tone.
7. Insert the screwdriver in adjusting screw No. 1b and turn it until the program is heard with deepest tone. Now again check the setting of screw No. 1a making sure it is adjusted to give maximum volume.
8. The set-up for button No. 1 is now complete.
9. To set up the remaining buttons use the same procedure; push in the "MANUAL" button, tune in the station using the tuning knob; push in the button to be set up; adjust its associated "a" adjusting screw until the station is tuned in (screw 2a for button No. 2 etc., see Fig. 1); the associated "b" screw is then adjusted for deepest tone as before.

ALIGNMENT EQUIPMENT & PROCEDURE

1. Connect the output meter across the voice coil or from plate of the 6V6GT output tube to chassis through a .1 mfd. condenser. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the receiver chassis.
3. Turn the RADIO-PHONO TONE SWITCH to the "Radio-Speech" position.
4. Turn the volume control to the maximum position and keep it in this position throughout the alignment procedure.
5. Push in the "Manual" button and keep it pushed in. Check the pointer to see that it is correctly set to 540 KC. with gang in full mesh.
6. The loop must be connected as indicated in circuit diagram at all times.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Lug on front Section of Gang Cond.	455 KC	American	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then repeat Adjustment.
					3-4	1st I.F.	
400 OHM Carbon Resistor	Antenna Terminal (Blue Wire)	16 MC	Foreign	16 MC	5	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Antenna Terminal (Blue Wire)	16 MC	Foreign	Tune to 16 MC Generator Signal	6	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	1500 KC	American	1500 KC	7	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
Now replace the chassis and loop antenna in the cabinet before proceeding further.							
200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	1500 KC	American	Tune to 1500 KC Generator Signal	8	Broadcast Antenna	Adjust for Maximum Output.
200 MMFD. Mica Condenser	Antenna Terminal (Blue Wire)	600 KC	American	Tune to 600 KC Generator Signal	9	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

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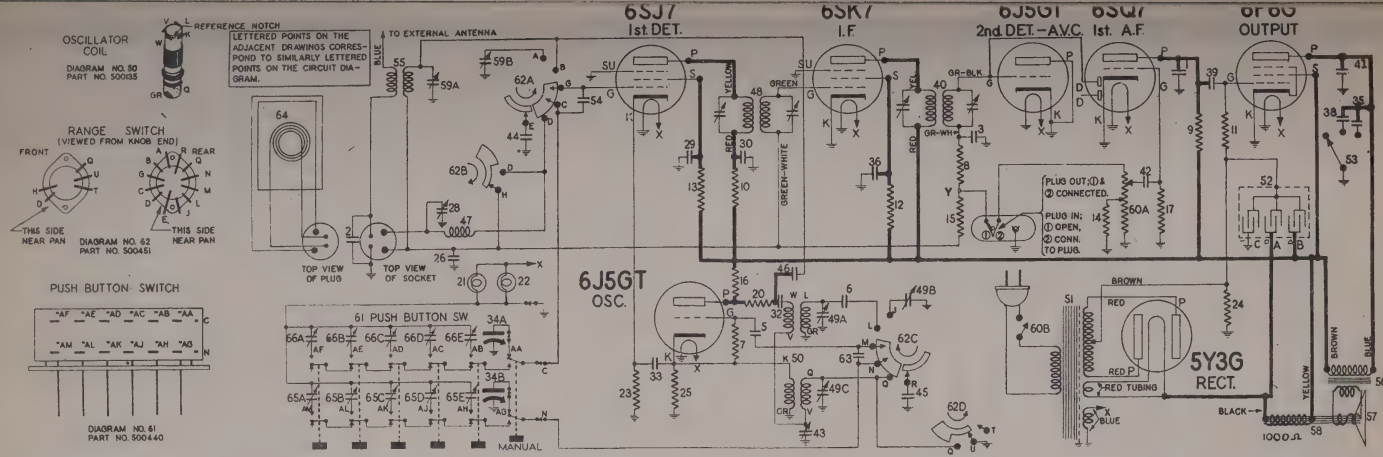
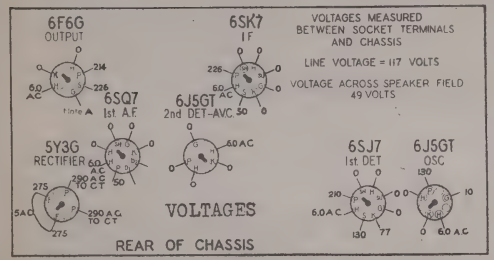
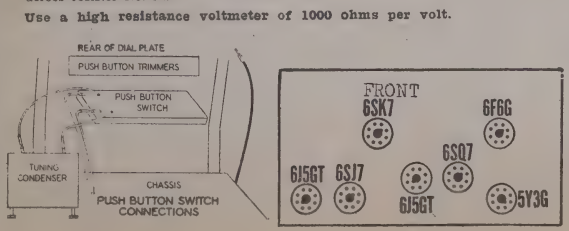




NOTE A: Grid voltage on the 6F6G output tube is —17 volts measured across resistor No. 24.

Use a high resistance voltmeter of 1000 ohms per volt.



I.F. PEAK 455 KC

ELECTRICAL PARTS

Diagram Number	Part Number	Description
1	83783	Condenser—mica 110 mmfd.
2-3	83539	Condenser—mica 260 mmfd.
5	85061	Condenser—mica 51 mmfd.
6	88587	Condenser—mica .0042 mfd.
7-8	110552	Resistor—carbon 47,000 ohms ¼ watt.
9	110553	Resistor—carbon 220,000 ohms ¼ watt
10	110557	Resistor—carbon 4700 ohms ¼ watt.
11	110559	Resistor—carbon 470,000 ohms ¼ watt.
12-13	110564	Resistor—carbon 100,000 ohms ¼ watt.
14	110565	Resistor—carbon 22,000 ohms ¼ watt.
15	110570	Resistor—carbon 2.2 Meg. ¼ watt.
16	110576	Resistor—carbon 10,000 ohms ½ watt.
17	112975	Resistor—carbon 10 Meg. ¼ watt.
18-19	110584	Resistor—carbon 330,000 ohms ¼ watt.
20	110590	Resistor—carbon 180 ohms ¼ watt.
21-22	110629	Dial Light Bulb—6.3 volt (Mazda No. 44)
23	112952	Resistor—carbon 3300 ohms ¼ watt.
24	117075	Resistor—300 ohm 1 watt w.w.
25	116078	Resistor—560 ohms ¼ watt
26-27	116819	Condenser—.05 mfd. 600 volt
28	119132	Condenser—trimmer
29 to 33	119193	Condenser—.01 mfd. 600 volt
34A-34B	119291	Condenser—variable tuning
35	119880	Condenser—.04 mfd. 600 volt
36-37	119414	Condenser—.02 mfd. 600 volt
38	119416	Condenser—.008 mfd. 600 volt
39	116819	Condenser—.05 mfd. 600 volt
40	119024	Transformer—2nd I.F.
41	119417	Condenser—.006 mfd. 600 volt
42	119875	Condenser—.002 mfd. 600 volt
43	119934	Condenser—padder
44-45	160646	Condenser—compensating, 100 mmfd.
46	161315	Condenser—twisted wire—5 mmfd.
47	500108	Coil—compensating
48	500131	Transformer—1st I.F.
49A-49B-49C	500133	Condenser—three section trimmer
50	500135	Coil—B.C. & S.W. Osc.
51	500127 / 500202	Transformer—power (60 cycles) / power (25 cycles)
52	501321	Condenser—electrolytic A—20 mfd.—350 volt / B—10 mfd.—350 volt / C—20 mfd.—25 volt
53	500207	Switch—tone
54	500212	Condenser—compensating 200 mmfd.
55	500249	Coil—short wave antenna
56	R-500710	Transformer—output for R-500426 Spkr.
57	R-500711	Cone & Voice Coil for R-500426 Spkr.
58	R-500426	Speaker, dynamic (6")
59A-59B	500438	Condenser—trimmer two section
60A-60B	501488	Volume Control—1 Meg. (with switch)
61	500440	Switch—push button
62A to 62D	501490	Switch—band
63	500484	Condenser—compensating, 215 mmfd.
64	501889	Loop antenna & cabinet back
65A to 65E	500860	Trimmers—push button (top bank)
66A to 66E	500861	Trimmers—push button (bottom bank)

NOTE: A 110 MMFD. MICA CONDENSER IS CONNECTED FROM POINT "Y" TO CHASSIS.

NOTE: RESISTOR No. 7 RETURNS TO CHASSIS INSTEAD OF CATHODE AS SHOWN.

MODEL S-7397-9
Code A-393

FIRESTONE TIRE & RUBBER CO.

ALIGNMENT EQUIPMENT & PROCEDURE

THIS RECEIVER MAY BE ALIGNED IN THE CABINET WITH LOOP CONNECTED

1. Connect the output meter across the voice coil or from the plate of the 6F6G output tube to chassis through a .1 mfd. condenser.
2. Connect the ground lead of the signal generator to the receiver chassis.
3. Make sure that the wires coming from the chassis and push button switch are connected as shown in the figure below.
4. Push in the "manual" button and keep it pushed in. Check the pointer to see that it is correctly set to 540 KC. with gang in full mesh.
5. Turn the volume control to the maximum volume position, and the tone control to the "speech" position.
6. FOLLOW THE ORDER OF ALIGNMENT INDICATED BELOW.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD Condenser	Lug on Outer Section of Gang Cond.	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then repeat Adjustment.
					3-4	1st I.F.	
400 OHM Carbon Resistor	Blue Lead from Chassis	16 MC	Foreign	16 MC	5	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Blue Lead from Chassis	16 MC	Foreign	Tune to 16 MC Generator Signal	6	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
400 OHM Carbon Resistor	Blue Lead from Chassis	11.5 MC	25-31 M	11.5 MC	7	Spread Band Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 10.6 MC. If Image does not appear, Realign at 11.5 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	Blue Lead from Chassis	11.5 MC	25-31 M	Tune to 11.5 MC Generator Signal	8	Spread Band Antenna	Adjust for Maximum Output.
No Connection	Place Lead from Signal Gen. Near Loop	1500 KC	Broadcast	1500 KC	9	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
NOW PLACE THE CABINET BACK AND LOOP ANTENNA INTO POSITION AT THE BACK OF THE CABINET.							
No Connection	Place Lead from Signal Gen. Near Loop	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	10	Broadcast Antenna	Adjust for Maximum Output.
No Connection	Place Lead from Signal Gen. Near Loop	600 KC	Broadcast	Tune to 600 KC Generator Signal	11	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.

TO SET UP THE BUTTONS FOR AUTOMATIC TUNING:

1. Turn the set on and allow it to operate at least fifteen minutes before attempting to set up the buttons.
2. Make a list of the frequencies of five nearby stations to which you wish to set up the buttons. Be sure to select the most powerful nearby stations, since weak signals will not give as satisfactory results.
3. Turn the set around so that the back of the set is facing you and remove the cabinet back. DO NOT DISCONNECT ANY WIRES WHICH COME FROM THE CABINET BACK.
4. Just behind the dial plate, when viewed from the rear, will be seen ten push button adjusting screws (see Fig. 1). These screws are used to tune in the stations that the buttons are to be set to.
5. Each of the push buttons can be made to tune in stations in a definite frequency range as shown in Fig. 1.

   Buttons No. 1 and 2 may be set up to any station which operates between 540 and 1000 KC. in frequency. Buttons No. 3 and 4 may be set up to stations operating between 750 and 1375 KC., while button No. 5 may be set up to stations operating between 980 and 1600 KC.
6. Turn the band switch to the "AM" position, push in the button labeled "MANUAL," then using the tuning knob (see Fig. 1) tune in the station you wish to set to button No. 1.

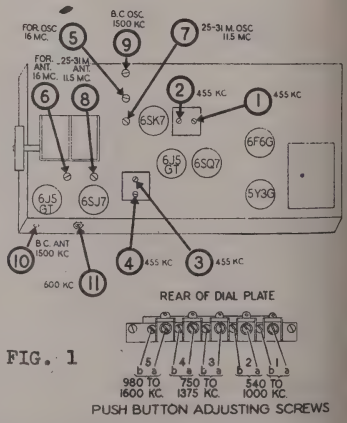


FIG. 1

7. Push in button No. 1 and using a screwdriver, turn adjusting screw No. 1a (the extreme right hand screw) until the station you had previously tuned in is again heard. If it is not heard, advance the volume control and adjust the screw again. Be sure to adjust screw No. 1a to the point where the program is heard with the deepest tone.
8. Insert the screwdriver in screw No. 1b (just to the left of, and behind, 1a) and turn it until the program is heard with the deepest tone. Check the setting of screw No. 1a, making sure it still is adjusted to give deepest tone.
9. The set-up for button No. 1 is now complete.
10. To set up the remaining buttons use the same procedure; push in the "MANUAL" button; tune in the station, using the tuning knob; push in the button to be set up; adjust its associated "a" adjusting screw until the station is tuned in (screw 2a for button No. 2, etc., see Fig. 1); the associated "b" screw is then adjusted for deepest tone as before.

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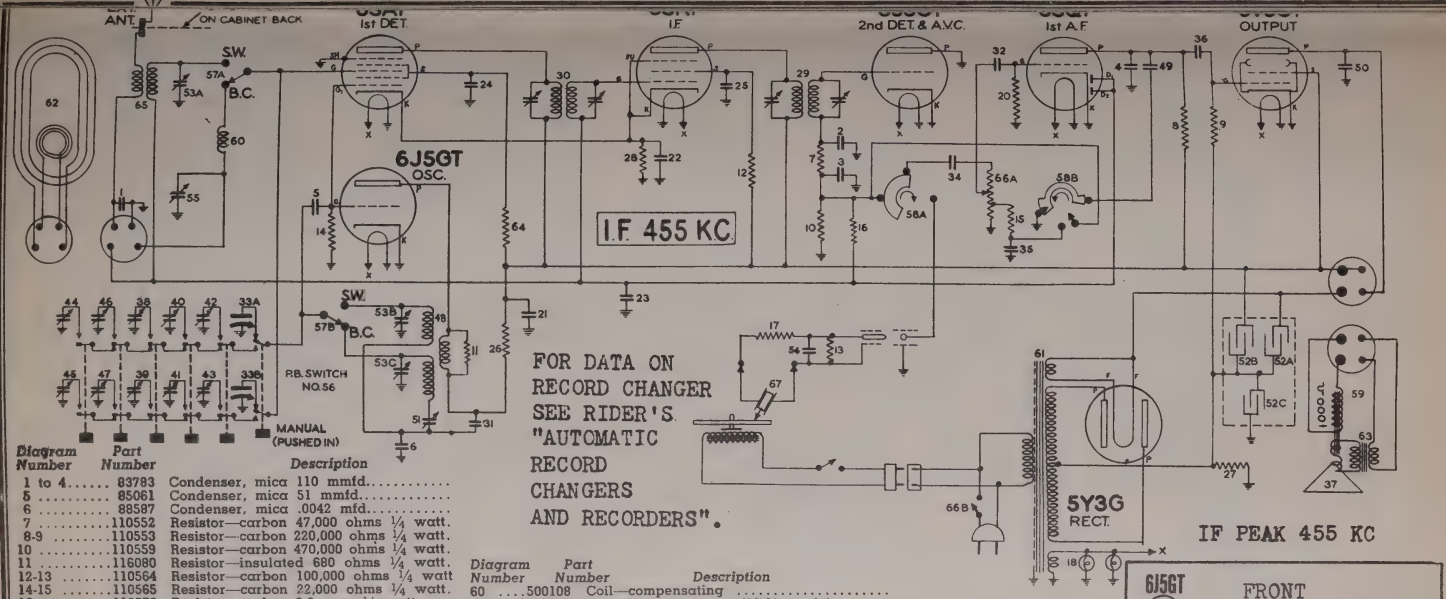


Diagram Number	Part Number	Description
1 to 4	83783	Condenser, mica 110 mmfd.
5	85061	Condenser, mica 51 mmfd.
6	88587	Condenser, mica .0042 mfd.
7	110552	Resistor—carbon 47,000 ohms ½ watt.
8-9	110553	Resistor—carbon 220,000 ohms ½ watt.
10	110559	Resistor—carbon 470,000 ohms ½ watt.
11	116080	Resistor—insulated 680 ohms ½ watt.
12-13	110564	Resistor—carbon 100,000 ohms ½ watt
14-15	110565	Resistor—carbon 22,000 ohms ½ watt.
16	110570	Resistor—carbon 2.2 meg. ½ watt.
17	110584	Resistor—carbon 330,000 ohms ½ watt
18-19	112636	Lamp—dial (Mazda No. 44 frosted)
20	112975	Resistor—carbon 10 meg. ½ watt.
21-22	116625	Condenser—.1 mfd. 600 V.
23-24-25	116819	Condenser—.05 mfd. 600 volt
26	118805	Resistor—carbon 10,000 ohms 1 watt
27	118812	Resistor—180 ohms 1 watt W.W.
28	118827	Resistor—carbon 270 ohms ½ watt
29	119024	Transformer—2nd I.F.
30	119042	Transformer—1st I.F.
31-32	119193	Condenser—.01 mfd. 600 volt
33A-33B	119291	Condenser—variable tuning
34-35-36	119414	Condenser—.02 mfd. 600 volt
37	M-500191	Cone & Voice coil for M-500105 speaker
38 to 41	119663	Condenser—push button trimmer
42-43	119664	Condenser—push button trimmer
44 to 47	119753	Condenser—push button trimmer
48	119788	Coil—oscillator
49	119817	Condenser—.004 mfd. 600 volt
50	119875	Condenser—.002 mfd. 600 volt
51	119934	Condenser—padder
52	160174	Condenser—electrolytic Section A—20 mfd. 400 volt Section B—15 mfd. 400 volt Section C—10 mfd. 25 volt
53A to 53C	160415	Condenser—trimmer (3 section)
54	160430	Condenser—.001 mfd. 600 volt
55	160449	Condenser—trimmer
56	500056	Switch—push button
57A-57B	500057	Switch—Band
58A-58B	500058	Switch—Radio-Phono tone
59	M-500105	Speaker—dynamic (10")

Diagram Number	Part Number	Description
60	500108	Coil—compensating
61	500116	Transformer—power (50-60 cycle)
	160780	Transformer—power (25 cycle)
62	500123	Loop antenna complete
63	M-500174	Transformer—output for M-500105 speaker
64	500146	Resistor—carbon 68,000 ohms ½ watt
65	500147	Coil—short wave antenna
66A-66B	118669	Volume control—1 meg. (with switch)
67	161289	Crystal cartridge

MENTION CODE No. A-348 WHEN ORDERING PARTS.

SOCKET VOLTAGES—ALL D.C. POTENTIAL MEASURED TO CHASSIS

NO SIGNAL CONDITION — DIAL TUNED TO 540 KC.

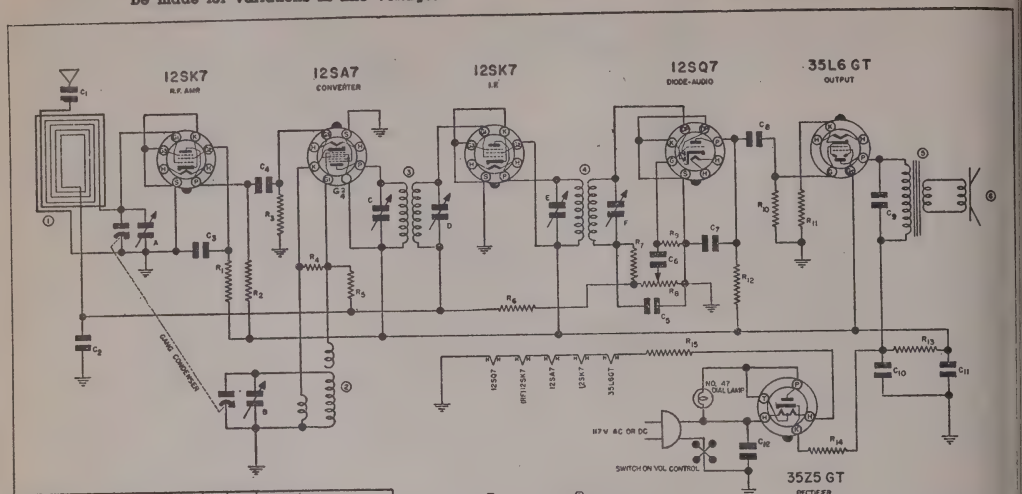
TUBE	FUNCTION	H	K	G	G_1	S	SU	P	D_1	D_2
6SA7	1st Det.	6.0 A.C.	3.2	0	—5	73		242		
6J5GT	Osc.	6.0 A.C.	0	—5				152		
6SK7	I. F.	6.0 A.C.	3.2	0		96	3.2	242		
6J5GT	2nd Det.-A.V.C.	6.0 A.C.	0	0				0		
6SQ7	1st A.F.	6.0 A.C.	0	0				75	0	0
6V6GT	Output	6.0 A.C.	0	Note A		242		218		
5Y3G	Rectifier	5.0 A.C.						Plates 350 V.A.C. to C.T.		

NOTE A: The 6V6GT grid bias voltage is —13.5 volts measured across resistor No. 27.
Use a high resistance voltmeter of at least 1000 ohms per volt.

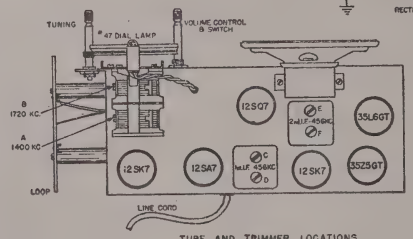
MODEL S-7403-2

FIRESTONE TIRE & RUBBER CO.

Voltages shown on the circuit diagram are from socket terminals to chassis base. In measuring voltages use a voltmeter having a resistance of at least 1000 ohms per volt. Allowances should be made for variations in line voltage.



DIAG NO	PART NO	DESCRIPTION
C1	N-1344	.01 MFD. 400 V. 20 %
C2	N-1345	.05 MFD. 200 V. 20 %
C3	N-1345	.05 MFD. 200 V. 20 %
C4	N-2383	150 MMFD. MICA 20 %
C5	N-1374	100 MMFD. MICA 20 %
C6	N-1344	.01 MFD. 400 V. 20 %
C7	N-1447	.0005 MFD 400 V. 20 %
C8	N-1344	.01 MFD. 400 V. 20 %
C9	N-1344	.01 MFD. 400 V. 20 %
C10 C11	N-3658	40 MFD. 150 W.V. ELECTROLYTIC 40 MFD. 150 W.V.
C12	N-1346	.05 MFD. 400 V. 20 %
R1	N-3814	15,000 OHM .5 W. 20 %
R2	N-3793	4,000 OHM .5 W. 10 %
R3	N-1260	50,000 OHM .5 W. 20 %
R4	N-1627	20,000 OHM .5 W. 20 %
R5	N-1263	10 MEGOHM .5 W 20 %
R6	N-1418	3.5 MEGOHM .5 W. 20 %
R7	N-1450	30,000 OHM .5 W 20 %
R8	N-3789	0.5 MEGOHM VOLUME CONTROL
R9	N-2189	4 MEGOHM .5 W. 20 %
R10	N-1264	500,000 OHM .5 W. 20 %
R11	N-3813	150 OHM .5 W. 10 %
R12	N-1377	200,000 OHM .5 W. 20 %
R13	N-3889	1200 OHM 1 W. 10 %
R14	N-1742	25 OHM .5 W. 20 %
R15	N-3794	30 OHM 1 W 10 %
1	N-3784	ANTENNA LOOP COIL
2	N-3298	OSCILLATOR COIL
3	N-3816	1ST. I.F. TRANSFORMER
4	N-3804	2ND. I.F. TRANSFORMER
5	N-3782	OUTPUT TRANSFORMER
6	N-3781	5" P.M. SPEAKER
	N-3783	2 GANG CONDENSER



TUBE AND TRIMMER LOCATIONS

I.F.—456 K.C.

6 TUBE A.C.-D.C.
SUPERHETERODYNE
SINGLE BAND

DRAWN [illegible] APPROVED [illegible]
OCTOBER 8, 1940.

ALIGNMENT DATA AND SERVICING

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or spe open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OU MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OT WISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFE TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume contro' on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connecte the chassis ground. Align all four I.F. trimmers to peak or maxi reading on the output meter.

BROADCAST BAND ALIGNMENT. Remove the chassis from cabinet and set on a bench, taking care that no metal is nea loop. Do not make this setup on a metal bench.

Connect the test oscillator to the antenna of the set throu 200 mmfd. (.0002) condenser. With the gang condenser s minimum capacity, set the test oscillator at 1720 KC, and a the oscillator (or 1720 KC trimmer) on gang condenser. Next the test oscillator at 1400 KC, and tune in the signal on the condenser. Adjust the antenna trimmer (or 1400 KC trimme maximum signal. Next set the test oscillator at 600 KC, and in signal on condenser to check alignment of coils.

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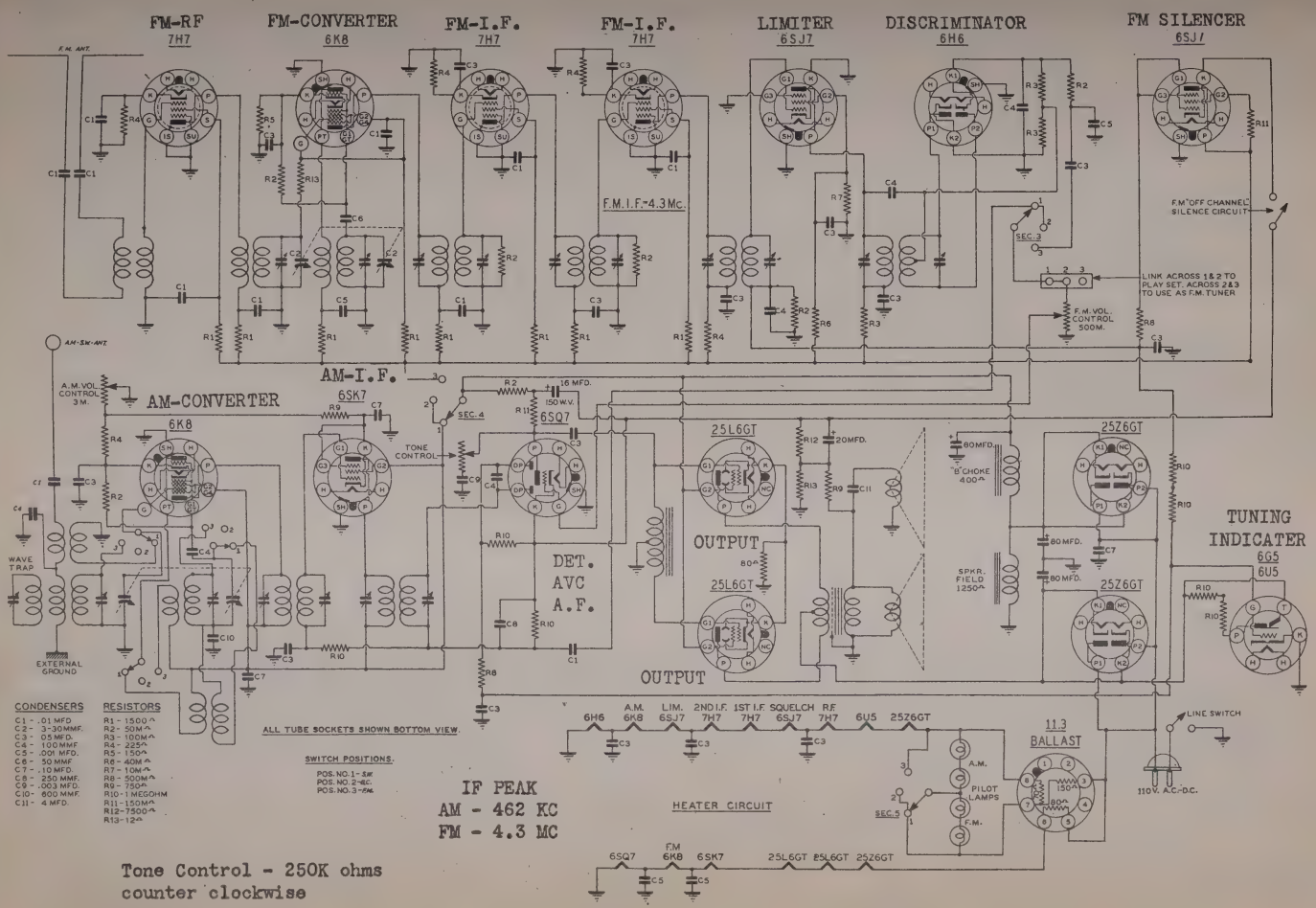
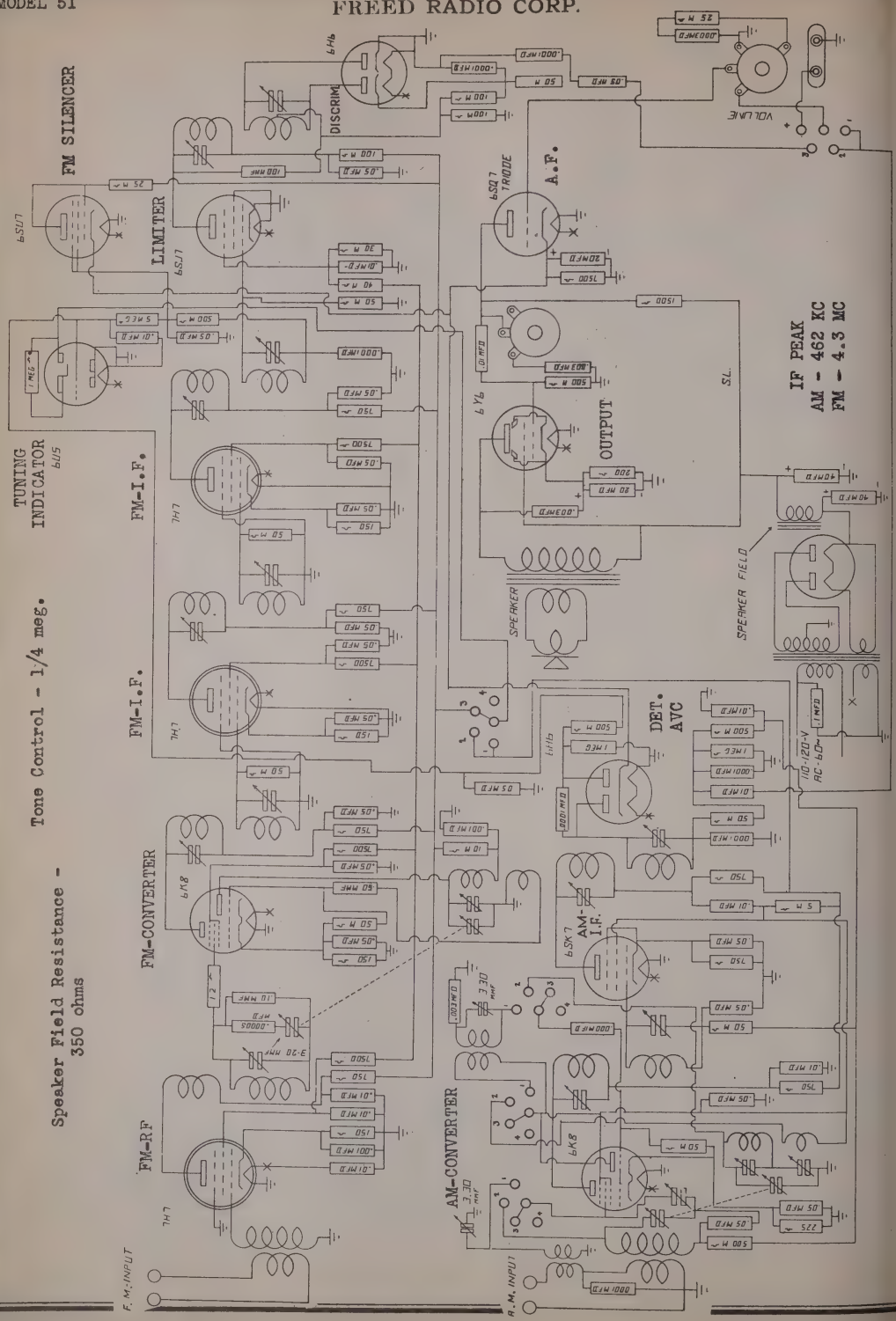


FREED RADIO CORP.

MODEL 40

MODEL 51

FREED RADIO CORP.



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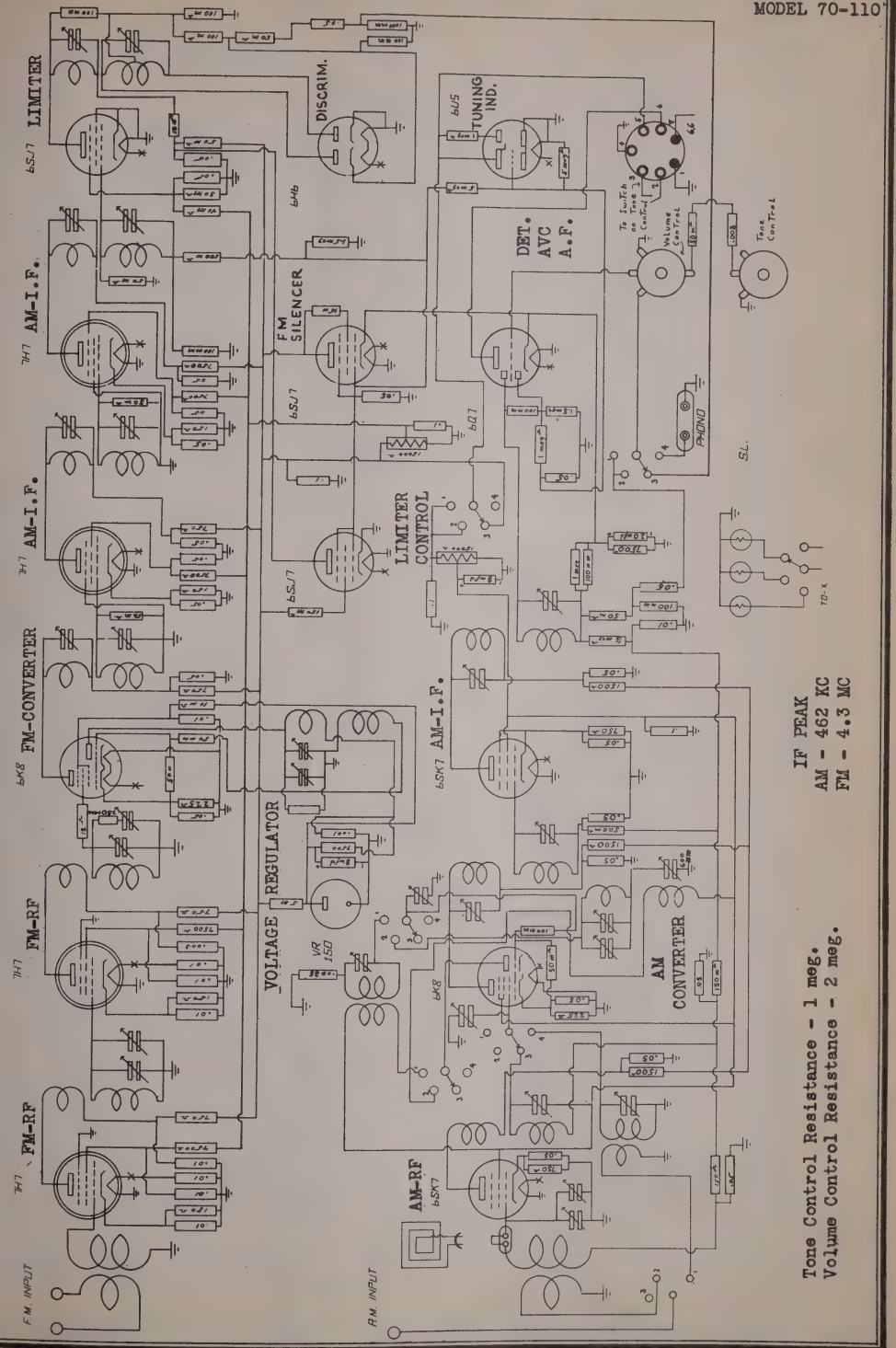
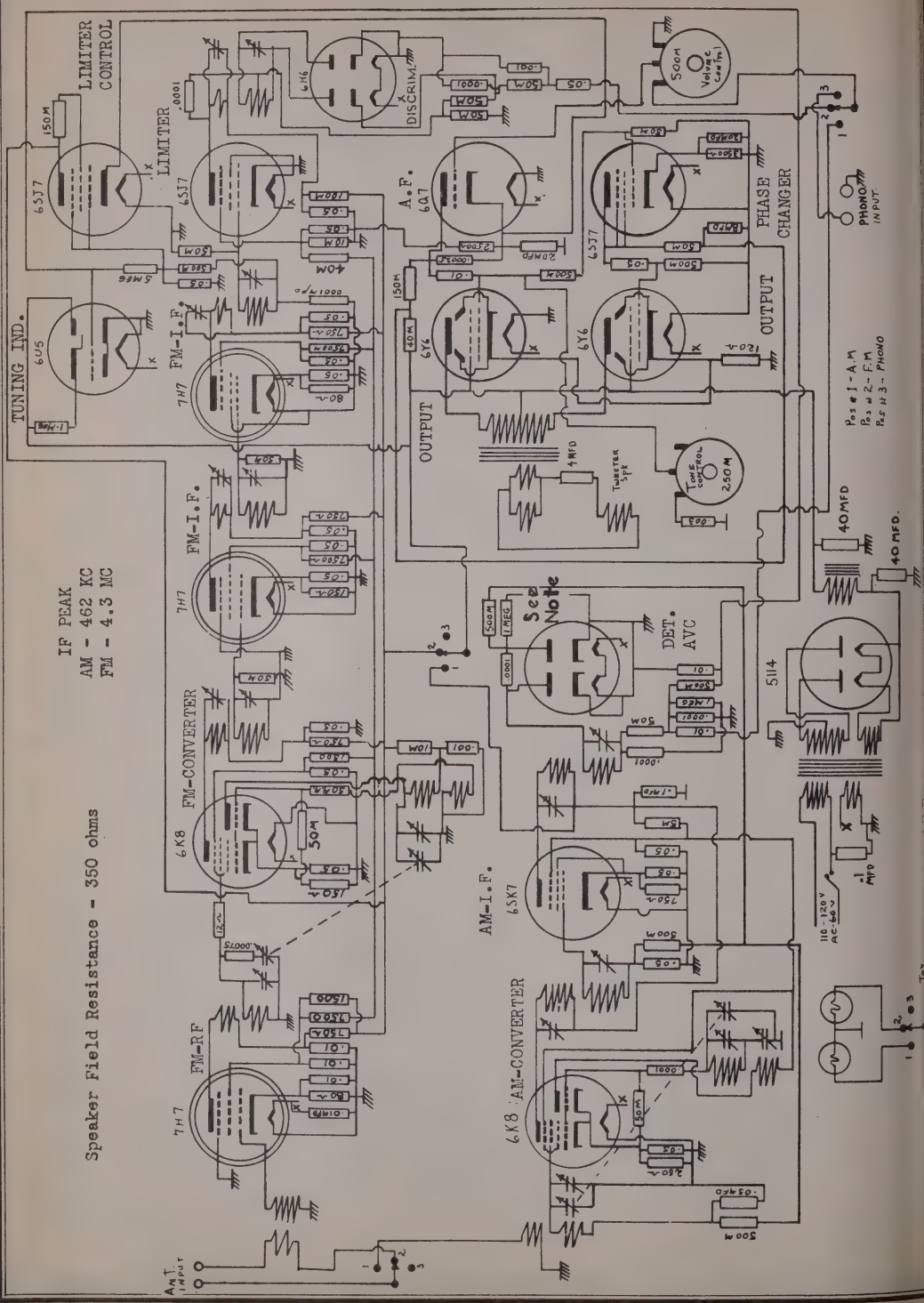
FREED RADIO CORP.

MODEL 52
MODEL 70-110



MODEL 57-71

FREED RADIO CORP.



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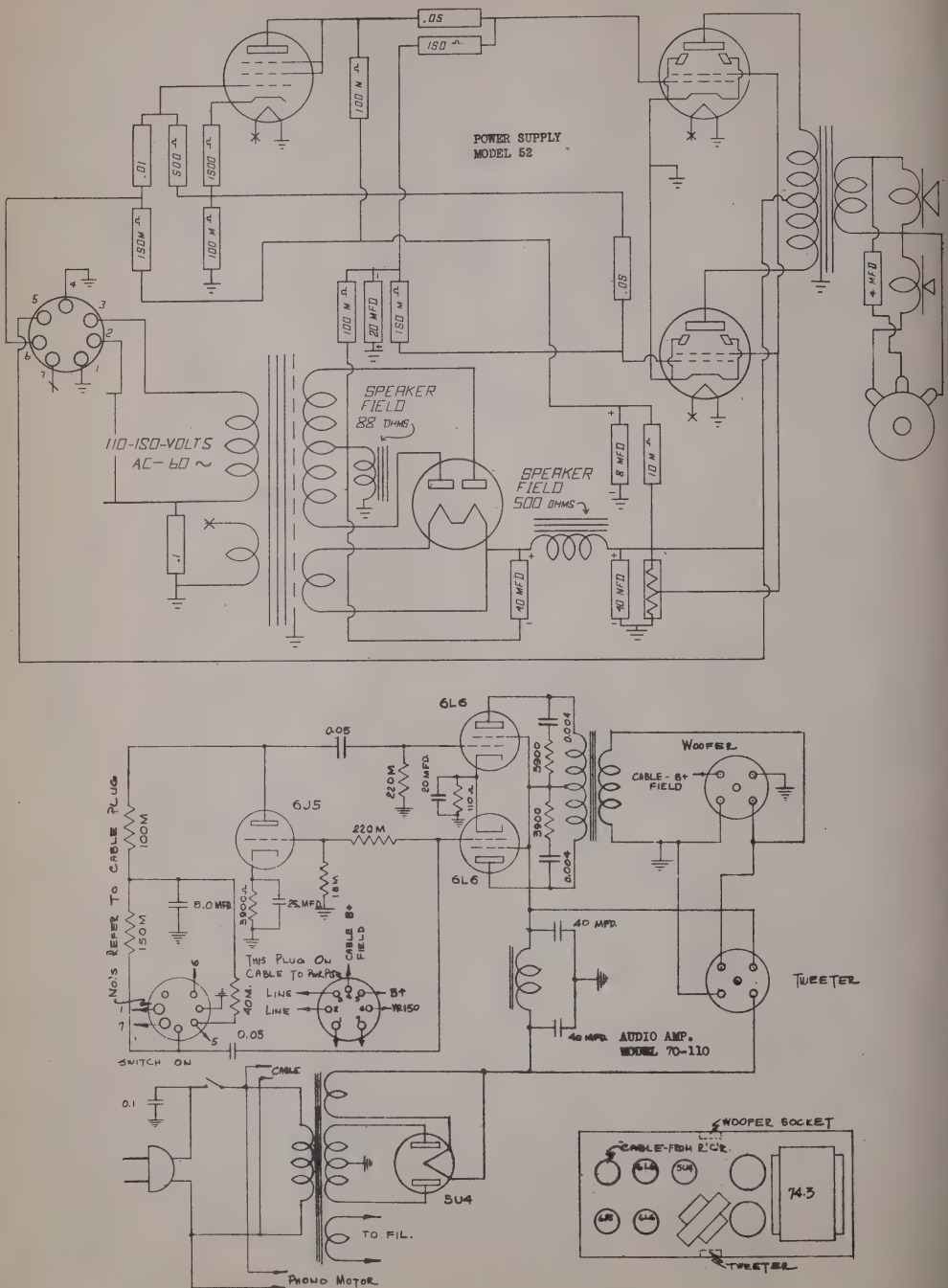
FREED RADIO CORP.

MODEL 57A-71A
MODEL 69

MODEL 52
MODEL 70-110

FREED RADIO CORP.



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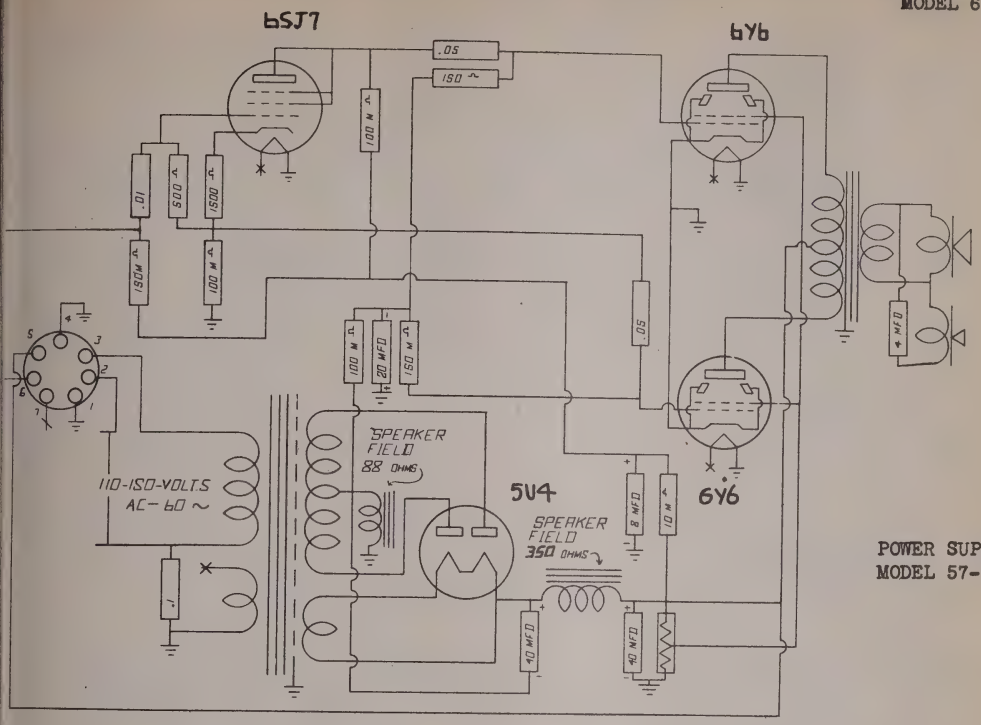
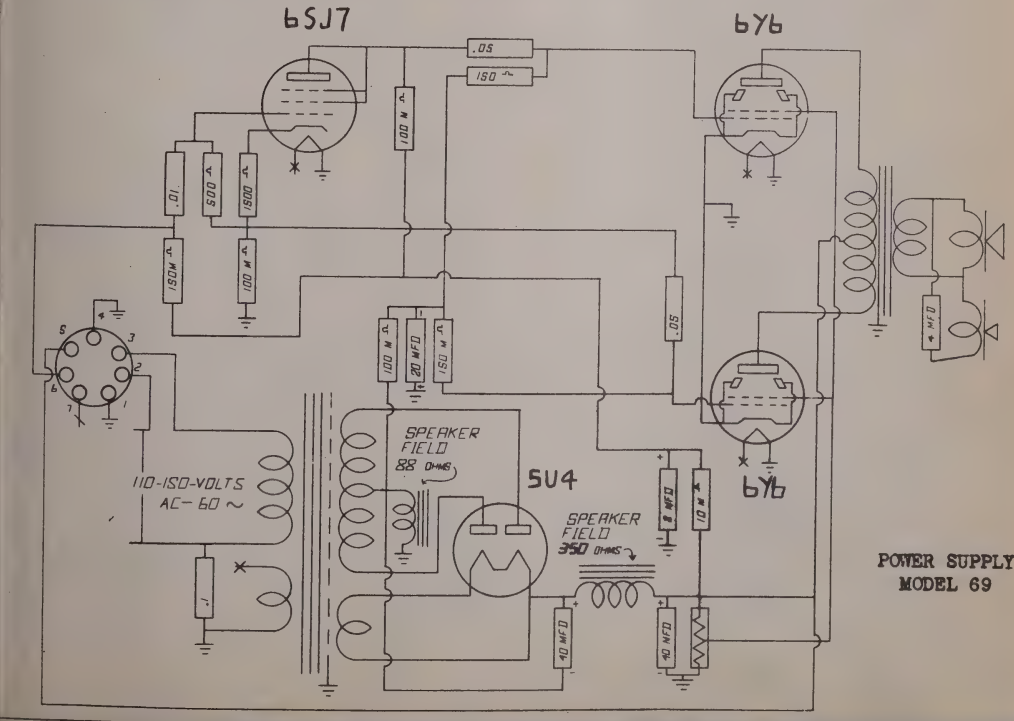
FREED RADIO CORP.

MODEL 57-57A
MODEL 69



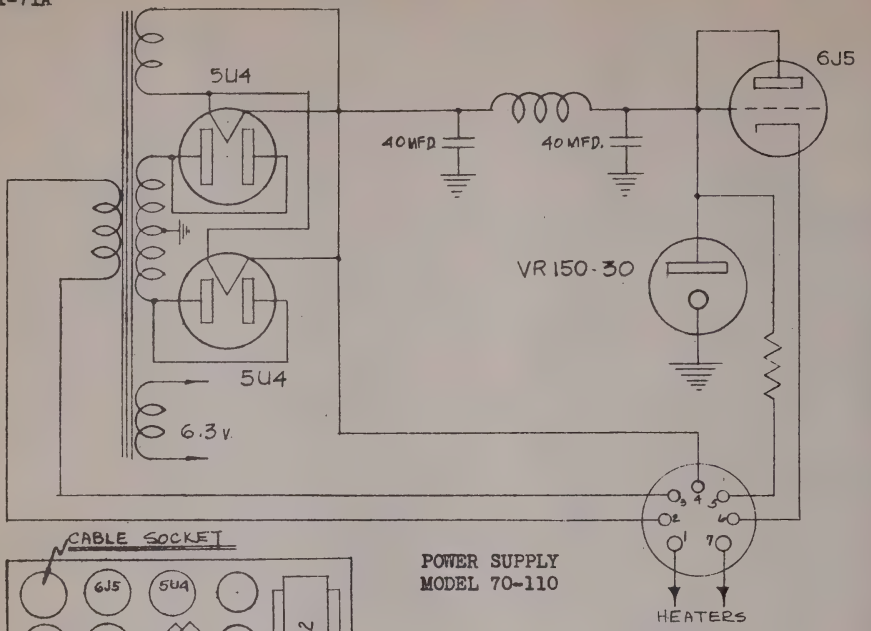
POWER SUPPLY
MODEL 57-57A

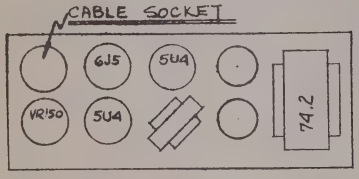


POWER SUPPLY
MODEL 69

MODEL 70-110
MODEL 71-71A

FREED RADIO CORP.

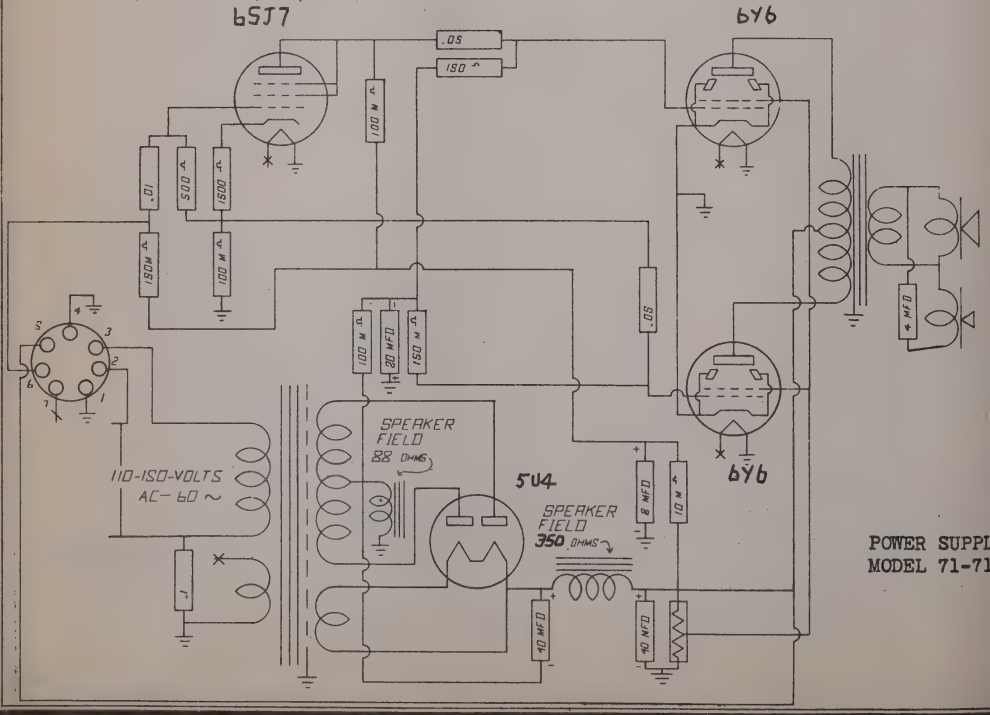




POWER SUPPLY
MODEL 70-110

THIS SOCKET ON CHASSIS. RECEIVES PLUG FROM OTHER POWER PACK. FOR DETAILS SEE DWG. NO. B

CHASSIS LAYOUT - TOP. VIEW.



POWER SUPPLY
MODEL 71-71A

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GALVIN MFG. CO.

MODEL 36C-1
MODEL 36C-2

ALIGNMENT CHART MODEL 36C-1

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	262 K.C.
2	1600 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1600 K.C.
3	545 K.C.	.1 Mfd.	Osc.-Mod. Grid	6	545 K.C.
4	1400 K.C.	*	To Special Dummy	7	1400 K.C.
5	1400 K.C.	*	To Special Dummy	8	1400 K.C.
6	600 K.C.	*	To Special Dummy	9	600 K.C.

* Use Special Dummy Part No. 26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.

ALIGNMENT CHART MODEL 36C-2

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod. Grid	1-2-3-4	455 K.C.
2	1400 K.C.	.1 Mfd.	Osc.-Mod. Grid	5	1400 K.C.
3	1400 K.C.	*	To Special Dummy	6	1400 K.C.
4	600 K.C.	*	To Special Dummy	7	600 K.C.

* Use Special Dummy Part No. 26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.

MODEL 36-C1

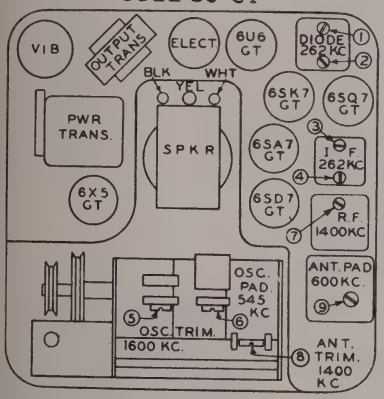
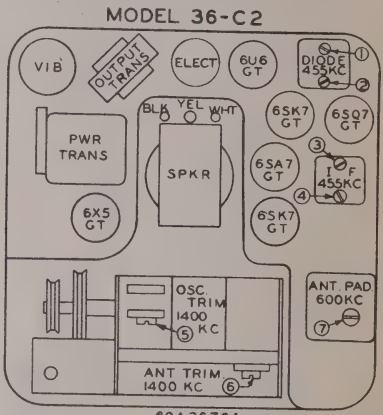


Fig. 1

MODEL 36-C2



69A26764

Fig. 2

SENSITIVITY AND STAGE GAIN MEASUREMENT MODEL 36C-1

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
22,250	262 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
700	262 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
710	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
13	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
3	600 K.C.	Ant. Lead	***	None	1.74

Volume Control Set At Maximum — Tone Control Set At Voice.
* 1 Watt = 1.74 Volts — ** Output meter connected across voice coil.
*** Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.

SENSITIVITY AND STAGE GAIN MEASUREMENT MODEL 36C-2

Average Microvolt Input *	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
10,000	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	1.74
560	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
625	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	1.74
90	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	1.74
12	600 K.C.	Ant. Lead	***	None	1.74

Volume Control Set At Maximum — Tone Control Set At Voice.
* 1 Watt = 1.74 Volts — ** Output meter connected across voice coil.
*** Use Special Dummy Part No. 1X26767 or Booster Coil Part No. 24A26751 in series with a 35 Mmf. Condenser.

MODEL 36C-1

GALVIN MFG. CO.

6SD7GT R.F. AMP
6SA7GT OSC. MOD
6SK7GT I.F. AMP
6SQ7GT DET-AVC-AF
6U6GT PWR AMP
6X5GT RECTIFIER
VIBRATOR (46)
3 GANG COND. (11)
ANT. RECEP. INPUT CAPACITY 25 MMF TO 250 MMF
ANT WHT GRN (1)
A INPUT
OSC. COIL (BRACKET VIEW) (3)
"A" FILTER CHOKE (49)
SPARK PLATE
15 AMP FUSE (48)
FUSE LEAD ASSEMBLY (50)
"A" CHOKE & BRACKET (45-3)
SW. ON VOL & TONE CONT. 50 Ω (42)
VIB CHOKE (8)
PILOT LIGHT (47) NO 51
X TO FIL.
PWR TRANS (6)
(7) OUTPUT TRANS
(10) SPEAKER 3 Ω VC (6" ELECTRO)
4 Ω SPKR. FLD.
VOLTAGE CHART
NOTE ALL VOLTAGES MEASURED ON A 1000 OHM PER VOLT VOLTMETER
BOTTOM VIEW OF CHASSIS
CURRENT INPUT:-.7 AMP. AT 6.3 V.
MAX. PWR. OUTPUT:-4.0 WATTS

TUBE	PLATE TO GND	SCREEN TO GND	CATH. TO GND
6SD7GT	R.F. AMP	115V	70 V.	0
6SA7GT	OSC. MOD	115 V.	115 V.	0
6SK7GT	I.F. AMP	120 V	115 V	7 V.
6SQ7GT	DET. AVC A.F.	35 V	—	-2.8 V
6U6GT	PWR. AMP	140 V	120 V.	0
6X5GT	RECT.	A.C.	—	148 V.

DIAG. NO.	PART NO.	DESCRIPTION
1	1X21107	ANTENNA COIL & SHIELD ASSEMBLY
2	1X21108	R.F. COIL & SHIELD ASSEMBLY
3	2U421025	OSC. COIL & MTG. STRIP
4	1X23096	I.F. & SHIELD ASSEMBLY
5	1X23094	DIODE COIL & SHIELD ASSEMBLY
6	2S823115	POWER TRANSFORMER
7	2S423059	OUTPUT TRANSFORMER
8	2S423060	VIBRATOR TRANS.
9	2U421058	"A" CHOKE & BRACKET
10	5082U158	SPEAKER (6" ELECTRO)
11	1X21021	TUNING UNIT, GANG & PULLEY ASSY.
12	2U421135	OSCILLATOR PADDER & BRACKET (9-30 MMFD.)
13	2U421127	TRIMMER & BRACKET (3-15 MMFD. MOM.)
14	2S421127	COMPOUNDING CONDENSER
15	23A21719	ELECTROLYTIC COND. (30-20/200V, -20/25V.)
16	5A19133	TUBULAR CONDENSER (.5-100)
17	5A14095	TUBULAR CONDENSER (.1-100)
18	5A3510	TUBULAR CONDENSER (.1-200V)
19	5A14096	TUBULAR CONDENSER (.05-400V)
20	5A13514	TUBULAR CONDENSER (.05-100V)
21	5A14760	TUBULAR CONDENSER (.02-400V)
22	5A13513	TUBULAR CONDENSER (.05-400V)
23	5A2899	TUBULAR CONDENSER (.002-600V)
24	5A2899	TUBULAR CONDENSER (.007-600V)
25	5A2899	TUBULAR CONDENSER (.007-600V)
26	5A13514	TUBULAR CONDENSER (.05-100V)
27	8U4X600	MOLDED MICA COND. (500 MMFD) 500V
28	8U4X600	MOLDED MICA COND. (500 MMFD) 500V
29	21A23110	CERAMIC MICA COND. (300 MMFD) 7KV
30	6661/59	CARBON RESISTOR (1 MEG.-+/-20)1W.
31	6661/59	CARBON RESISTOR (1 MEG.-+/-20)1W.
32	6661/60	CARBON RESISTOR (470,000-+/-20)1W.
33	6661/64	CARBON RESISTOR (220,000-+/-20)1W.
34	6661/54	CARBON RESISTOR (33,000-+/-20)1W.
35	6661/59	CARBON RESISTOR (33,000-+/-20)1W.
36	6661/2	CARBON RESISTOR (22,000-+/-20)1W.
37	6661/53	CARBON RESISTOR (2,200-+/-10)1W.
38	6661/44	CARBON RESISTOR (100-+/-20)1W.
39	6661/51	CARBON RESISTOR (330-+/-10)1W.
40	6661/50	CARBON RESISTOR (150-+/-10)1W.
41	6661/55	CARBON RESISTOR (50-+/-20)1W.
42	6661/55	CARBON RESISTOR (50-+/-20)1W.
43	6661/52	CARBON RESISTOR (27-+/-10)1W.
44	6661/48	CARBON RESISTOR (10-+/-10)1W.
45	1A21/56	VOLUME CONTROL & SWITCH (.5MEG)
45-1	1A21/057	VIBRATOR
46	6541/151	BULB (WHITE BEAD) #51
47	6541/166	FUSE (15 AMP.) 3AG
48	6541/168	FUSE HOLDER ASSEMBLY
49	1X23068	FUSE LEAD ASSEMBLY
50	2U411760	SANTAY TUBE SHIELD
51		

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MODELS 36-C1, 36-C2 DIAL CORD INSTRUCTIONS TUNING CORD

1. Remove the chassis from the housing, and place on service bench.
2. Remove the broken string.
3. Turn the condenser gang to fully meshed position.
4. Cut a length of 30 lb. silk fish cord 25 inches long.
5. Thread one end of cord through Hole (x) in drive pulley and with an ordinary paper clip fasten to tuning control bracket so that cord will stay in place.
6. In a clockwise direction, wind cord one full turn around drive pulley and up to tuning shaft. (See Fig. 3.)
7. Route cord 7 turns around tuning shaft as shown in Fig. 3 and down to drive pulley.
8. Continue in a clockwise direction around drive pulley and through hole (x).
9. Slip the two cord ends through eyelet (Part No.5S7824) inside of pulley.
10. Knot the two cord ends together and fasten to one end of spring (Part No.41A14759). Hook other end of spring to hole (y) in drive pulley.
11. With a pair of pliers pinch eyelet on cord and place drop of shellac on cord knot.

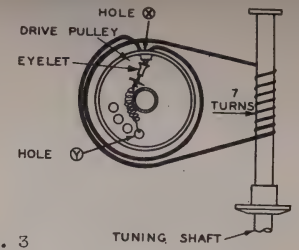


Fig. 3

MODELS 36-C1, 36-C2 POINTER CORD

1. Remove the chassis from housing and place on service bench.
2. Remove broken string.
3. Set condenser gang to fully meshed position.
4. Cut a length of 18 lb. silk fish cord 27 inches long.
5. Thread one end of cord through hole (c) in condenser pulley and with an ordinary paper clip fasten it to the tuning shaft bracket to hold in place. (See Fig. 4.)
6. In a clockwise direction run cord one turn around condenser pulley, under brake shoe and over to idler pulley No. 3 and around it in a counter-clockwise direction.
7. Route string across chassis to idler pulley No. 2, and around it in a counter-clockwise direction.
8. Route cord back across chassis and down over idler pulley No. 1.
9. Route cord down and around condenser pulley turn to hole (c).
10. Remove the paper clip from end of cord and knot the two ends of cord together inside of drive pulley and fasten one end of spring (Part No.41A11091) to cord and the other end to hook in condenser pulley.
11. Cut off surplus cord.
12. To set pointer to correct frequency, tune in a station of known frequency and adjust pointer on string.
13. Fasten pointer to string with a drop of shellac. Place a drop of shellac on cord knot.

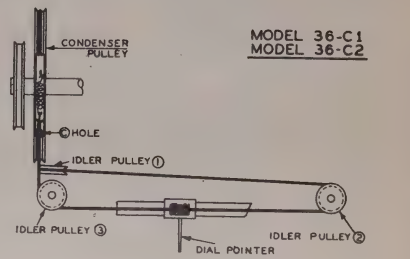


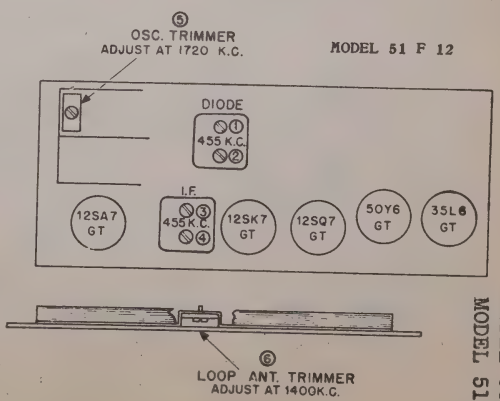
Fig. 4

MODEL 51 F 12 SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading
2600	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	.38
25	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
30	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
4.5	600 K.C.	Ant.Terminal	200 Mmf.	None	.38

MODEL 51 F 12 ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.-Mod.	1-2-3-4	455 K.C.
2	1720 K.C.	.1 Mfd.	Osc.-Mod.	5	1720 K.C.
3	1400 K.C.	200 Mmf.	Ant.Lead.	6	1400 K.C.



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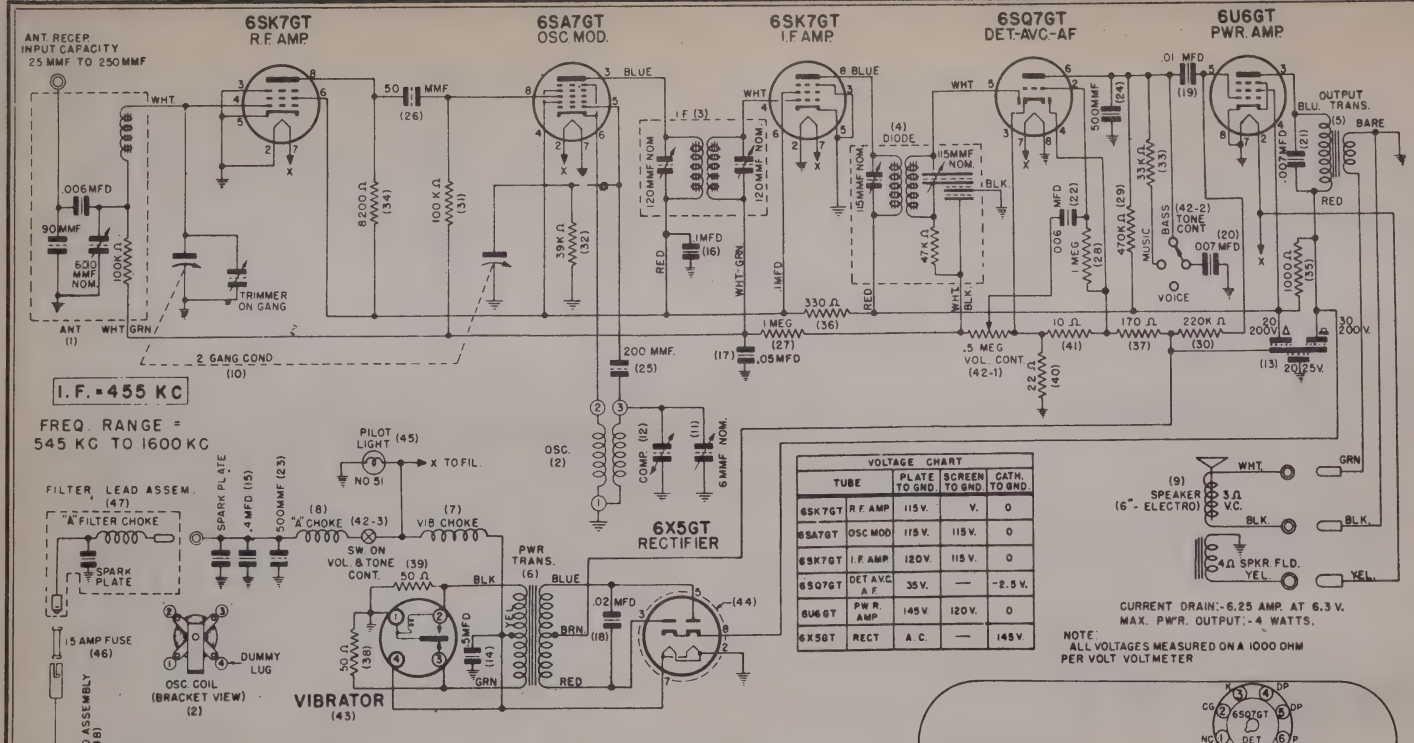
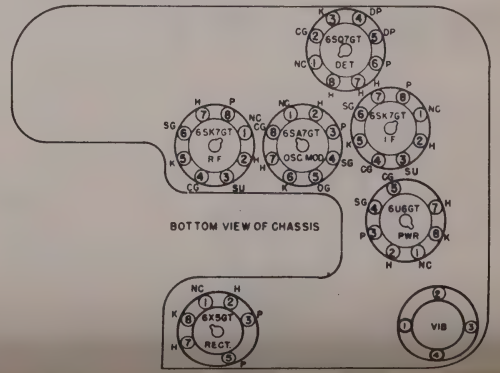


VOLTAGE CHART				
TUBE		PLATE TO GND.	SCREEN TO GND.	CATH. TO GND.
6SK7GT	R.F. AMP	115 V.	V.	0
6SA7GT	OSC. MOD.	115 V.	115 V.	0
6SK7GT	I.F. AMP.	120 V.	115 V.	0
6SQ7GT	DET. AVC. A.F.	35 V.	—	-2.5 V.
6U6GT	PWR. AMP.	145 V.	120 V.	0
6X5GT	RECT.	A.C.	—	145 V.

CURRENT DRAIN:-6.25 AMP. AT 6.3 V.
MAX. PWR. OUTPUT:-4 WATTS.

NOTE:
ALL VOLTAGES MEASURED ON A 1000 OHM PER VOLT VOLTMETER



DIAG. NO.	PART NO.	DESCRIPTION
1	1X2,523	ANTENNA COIL & SHIELD ASSEMBLY
2	21AX3792	OSCILLATOR COIL
3	1X2,529	I.F. COIL & SHIELD ASSEMBLY
4	1X2,527	DIODE COIL & SHIELD ASSEMBLY
5	25A2,525	OUTPUT TRANSFORMER
6	25B2,3103	POWER TRANSFORMER
7	21A17010	VIBRATOR CHOKE
8	21A23092	"A" CHOKE & BRACKET
9	50B2,561	SPEAKER (6" ELECTRO)
10	1X2,543	TUNING UNIT, GANG & PULLEY ASSEMBLY (2 GANG)
11	20A17237	TRIMMER & BRACKET (6 MMFD NOM.)
12	20A20358	COMPENSATING CONDENSER
13	2A22738	ELECTROLYTIC CONDENSER (20-30/200V, 20/25V)
14	8A19133	TUBULAR CONDENSER (.3-100V)
15	8A11,095	TUBULAR CONDENSER (.4-100V)
16	8A3310	TUBULAR CONDENSER (.1-200V)
17	8A13514	TUBULAR CONDENSER (.05-100V)
18	8A22760	TUBULAR CONDENSER (.02-600V)
19	8A23053	TUBULAR CONDENSER (.01-200V)
20	8A2289	TUBULAR CONDENSER (.007-600V)
21	8A2284	TUBULAR CONDENSER (.007-600V)
22	8A1,529	TUBULAR CONDENSER (.006-100V)
23	21B6500	MOLDED MICA COND. (500 MMFD) 20%
24	21B6500	MOLDED MICA COND. (500 MMFD) 20%
25	21B6501	MOLDED MICA COND. (200 MMFD) 20%
26	21A12843	CERAMIC COND. (50 MMFD)
27	686159	CARBON RESISTOR (1 MEG-1/3-20) INS.
28	686159	CARBON RESISTOR (1 MEG-1/3-20) INS.
29	686160	CARBON RESISTOR (470,000-1/3-20) INS.
30	686204	CARBON RESISTOR (220,000-1/3-20) INS.
31	686165	CARBON RESISTOR (100,000-1/3-20) INS.
32	686355	CARBON RESISTOR (39,000-1/3-20) INS.
33	686329	CARBON RESISTOR (33,000-1/3-20) INS.
34	686302	CARBON RESISTOR (8,200-1/3-20) INS.
35	686184	CARBON RESISTOR (1,000-1-20) N.I.
36	686010	CARBON RESISTOR (330-1/2-20) INS.
37	686363	CARBON RESISTOR (170-1-10) INS.
38	686005	CARBON RESISTOR (50-1/2-20) N.I.
39	686005	CARBON RESISTOR (50-1/2-20) N.I.
40	686356	CARBON RESISTOR (22-1/3-10) INS.
41	686332	CARBON RESISTOR (10-1/3-10) INS.
42	18B2,046	VOL. TONE CONTROL & SWITCH (.5 MEG)
43	1DA5067	VIBRATOR
44	26A2683	TUBE SHIELD
45	6X,151	BULB, (WHITE BEAD) #51
46	6X,155	FUSE (15 AMP) 3AG
47	1X2,555	FILTER LEAD ASSEMBLY
48	1X2,508	FUSE LEAD ASSEMBLY

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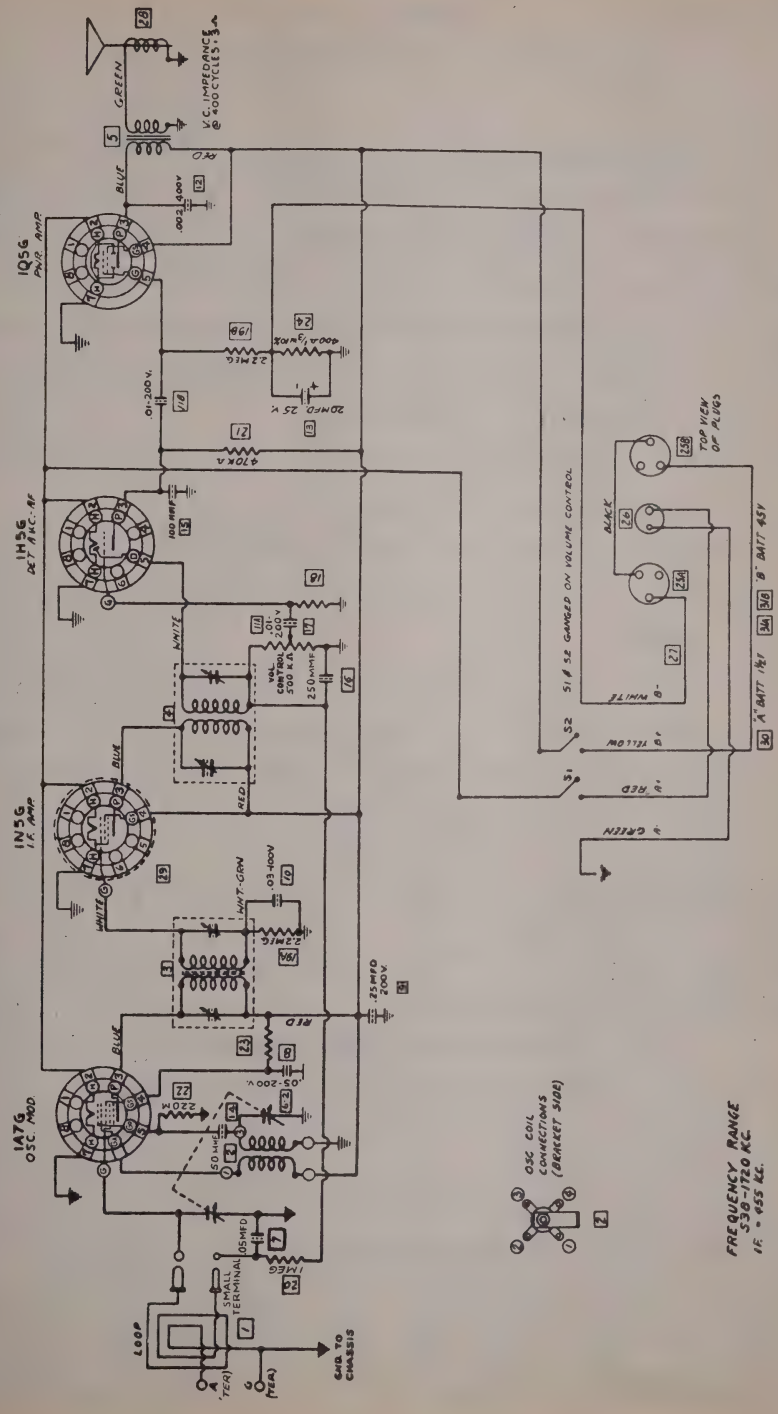
MODEL 41D



MODELS 49BT1, 49BT2
MODEL 41H
MODELS 41D, 51D, 52D

GALVIN MFG. CO.

ALIGNMENT PROCEDURE

MODELS 49BT1 AND 49BT2

1. Connect signal generator to control grid of first detector tube (1A7G) through a .05 MF condenser, and to chassis. Do not remove grid cap. Also connect output meter across speaker voice coil. Turn condenser gang completely out of mesh.
2. Set signal generator to 455 KC and carefully adjust the two I.F. trimmers and the one diode trimmer to point showing highest reading on output meter.
3. Connect signal generator to antenna and ground leads using a .0002 MF condenser in antenna lead.
4. Set signal generator and receiver dial both at 1700 KC. Adjust osc. trimmer (on condenser gang) until 1700 KC signal is heard.
5. Set signal generator at 1400 KC and turn condenser gang to the signal at 1400 KC. Adjust antenna trimmer (on condenser gang) to point showing highest reading on output meter.

MODEL 41H

ALIGNMENT PROCEDURE

1. Connect signal generator to control grid of first detector tube (1A7GT) through a .05 Mf Condenser, and to chassis. Do not remove grid cap. Also connect output meter across speaker voice coil. Turn condenser gang completely out of mesh. The loop must be connected to the chassis at all times.

2. Set Signal generator at 455 K.C. and carefully adjust the two I.F. trimmers and the two DIODE trimmers to point showing highest reading on output meter.

3. Turn signal generator to 1720 K.C. and, with condenser gang completely out of mesh adjust OSC. trimmer (on small section of condenser gang) until 1720 K.C. signal is heard.

4. Place chassis in cabinet, connect loop terminals, and fasten back on cabinet.

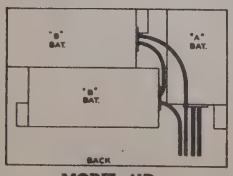
5. Remove plug from side of cabinet to expose ANT. trimmer.

6. Tune in a weak station near 1400 or 1500 K.C. and adjust ANT. trimmer through hole in cabinet for maximum volume.

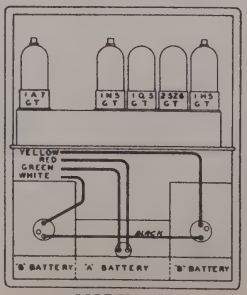
There are no further adjustments.

MODELS 41D, 51D, AND 52D

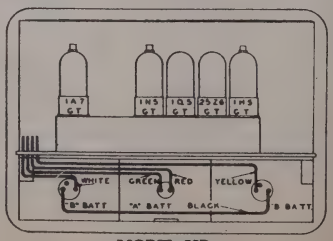
POSITION AND CONNECT BATTERIES AS SHOWN BELOW



MODEL 41D



MODEL 51D



MODEL 52D

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MODEL 41H

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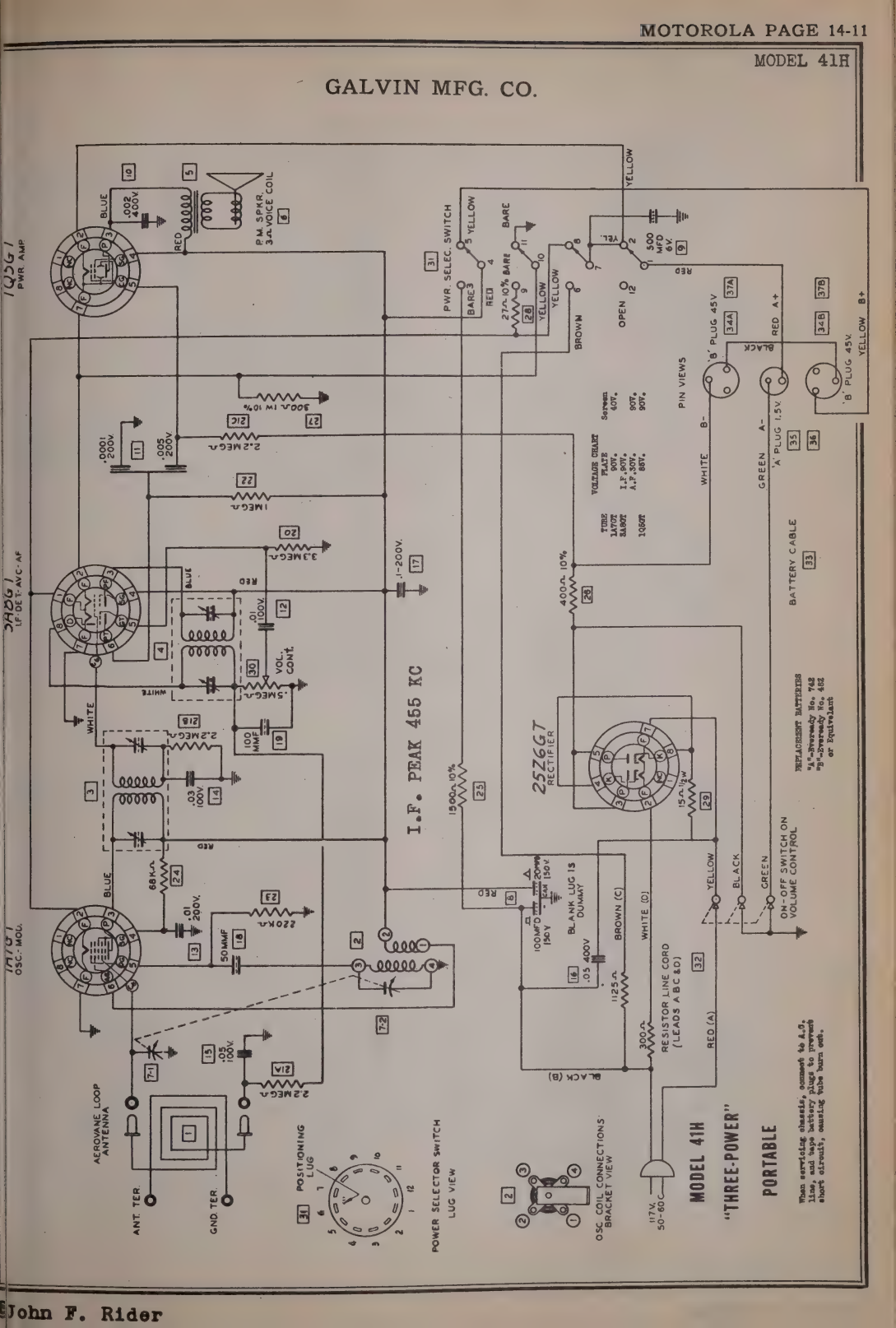

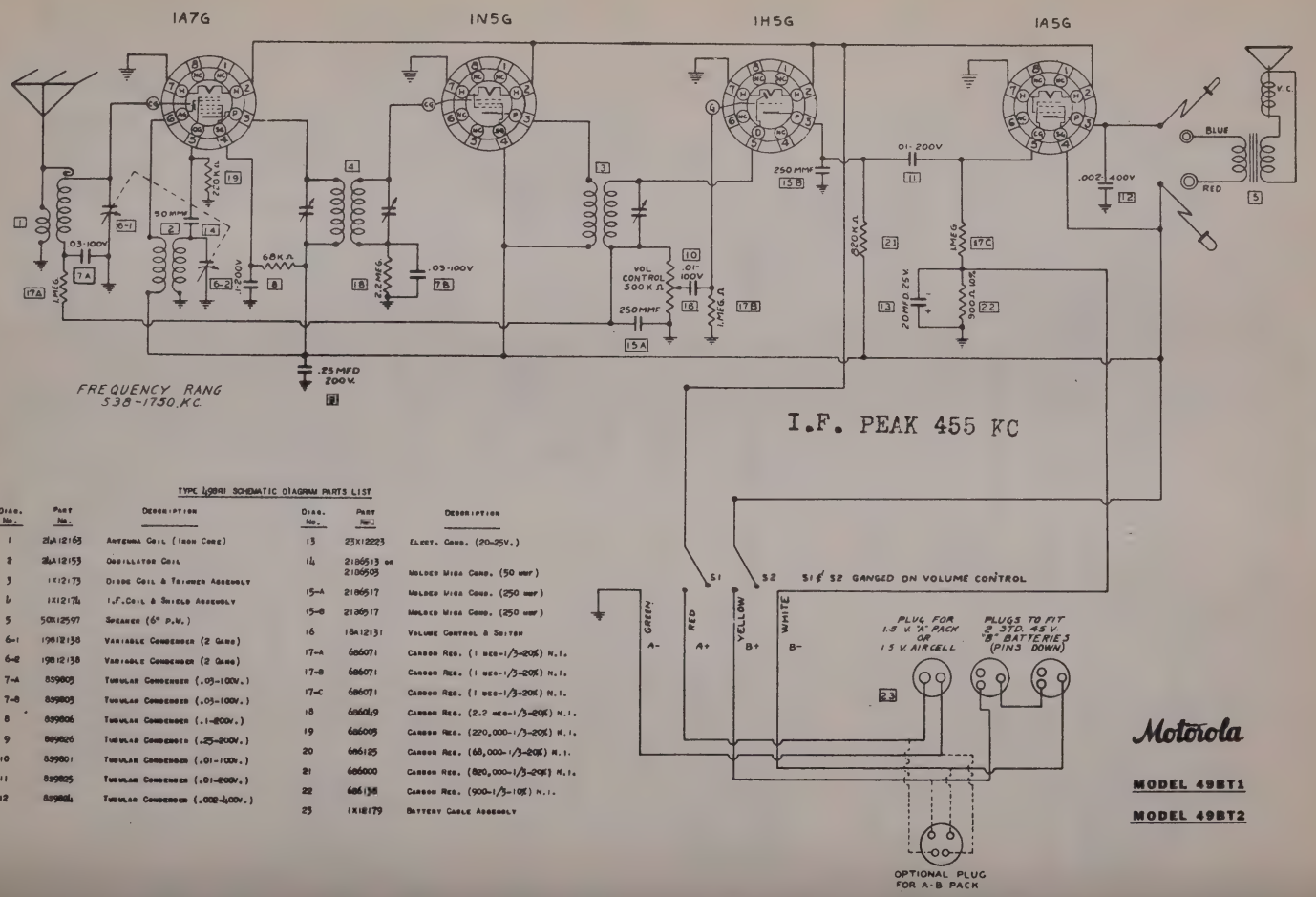

TYPE 49BR1 SCHEMATIC DIAGRAM PARTS LIST

Diag. No.	Part No.	Description
1	2BA12165	Antenna Coil (Iron Core)
2	2BA12153	Oscillator Coil
3	1X12173	Diode Coil & Trimmer Assembly
4	1X12174	I.F. Coil & Shield Assembly
5	50X12597	Speaker (6" P.M.)
6-1	19B12138	Variable Condenser (2 Gang)
6-2	19B12138	Variable Condenser (2 Gang)
7-A	859805	Tubular Condenser (.03-100V.)
7-B	859805	Tubular Condenser (.03-100V.)
8	859806	Tubular Condenser (.1-200V.)
9	859826	Tubular Condenser (.25-200V.)
10	859801	Tubular Condenser (.01-100v.)
11	859825	Tubular Condenser (.01-200V.)
12	859824	Tubular Condenser (.002-400V.)
13	23X12223	Elect. Cond. (20-25V.)
14	2186513 or 2186503	Molded Mica Cond. (50 mmf)
15-A	2186517	Molded Mica Cond. (250 mmf)
15-B	2186517	Molded Mica Cond. (250 mmf)
16	18A12131	Volume Control & Switch
17-A	686071	Carbon Res. (1 meg-1/3-20%) N.I.
17-B	686071	Carbon Res. (1 meg-1/3-20%) N.I.
17-C	686071	Carbon Res. (1 meg-1/3-20%) N.I.
18	686049	Carbon Res. (2.2 meg-1/3-20%) N.I.
19	686005	Carbon Res. (220,000-1/3-20%) N.I.
20	686125	Carbon Res. (68,000-1/3-20%) N.I.
21	686000	Carbon Res. (820,000-1/3-20%) N.I.
22	686136	Carbon Res. (900-1/3-10%) N.I.
23	1X12179	Battery Cable Assembly

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MODELS 61L11, 61L12
MODELS 61X11, 61X12, 61X13
61X15, 61X16, 61X17

GALVIN MFG. CO.

MODELS 61L11, 61L12

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading
5500	455	I.F. Grid	.1 Mfd.	.5 Meg.	.38
105	455	Mod. Grid	.1 Mfd.	.5 Meg.	.38
110	600	Mod. Grid	.1 Mfd.	.5 Meg.	.38
6	600	R.F. Grid	.1 Mfd.	None	.38

MODELS 61X11, 61X12, 61X13, 61X15, 61X16, 61X17

SENSITIVITY AND STAGE GAIN MEASUREMENTS

Average Microvolt Input	Generator Set At	Generator Feeder Connected To	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading
4750	455 K.C.	I.F. Grid	.1 Mfd.	.5 Meg.	.38
110	455 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
55	600 K.C.	Mod. Grid	.1 Mfd.	.5 Meg.	.38
7	600 K.C.	R.F. Grid	.1 Mfd.	.5 Meg.	.38
6	600 K.C.	Ant.Terminal	200 Mmfd.	None	.38

OUTPUT METER CONNECTED ACROSS SPEAKER VOICE COIL; .38 VOLT CORRESPONDS TO AN OUTPUT OF .05 WATT.

MODELS

61 L 11 61 L 12

ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	Osc.Mod.Grid	1-2-3-4	455 K.C.
2	Minimum*	.1 Mfd.	R.F. Grid	5	1600 K.C.
3	1400 K.C.	.1 Mfd.	R.F. Grid	6	1400 K.C.
4	600 K.C.	.1 Mfd.	R.F. Grid	7**	600 K.C.
5	1400 K.C.	None	***	8	1400 K.C.
6	Repeat above steps for maximum accuracy.				

* Adjust pointer to zero.
* Rock condenser until greatest output is obtained.
** Connect output of signal generator to a 5" diameter 3 turn loop. With volume on full and output meter connected across voice coil bring loop close enough to receiver loop (receiver loop should be in front up position) until an output of 50 Milliwatts is obtained. 50 Milliwatts = .38 Volts on output meter.
Vary distance between generator and receiver loop to maintain this output during alignment.
NOTE: Trimmer No. 8 is adjusted with chassis in cabinet.

MODELS

61X11 61X12 61X13 61X14 61X15 61X16 61X17

ALIGNMENT CHART

Operations In Order	Gang Condenser Set At	Dummy Antenna	Generator Connected To	Adjust Trimmers No.	Generator Set At
1	Minimum	.1 Mfd.	R.F. Grid	1-2-3-4	455 K.C.
2	Minimum	.1 Mfd.	R.F. Grid	5*	455 K.C.
3	1720 K.C.	.1 Mfd.	R.F. Grid	6	1720 K.C.
4	1400 K.C.	200 Mmfd.	Ant.Terminal	7	1400 K.C.

* Adjust for Minimum Response (I.F. Wave Trap)

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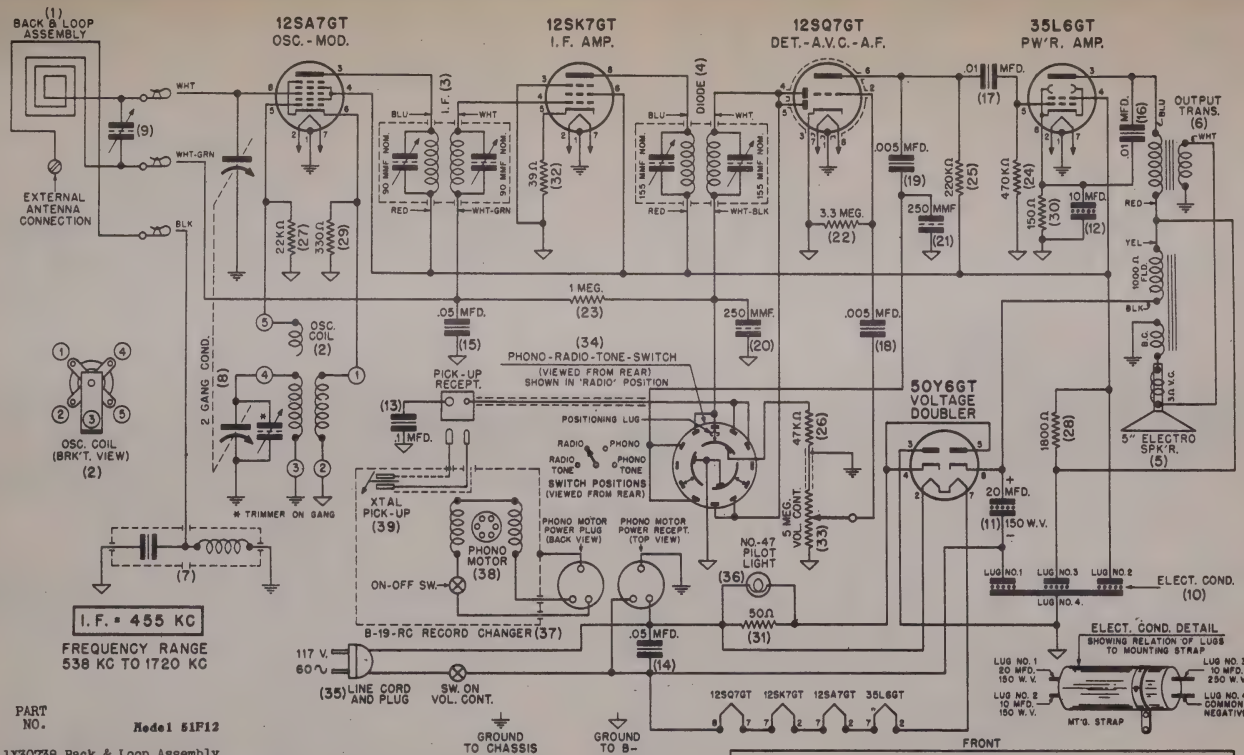
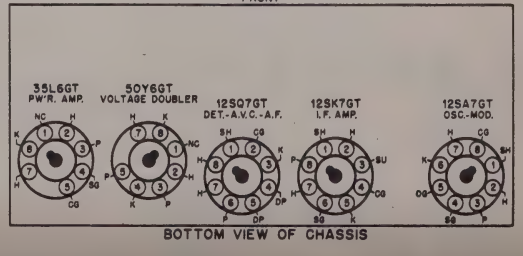


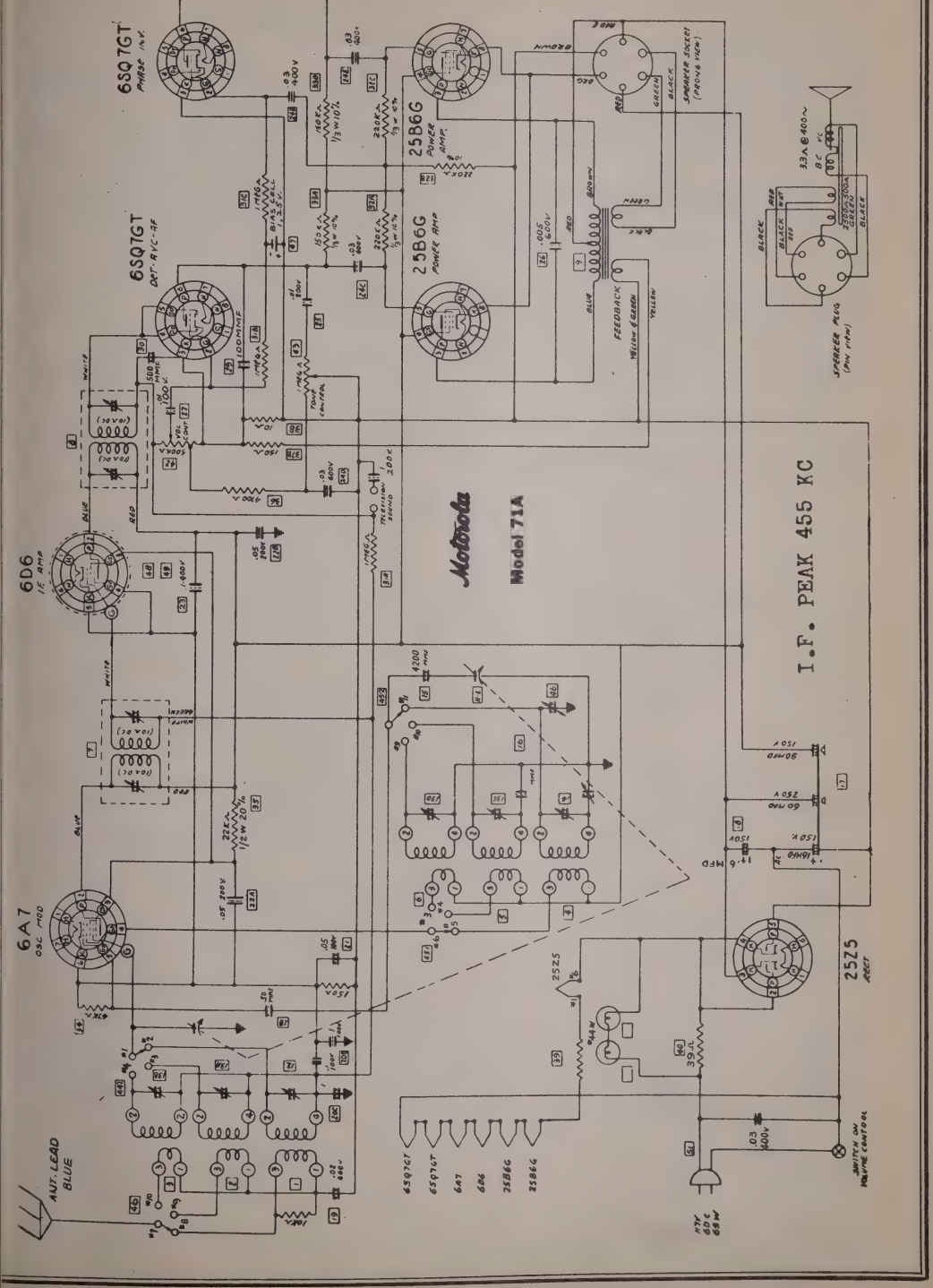
DIAG. NO.	PART NO.	Model 51F12
1	1X30738	Back & Loop Assembly
2	24A26942	Oscillator Coil
3	1X30645	I.F. Coil & Shield Assembly
4	1X30471	Diode Coil & Shield Assembly
5	50B31097	Speaker (5" Electro)
6	25A20503	Output Transformer
7	1X31408	R.F. Choke Assembly
8	1X26949	Gang & Pulley Assembly (2 Gang)
9	20A18740	Trimmer & "U" Bracket (7 MMF Nom.)
10	23A31059	Elect. Cond. (20 MFD/150W.V.-10 MFD/250W.V.-10 MFD/150W.V.)
11	23A30679	Elect. Cond. (20 MFD/150W.V.)
12	23A22953	Elect. Cond. (20 MFD/25W.V.)
33	18A14629	Volume Control & Switch (.5 Meg)
34	40A30748	Phono-Radio-Tone Switch
35	30A151	Line Cord & Plug (6 Ft.)
36	65X11854	Bulb (6.3V.-.15 Amp. Tub. Bay.) Clear #47
37	1X30760	Model B-19-RC Record Changer
38	59B27687	Phono Motor & Mounting Plate (117V.-60C)
39	59K30759	Crystal Pickup

VOLTAGE CHART - 117 V. AC INPUT				
TUBE		PLATE TO B-	SCREEN TO B-	CATH. TO B-
12SA7GT	OSC.-MOD.			
12SK7GT	I.F. AMP.			
12SQ7GT	DET.-A.V.C. A.F.			
35L6GT	PW'R. AMP.			
50Y6GT	VOLTAGE DOUBLER			



GALVIN MFG. CO.

MODEL 71A



MODEL 71A

GALVIN MFG. CO.

ALIGNMENT PROCEDURE

MODEL 71-A

1. Connect signal generator to control grid of modulator tube through a .1 MFD. condenser and to chassis ground. Do not remove grid cap. Connect output meter across speaker voice coil. Turn band switch to "Broadcast" position. Turn condenser gang completely out of mesh.

2. Set signal generator at 455 K.C. and carefully adjust the four I.F. trimmers (located in top of I.F. coil cans) to point showing highest reading on output meter.

3. Leave band switch in "Broadcast" position. Connect signal generator to antenna lead and chassis, using a 200 MMF. condenser in antenna lead.

4. Set signal generator and receiver dial both at 1750 K.C. Adjust B.C. Oscillator trimmer until 1750 K.C. signal is heard.

5. Set signal generator at 1400 K.C. and turn condenser gang to the signal at 1400 K.C. Adjust B.C. Antenna trimmer to point showing highest reading on output meter.

6. Set signal generator at 600 K.C. and rock pointer at 600 K.C. position on dial scale while adjusting B.C. padder until combination is found which gives highest output reading.

7. Turn band switch to "Police" position. Connect antenna lead to signal generator through a 400 ohm resistor.

8. Set signal generator and receiver dial both at 5.7 M.C. Adjust police oscillator trimmer until 5.7 M.C. signal is heard.

9. Set signal generator at 5.5 M.C. and turn condenser gang to signal at 5.5 M.C. Adjust Police Antenna trimmer to point giving greatest output reading while slightly rocking condenser gang.

10. Turn band switch to "Short Wave" position, still using 400 ohm carbon resistor in antenna lead to signal generator.

11. Set signal generator and receiver dial both at 18.0.M.C. Adjust S.W. Oscillator trimmer until 18.0.M.C. signal is heard.

12. Set signal generator at 16 M.C. and turn condenser gang to the signal at 16 M.C. Adjust S.W. Ant. trimmer to point giving greatest output reading, while slightly rocking condenser gang.

13. Padders on "Police" and "Short Wave" bands are fixed.

Note: Under no circumstances should "Police" and "Short Wave" padder be adjusted.

MODEL 72-C

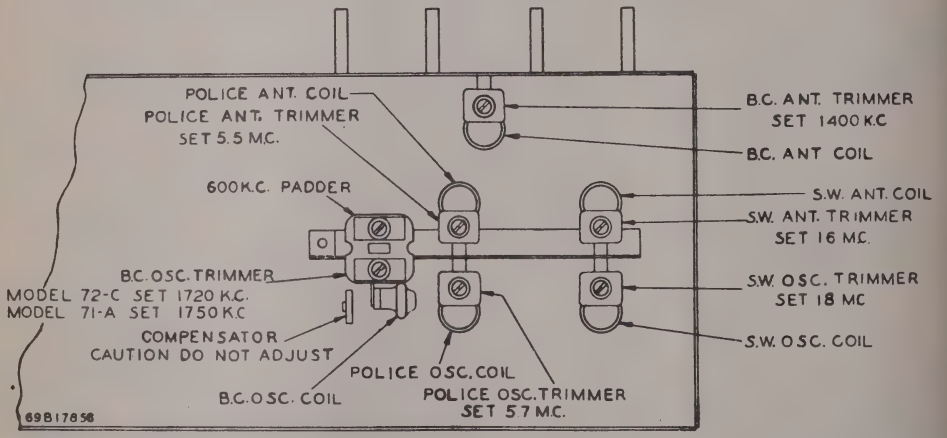
(SAME AS 71-A EXCEPT FOR THE FOLLOWING STEPS:)

1. Loop must be connected to chassis during alignment.

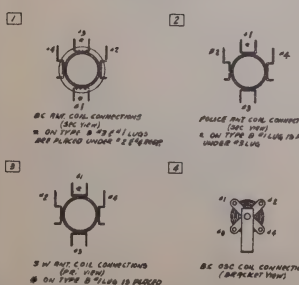
3. Connect signal generator to antenna lead through 400 ohm resistor.

4. Adjust for 1720 K.C. instead of 1750 K.C.

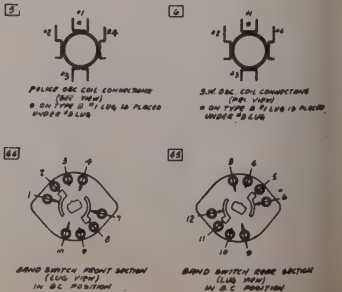
5. Model 72C has no antenna trimmer. Continue alignment as for Model 71-A.


POLICE ANT. COIL
POLICE ANT. TRIMMER SET 5.5 M.C.
600K.C. PADDER
B.C. OSC. TRIMMER
MODEL 72-C SET 1720 K.C.
MODEL 71-A SET 1750 K.C.
COMPENSATOR CAUTION DO NOT ADJUST
B.C. OSC. COIL
POLICE OSC. COIL
POLICE OSC. TRIMMER SET 5.7 M.C.
B.C. ANT. TRIMMER SET 1400 K.C
B.C. ANT COIL
S.W. ANT. COIL
S.W. ANT. TRIMMER SET 16 M.C.
S.W. OSC. TRIMMER SET 18 MC
S.W. OSC. COIL
69B17856

TWO TYPES OF COILS HAVE BEEN USED, WHICH ARE IDENTICAL EXCEPT FOR LUG POSITIONS. COILS SHOWN ARE TYPE B - NOTED UNDER COIL DATA TYPE B DIFFERENCES. COILS SHOWN WITH SHORTING LUGS AT TOP



MODEL 71-A


5
6
POLICE OSC. COIL CONNECTIONS (BOTTOM VIEW)
S.W. OSC. COIL CONNECTIONS (BOTTOM VIEW)
6A
6B
BAND SWITCH FRONT SECTION (LUG VIEW) IN B.C. POSITION
BAND SWITCH REAR SECTION (LUG VIEW) IN B.C. POSITION

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MODEL 71A
MODEL 72C

GALVIN MFG. CO.

SENSITIVITY AND STAGE GAIN MEASUREMENTS

71-A AND 72-C

All stage gain measurements must be made with volume control set for full volume and tone control in treble position. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser with a 500 M ohm resistor connected as a leak resistor between the grid of the tube and the grid lead which has been removed.

To measure overall sensitivity of the Model 72-C, connect the signal generator to the coupling turn in the loop, using a 400 ohm dummy. The lead, including the resistor, should be thoroughly shielded and the receiver must be at least 3 feet away from the signal generator.

MODEL 71-A

Microvolt Input *	Generator Set at	Generator Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter **
2500	455	I.F. Grid	.1 Mfd	.5 Meg	.38 Volt
35	455	Mod. Grid	.1 Mfd	.5 Meg	.38 Volt
40	600	Mod. Grid	.1 Mfd	.5 Meg	.38 Volt
10	600	Ant. Lead	200 mmf.	None	.38 Volt

* For .05 Watts output. ** Output meter connected across voice coil.

MODEL 72-C

Microvolt Input *	Generator Set at	Generator Connected to	Dummy Antenna Capacity	Leak Resistance	Output Meter Reading **
2100	455	I.F. Grid	.1	.5 meg	.38 volts
35	455	Mod. Grid	.1	.5 meg	.38 volts
45	600	Mod. Grid	.1	.5 meg	.38 volts
7	600	Ant. Lead	400 ohms	none	.38 volts

* For .05 Watts output
** Output meter connected across voice coil

VOLTAGE CHART 71-A

TUBE	POSITION	PLATE	SCREEN	CATHODE	OSC. GRID	ANODE GRID
6A7	Mod.-Osc.	165	90	3	12	165
6D6	I.F.	165	90	3	-	-
6SQ7GT	Inverter	105	-	-	-	-
6SQ7GT	Driver	105	-	-	-	-
25B6G	Output	210	170	31	-	-
25B6G	Output	210	170	31	-	-
25Z5	Rect.	117	-	208	-	-

Line Voltage 117 AC 60 Cycle All Reading to B minus Volume control set at Maximum

VOLTAGE CHART 72-C

TUBE	POSITION	PLATE	SCREEN	CATHODE	OSC. PLATE
6A8GT	Mod.-Osc.	185	80	1.3	110
6K7GT	I.F.	185	80	1.2	-
6SQ7GT	Det.-AVC-A.F.	95	-	0	-
6SQ7GT	Phase Inv.	95	-	0	-
6V6G	Output	260	185	8.2	-
6V6G	Output	260	185	8.2	-
5W4GT	Rect.	AC	-	260	-

Line Voltage 117 AC. 60 cycle Measurements are from socket terminal indicated to chassis ground using 1000 ohms per volt meter. Volume control set at maximum

MODEL 71A

GALVIN MFG. CO.

MODEL 71-A SCHEMATIC DIAGRAM PARTS LIST

Diag. No.	Part No.	Description	Diag. No.	Part No.	Description
1	24A17043	B.C.Antenna Coil (Violet & Black Dots)	26	8S9813	Tubular Condenser (.005-600V.)
2	24A16787	Police Antenna Coil	27	8S9801	Tubular Condenser (.01-100V.)
3	24A16788	S. W. Antenna Coil	28	21B6503	Molded Mica Cond. (50 mmf) 20%
4	24K17049	B.C.Osc. Coil (Violet & Brown Dots)	29	21B6511	Molded Mica Cond. (100 mmf) 20%
5	24A16789	Police Oscillator Coil	30	21B6500	Molded Mica Cond. (500 mmf) 20%
6	24A16790	S. W. Oscillator Coil	31	6B6071	Carbon Res. (1 meg-1/3-20) N.I.
7	1X17014	I.F. Coil & Shield Assembly	32	6B6122	Carbon Res. (220,000-1/3-10) N.I.
8	1X17032	Diode Coil & Shield Assembly	33	6B6130	Carbon Res. (150,000-1/3-10) N.I.
9	25A16761	Output Transformer	34	6B6020	Carbon Res. (47,000-1/3-20) N.I.
10	50B16808	Speaker (8" Electro) & Cable	35	6B6088	Carbon Res. (22,000-1/2-20) N.I.
11	1X14887	Tuner, Gang & Pulley	36	6B6101	Carbon Res. (4700-1/3-20) N.I.
12	20A16803	Trimmer & L Brkt. (2-22) R.H.	37	6B6228	Carbon Res. (150-1/3-20) N.I.
13	20K16825	Trimmer & L Brkt. (2-22) L.H.	38	6B6227	Carbon Res. (10-1/3-10) N.I.
14	20K10996	B. C. Trimmer & Padder	39	17X15295	Ins. W. W. Resistor (50-5-10)
15	20K17439	S. W. Padder (4200 mmf)	40	17X15296	Ins. W. W. Resistor (39-5-10)
16	20A17438	Police Padder (2500 mmf)	41	6B6123	Carbon Res. (10,000-1/3-10) N.I.
17	23A16805	Electrolytic Condenser (3 Section)	42	18A17041	Volume Control & Switch (.5 meg)
18	23A15291	Electrolytic Condenser (16-150V.)	43	18A16083	Tone Control (1 meg)
19	8S9802	Tubular Condenser (.02-400V.)	44	40A16796	Band Switch Section (Front)
20	8S9814	Tubular Condenser (.1-100V.)	45	40K16797	Band Switch Section (Rear)
21	8S9805	Tubular Condenser (.05-100V.)	46	20A11047	Compensating Condenser
22	8S9821	Tubular Condenser (.05-200V.)	47	48X10089	Bias Cell
23	8S9807	Tubular Condenser (.1-400V.)	48	26X10881	Tube Shield Shell
24	8S9804	Tubular Condenser (.03-400V.)	49	26X10882	Tube Shield Cap
25	8S9825	Tubular Condenser (.01-200V.)	50	65X12028	Bulb (6.3V-.25 A Tub.Bay.) White
			51	30A151	Line Cord & Plug (6 feet)

MODEL 71-A DIAL CORD INSTRUCTIONS

1. Cut a length of 24# test dial drive cord 34 inches long.
2. Turn gang to fully meshed position.
3. Push dial drive shaft down.
4. Thread end of cord thru slot"G" in drive pulley.
5. With an ordinary paper clip fasted cord to drive disc "H" to hold in place.
6. Wind cord in a clock-wise direction one half turn around the drive pulley and up to the front idler pulley "B".
7. Run cord across dial to idler pulley "B" and around it in a clock-wise direction.
8. Continue cord back across chassis and over rear idler pulley "C".
9. Continue cord down to drive pulley "A" and clockwise around it one and one half turns to the slot "G".
10. Knot both ends of cord securely together inside the slot.
11. Tie in one end of tension spring.
12. Hook the other end of tension spring into hole in drive pulley "A".
13. Replace the dial pointer.
14. To set pointer to correct frequency, tune in a station of known frequency and adjust position of pointer on string.
15. Secure pointer to string with a drop of shellac or good grade household cement.

MODEL 71A

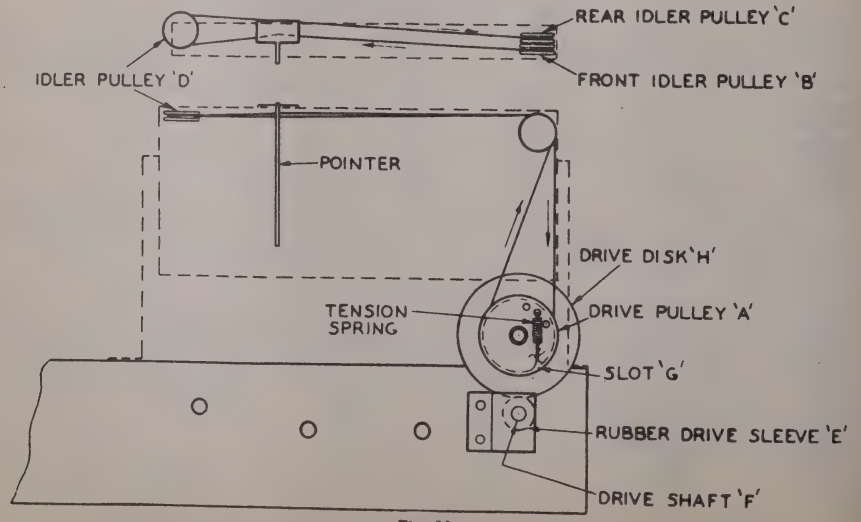

Fig. 21

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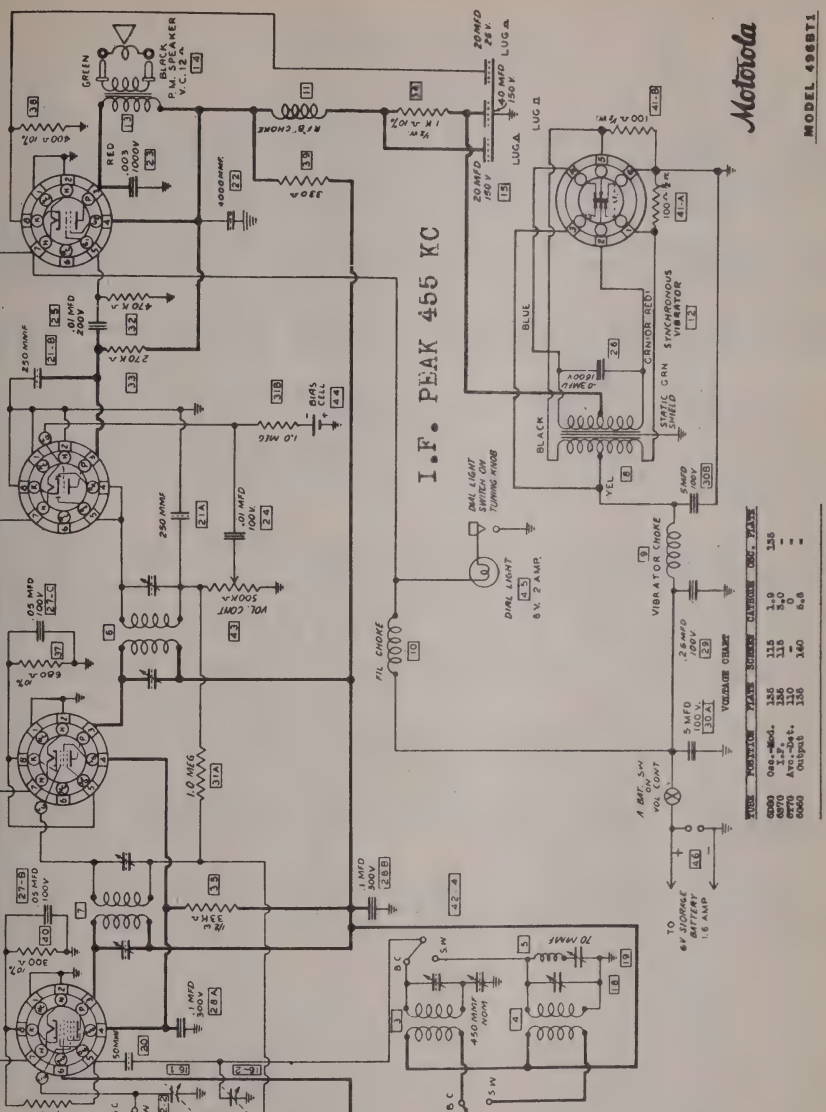
GALVIN MFG. CO.

MODEL 496BT1



MODEL 496BT1

GALVIN MFG. CO.

ALIGNMENT PROCEDURE

MODEL 496BT1

1. Connect signal generator to control grid of Osc.-Mod. tube (6D8G) through a .05 MF. condenser and to chassis. Do not remove grid cap. Also connect output meter across speaker voice coil. Turn band switch to "Broadcast" position. Turn condenser gang completely out of mesh.

2. Set signal generator at 455 K.C. and carefully adjust the four I.F. trimmers (located in top of I.F. coil cans) to point showing highest reading on output meter.

3. Leave band switch in "Broadcast" position. Connect signal generator to antenna and ground terminals, using a .0002 MF condenser in antenna lead.

4. Set signal generator and receiver dial both at 1700 K.C. Adjust B.C. OSC. trimmer until 1700 K.C. signal is heard.

5. Set signal generator at 1400 K.C. and turn condenser gang to the signal at 1400 K.C. Adjust BC ANT. trimmer to point showing highest reading on output meter.

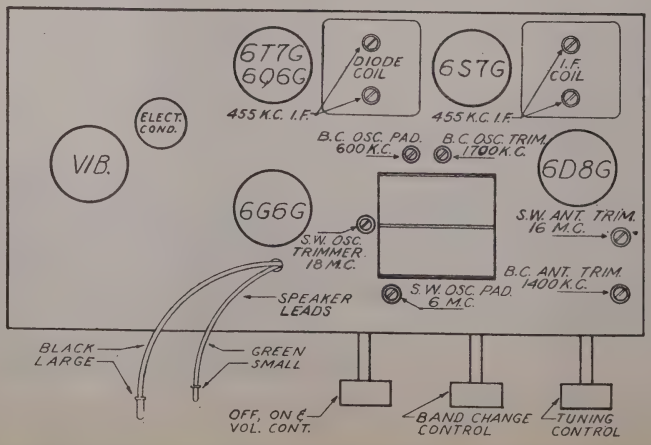
6. Set signal generator at 600 K.C. and rock pointer at 600 K.C. position on dial scale, while adjusting BC padder, until combination is found which gives highest output reading. (NOTE: If there is noise level at 600 K.C., padder can be adjusted to maximum noise without rocking gang and without use of signal generator. Use short wire for pick-up if necessary.)

7. Turn band switch to "Short Wave" position. Replace .0002 MF condenser in signal generator lead with a 400 ohm carbon resistor.

8. Set signal generator and receiver dial both at 18.0 MC. Adjust S.W. OSC. trimmer until 18.0 MC signal is heard.

9. Set signal generator at 16.0 MC and turn condenser gang to signal at 16.0 MC. Adjust S.W. ANT. trimmer to point giving greatest output reading. (Use non-metallic screw driver.)

10. Set signal generator at 6.0 MC and rock pointer at 6.0 MC position on dial scale, while adjusting S.W. padder, until combination is found which gives highest output reading. (NOTE: May also be adjustable to maximum noise.)



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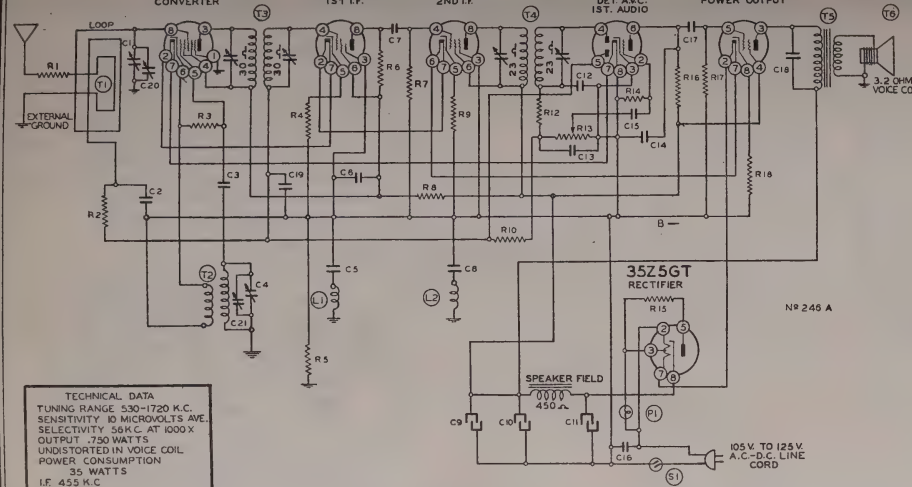


TECHNICAL DATA
TUNING RANGE 530-1720 K.C.
SENSITIVITY 10 MICROVOLTS AVE.
SELECTIVITY 56K.C. AT 1000X
OUTPUT .750 WATTS
UNDISTORTED IN VOICE COIL
POWER CONSUMPTION
35 WATTS
I.F. 455 K.C

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Part No.	Schematic Diagram Reference	Description	No. Used In Set	Selling Price Each
		CONDENSERS		
102153	C1, C4, C20, C21	Two Gang Condenser Complete with Tuner Assembly and Ant. and Osc. Trimmers	1	6.00
10026	C8, C17, C18	.02 x 400 Volt Tubular Condenser	3	.25
10025	C15	.002 x 600 Volt Tubular Condenser	1	.25
1009	C2, C19	.05 x 200 Volt Tubular Condenser	2	.25
10020	C6	.1 x 200 Volt Tubular Condenser	1	.25
100110	C5	.2 x 400 Volt Tubular Condenser	1	.25
1001	C16	.1 x 400 Volt Tubular Condenser	1	.25
119135	C9, C10, C11	Electrolytic Filter Condenser. 20 Mfd. x 150 V.; 20 Mfd. x 150 V.; 40 Mfd. x 150 V.	1	1.25
1295	C3, C7, C12, C13, C14	.0001 Mica Type Condenser—20%	5	.25
		RESISTORS		
101274	R13, S1	Volume Control and Switch (1 Megohm)	1	1.00
13082	R6	10M Ohm—½ Watt Resistor—10%	1	.20
1304	R10	3 Megohm—½ Watt Resistor—20%	1	.20
13021	R3	20M Ohm—½ Watt Resistor—20%	1	.20
130166	R18	150 Ohm—½ Watt Resistor—10%	1	.20
130215	R15	25 Ohm—½ Watt Resistor—10%	1	.20
13019	R17	1 Megohm—½ Watt Resistor—20%	1	.20
130257	R14	5 Megohm—½ Watt Resistor—25%	1	.20
13020	R12	100M Ohm—½ Watt Resistor—20%	1	.20
1309	R16	200M Ohm—½ Watt Resistor—20%	1	.20
130168	R4	100 Ohm—½ Watt Resistor—10%	1	.20
1303	R7	500M Ohm—½ Watt Resistor—20%	1	.20
13097	R9	200 Ohm—½ Watt Resistor—10%	1	.20
130345	R1, R8	1M Ohm —½ Watt Resistor—10%	1	.20
130100	R2, R5	150M Ohm—½ Watt Resistor—20%	2	.20
		COILS		
108149P	T3	Input I. F. Coil Complete in Can	1	1.00
108145G	T4	Output I. F. Coil Complete in Can	1	1.00
110146	T2	Oscillator Coil	1	.75
111260	T1	Loop Antenna Assembly—Specify Color	1	1.25
105140	L1	I. F. Filter Choke	1	.05
105141	L2	Filter Choke	1	.05

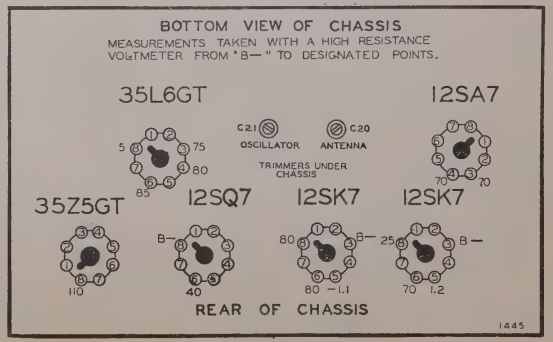
October 1941

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B— of radio chassis to ground post of signal generator through .1 Mfd. condenser.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted to Maximum
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 2nd I. F.	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 12SA7 Converter	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
BROAD CAST BAND	1720 Kc.	.1 mmf.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Osc. trimmer C21 See voltage chart view
	1400 Kc.	200 mmf.	External Antenna and B—	Set Dial at 1400 K. C.	Ant. trimmer C20 See voltage chart view

The loop antenna should be connected to the radio and in its proper position when making all adjustments.



VOLTAGE CHART

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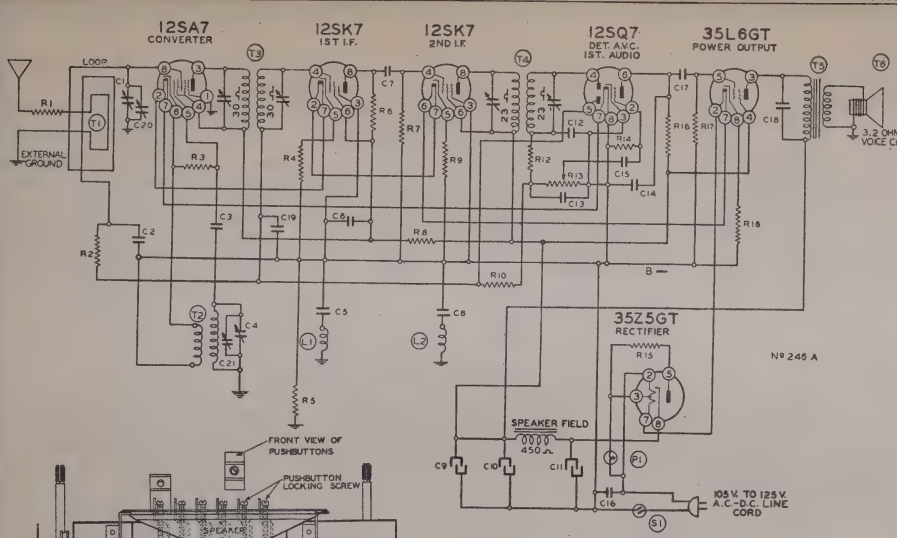
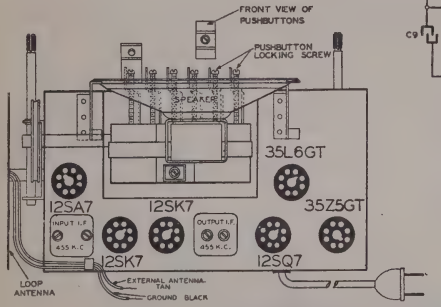




TECHNICAL DATA

TUNING RANGE 530-1720 K.C.
SENSITIVITY 10 MICROVOLTS AVE.
SELECTIVITY 56K.C. AT 1000 x
OUTPUT .750 WATTS
UNDISTORTED IN VOICE COIL
POWER CONSUMPTION
35 WATTS
I.F. 455 K.C.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B— of radio chassis to ground post of signal generator through .1 Mfd. condenser.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted to Maximum
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 2nd I. F.	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 12SA7 Converter	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
BROAD CAST BAND	1720 Kc.	.1 mmf.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Osc. trimmer C21 See voltage chart view
	1400 Kc.	200 mmf.	External Antenna and B—	Set Dial at 1400 K. C.	Ant. trimmer C20 See voltage chart view

The loop antenna should be connected to the radio and in its proper position when making all adjustments.

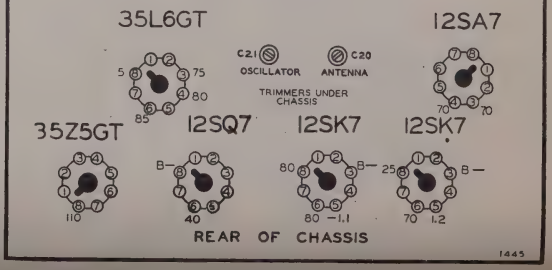
Part No.	Schematic Diagram Reference	Description	No. Used In Set	Selling Price Each
		CONDENSERS		
102153	C1, C4, C20, C21	Two Gang Condenser Complete with Tuner Assembly and Ant. and Osc. Trimmers	1	6.00
10026	C8, C17, C18	.02 x 400 Volt Tubular Condenser	3	.25
10025	C15	.002 x 600 Volt Tubular Condenser	1	.25
1009	C2, C19	.05 x 200 Volt Tubular Condenser	2	.25
10020	C6	.1 x 200 Volt Tubular Condenser	1	.25
100110	C5	.2 x 400 Volt Tubular Condenser	1	.25
1001	C16	.1 x 400 Volt Tubular Condenser	1	.25
119135	C9, C10, C11	Electrolytic Filter Condenser, 20 Mfd. x 150 V.; 20 Mfd. x 150 V.; 40 Mfd. x 150 V.	1	1.25
1295	C3, C7, C12, C13, C14	.0001 Mica Type Condenser—20%	5	.25
		RESISTORS		
101274	R13, S1	Volume Control and Switch (1 Megohm)	1	1.00
13082	R6	10M Ohm—½ Watt Resistor—10%	1	.20
1304	R10	3 Megohm—½ Watt Resistor—20%	1	.20
13021	R3	20M Ohm—½ Watt Resistor—20%	1	.20
130166	R18	150 Ohm—½ Watt Resistor—10%	1	.20
130215	R15	25 Ohm—½ Watt Resistor—10%	1	.20
13019	R17	1 Megohm—½ Watt Resistor—20%	1	.20
130257	R14	5 Megohm—½ Watt Resistor—25%	1	.20
13020	R12	100M Ohm—½ Watt Resistor—20%	1	.20
1309	R16	200M Ohm—½ Watt Resistor—20%	1	.20
130168	R4	100 Ohm—½ Watt Resistor—10%	1	.20
1303	R7	500M Ohm—½ Watt Resistor—20%	1	.20
13097	R9	200 Ohm—½ Watt Resistor—10%	1	.20
130345	R1, R8	1M Ohm —½ Watt Resistor—10%	1	.20
130100	R2, R5	150M Ohm—½ Watt Resistor—20%	2	.20
		COILS		
108140P	T3	Input I. F. Coil Complete in Can	1	1.00
108145G	T4	Output I. F. Coil Complete in Can	1	1.00
110146	T2	Oscillator Coil	1	.75
111260	T1	Loop Antenna Assembly—Specify Color	1	1.25
105140	L1	I. F. Filter Choke	1	.05
105141	L2	Filter Choke	1	.05

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

October 1941

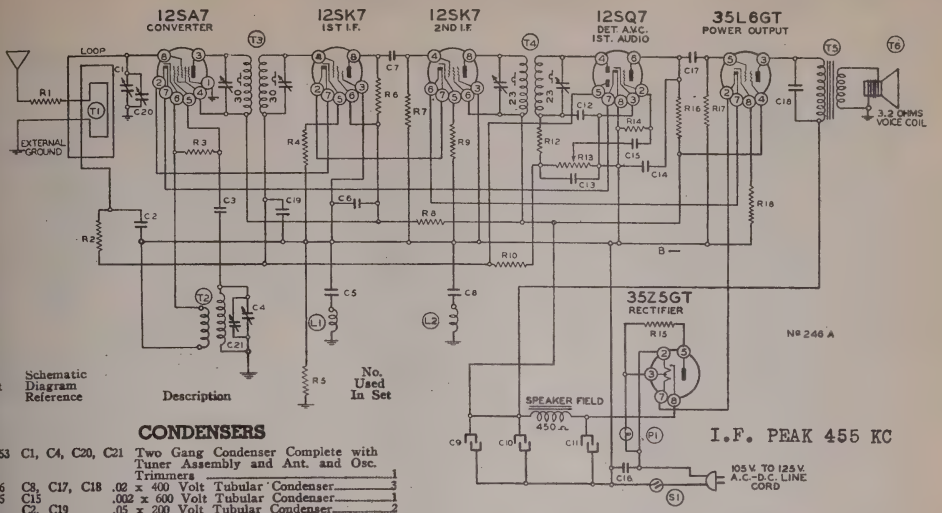
BOTTOM VIEW OF CHASSIS

MEASUREMENTS TAKEN WITH A HIGH RESISTANCE VOLTMETER FROM "B—" TO DESIGNATED POINTS.



VOLTAGE CHART

GAMBLE-SKOGMO, INC. MODEL C6D16, Series A



Part No.	Schematic Diagram Reference	Description	No. Used In Set

CONDENSERS

102153	C1, C4, C20, C21	Two Gang Condenser Complete with Tuner Assembly and Ant. and Osc. Trimmers	1
10026	C8, C17, C18	.02 x 400 Volt Tubular Condenser	3
10025	C15	.002 x 600 Volt Tubular Condenser	1
1009	C2, C19	.05 x 200 Volt Tubular Condenser	2
10020	C6	.1 x 200 Volt Tubular Condenser	1
100110	C5	.2 x 400 Volt Tubular Condenser	1
1001	C16	.1 x 400 Volt Tubular Condenser	1
119135	C9, C10, C11	Electrolytic Filter Condenser, 20 Mfd. x 150 V.; 20 Mfd. x 150 V.; 40 Mfd. x 150 V.	1
1295	C3, C7, C12, C13, C14	.0001 Mica Type Condenser—20%	5

RESISTORS

101274	R13, S1	Volume Control and Switch (1 Megohm)	1
13082	R6	10M Ohm—½ Watt Resistor—10%	1
1304	R10	3 Megohm—½ Watt Resistor—20%	1
13021	R3	20M Ohm—½ Watt Resistor—20%	1
130166	R18	150 Ohm—½ Watt Resistor—10%	1
130215	R15	25 Ohm—½ Watt Resistor—10%	1
13019	R17	1 Megohm—½ Watt Resistor—20%	1
130257	R14	5 Megohm—½ Watt Resistor—25%	1
13020	R12	100M Ohm—½ Watt Resistor—20%	1
1309	R16	200M Ohm—½ Watt Resistor—20%	1
130168	R4	100 Ohm—½ Watt Resistor—10%	1
1303	R7	500M Ohm—½ Watt Resistor—20%	1
13097	R9	200 Ohm—½ Watt Resistor—10%	1
130345	R1, R8	1M Ohm—½ Watt Resistor—10%	1
130100	R2, R5	150M Ohm—½ Watt Resistor—20%	2

COILS

108149P	T3	Input I. F. Coil Complete in Can	1
108145G	T4	Output I. F. Coil Complete in Can	1
110146	T2	Oscillator Coil	1
111260	T1	Loop Antenna Assembly—Specify Color	1
105140	L1	I. F. Filter Choke	1
105141	L2	Filter Choke	1

SPEAKER

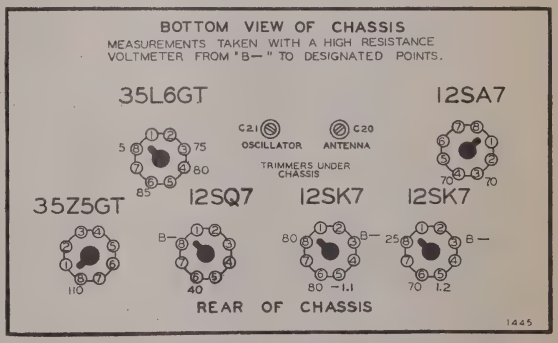
114263	T6	4 x 6 Inch Oval Electrodynamic Speaker (Less Output Transformer)	1
105106C	T5	Output Transformer for Speaker	1

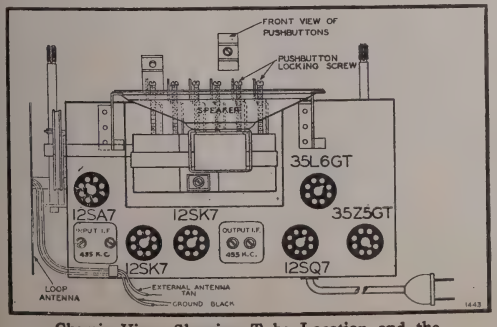
MISCELLANEOUS

107249	P1	6-8 Volt Pilot Lite Bulb, Type T-47	1
107389		Socket Assembly for Pilot Lite	1
10798		Line Cord and Plug	1
121210		8 Prong Molded Octal Sockets	6

DIAL AND TUNING PARTS

1121012	Dial Scale	1
112998	Diffuser	1
131211	Snap-in Rivets to Fasten Dial	2
1121013	Pointer	1
120377	Coiled Tension Spring for Dial String	2
120214	String for Dial	Per Yd.
120424	Spring—On Tuning Shaft	1
1209	String for Tuning Shaft	Per Yd.
117922	Tuning Shaft	1
128699-14	Pushbuttons—Left—Walnut	3
128700-14	Pushbuttons—Right—Walnut	3
131383	Screw Driver	1
128523-14	Knob—Walnut	2
112973	Set of Station Call Letters	1
112979	Set of Tabs for Call Letters	1





Chassis View, Showing Tube Location and the External Antenna and Ground Leads

Setting the Pushbuttons

Make a list of your 6 favorite stations—push out the call letters of these stations from the call letter sheets supplied. Next insert a long slim screw driver into the hole in front of one of the pushbuttons and unscrew the pushbutton locking screw (to the left) several turns. Now with the screw driver still engaged in the locking screw slot push it all the way in. Hold it in this position and tune in the station you want with the tuning knob. Now tighten up the pushbutton locking screw by turning it to the right. Tighten firmly. Continue setting each button in the same way. When you have set your stations insert the call letter of each station in the front of the proper button and put one of the celluloid tabs over the station call letter.

To change stations simply repeat the above procedure.

If you are unable to set a station on any particular button it is probably because the pushbutton locking screw has not been unloosened (turned to the left).

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MODEL C6D16

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B— of radio chassis to ground post of signal generator through .1 Mfd. condenser.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted to Maximum
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 2nd I. F.	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 12SA7 Converter	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
BROAD-CAST BAND	1720 Kc.	.1 mmf.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Osc. trimmer C21 See voltage chart view
	1400 Kc.	200 mmf.	External Antenna and B—	Set Dial at 1400 K. C.	Ant. trimmer C20 See voltage chart view

The loop antenna should be connected to the radio and in its proper position when making all adjustments.

ALIGNMENT
MODEL C6D18

Slight adjustments to the oscillator and antenna circuits can be made without removing the chassis from the cabinet through two holes which are provided on the bottom of the cabinet.

The two adjustments on the variable gang condenser can be reached with a long insulated type screw driver through these two holes.

ALIGNMENT PROCEDURE

IMPORTANT:—See alignment instructions

- Volume control—Maximum all adjustments.
- Connect B— of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver
- Dummy antennas—.1 Mfd

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Four Trimmers on Top (See Fig. 1)	Output and Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1650 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Trimmer bottom of rear section of gang. (See bottom of radio)	Broadcast Oscillator	Adjust to maximum output
	1400 Kc.	See Note "A"		Set dial at 1400 Kc.	Trimmer bottom of front section of gang. (See bottom of radio)	Broadcast Antenna	Adjust to maximum output

NOTE "A" Lay the output lead from the generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the generator.

It is important during alignment that the same distance between the loop antenna and the chassis be maintained as when the chassis is installed in the cabinet.

FREQUENCY RANGE
530 to 1650 K.C.

Power Output—1 Watt Undistorted, 1.7 Watts Maximum

Intermediate Frequency—455 K.C.

PUSH BUTTON ADJUSTMENT
MODEL C6D18

Insert the call letter tabs in the rectangular openings in each of the automatic tuner push buttons.

Stations may be set up in any sequence desired. Press any one of the automatic tuner push buttons down all the way.

Hold the push button down firmly, and tune set very carefully to station desired, until station is heard clearly and with maximum volume

Release the push button.

Press down another automatic tuner push button. Hold it down FIRMLY and carefully tune in next station desired. Release this push button.

Follow this procedure until you have selected all of your favorite stations.

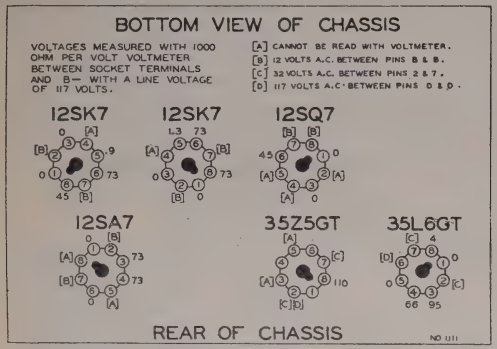
Now rotate the tuning knob to the right (clockwise) as far as it will turn, and with a coin (quarter), tighten the special locking screw ("C") in the center of the tuning knob, (See Fig. 2).

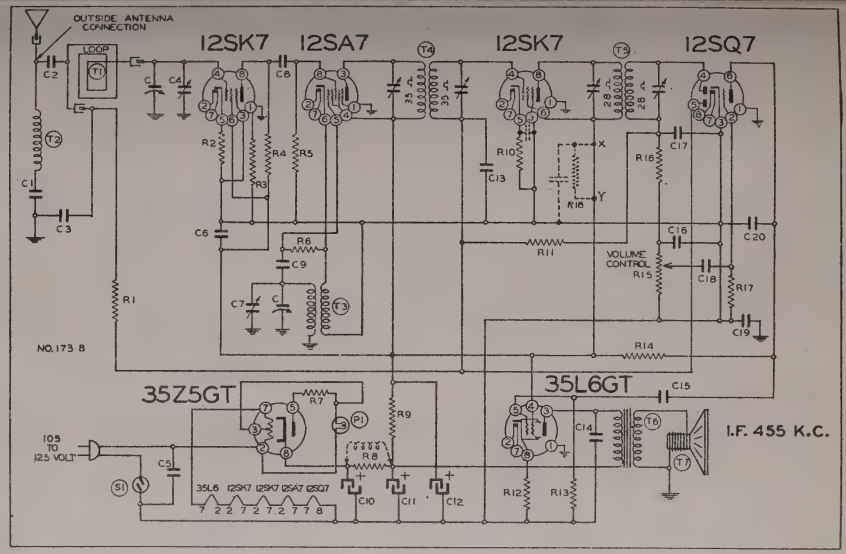
It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner push buttons. (Note: Locking screw "C" is loose when radio is shipped from factory.)

NOTE: Some sets of this model were made for glass tubes only. Where glass tubes were used items C21—C22—R18 shown in dotted lines, were added to the circuit and the B + Line was opened between points X + 4.

On some sets R8 is replaced by a speaker field; R9 is also eliminated and C11 and C12 are connected in parallel.


BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B— WITH A LINE VOLTAGE OF 117 VOLTS.
[A] CANNOT BE READ WITH VOLTMETER.
[B] 12 VOLTS A.C. BETWEEN PINS B & B.
[C] 32 VOLTS A.C. BETWEEN PINS 2 & 7.
[D] 117 VOLTS A.C. BETWEEN PINS D & D.
12SK7
12SK7
12SQ7
12SA7
35Z5GT
35L6GT
REAR OF CHASSIS
NO 1111



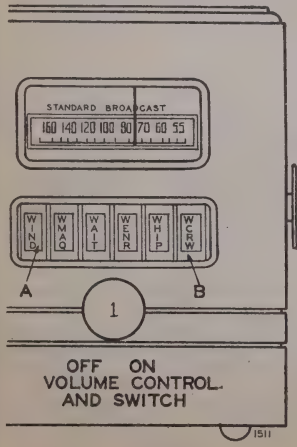


FIG. 2

Circuit Diagram Ref.	Part No.	Description
		RESISTORS
R1	130100	150M ohms—½ w.
R2	130168	100 ohms—½ w.
R3	130100	150M ohms—½ w.
R4	130218	5M ohms—½ w.
R5	13020	100M ohms—½ w.
R6	13094	50M ohms—½ w.
R7	130215	25 ohms—½ w.
R8	130296	200 ohms—1 w.
R9	130287	1200 ohms—1 w.
R10	130166	150 ohms—½ w.
R11	1304	3 megohm—½ w.
R12	130166	150 ohm—½ w.
R13	1303	500M ohm—½ w.
R14	1309	200M ohm—½ w.
R15	101211	1 megohm—volume control
R16	13012	50M ohm—½ w.
R17	130257	5 megohm—½ w.
R18	13064	3500 Ohm—½ w.
		CONDENSERS
C	102116	Two gang variable condenser
C1	10011	.01 x 400 v.
C2	129132	.000125 mica
C3	10026	.02 x 400 v.
C4		B.C. antenna trimmer
C5	1001	.1 x 400 v.
C6	1006	.25 x 200 v.
C7		B.C. Oscillator Trimmer
C8	1295	.0001 mica
C9	1295	.0001 mica

Circuit Diagram Ref.	Part No.	Description
C10	11994	40 mfd.—150 w.v. lytic
C11	11994	20 mfd.—150 w.v. lytic
C12	11994	20 mfd.—150 w.v. lytic
C13	1009	.05 x 200 v.
C14	10026	.02 x 400 v.
C15	100105	.004 x 600 v.
C16	129339	.00005 mica
C17	1295	.0001 mica
C18	10025	.002 x 600 v.
C19	100110	.2 x 400 v.
C20	1295	.0001 mica
C21	10020	.1 x 200 Volt
C22	10020	.1 x 200 Volt
		C10, C11, C12 are in same unit
		PARTS
T1	111145	Loop Antenna Assembly
T2	1237	Loading Coil
T3	110128	Oscillator Coil
T4	108140G	Input I.F. Coil—455 kc.
T5	108145C	Output I.F. Coil—455 kc.
T6	10595B	Output Transformer
T7	114191	5" P.M. Speaker
		or
T7	114265	5" Electrodynamic Speaker
S1		On-off switch
P1	107249	T-47 Pilot light

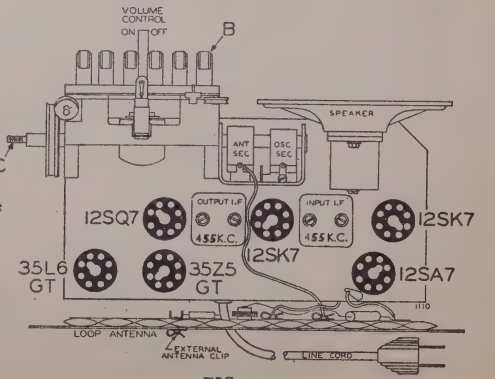


FIG. 1

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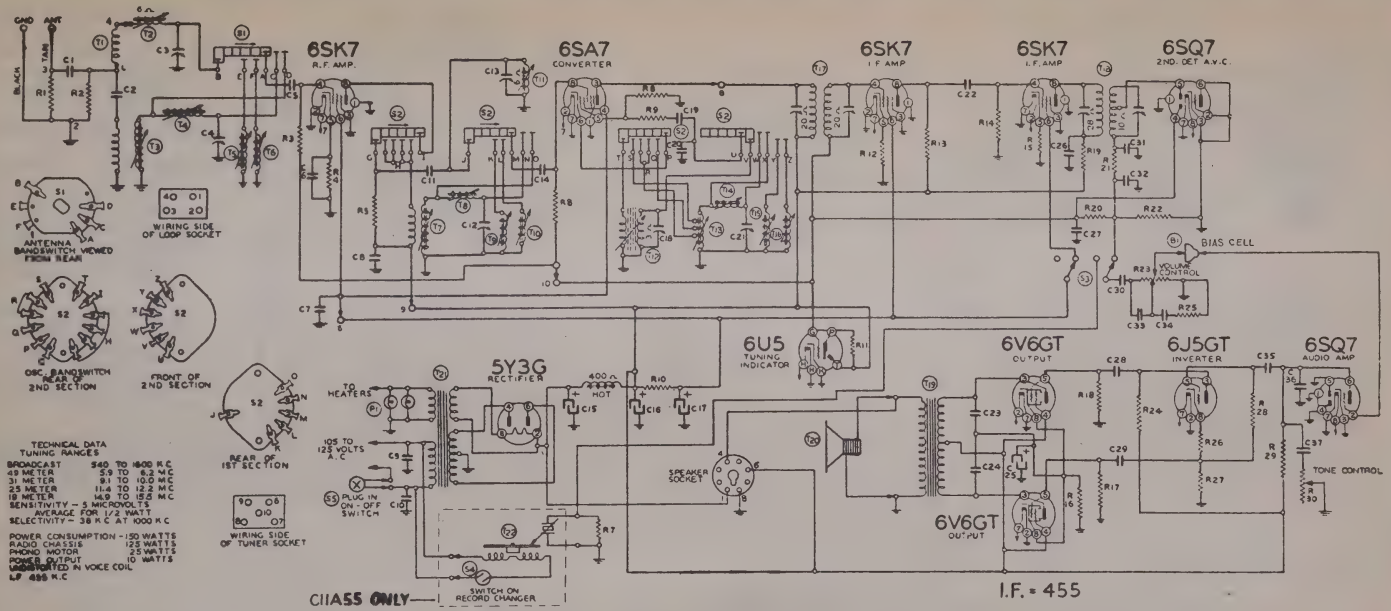
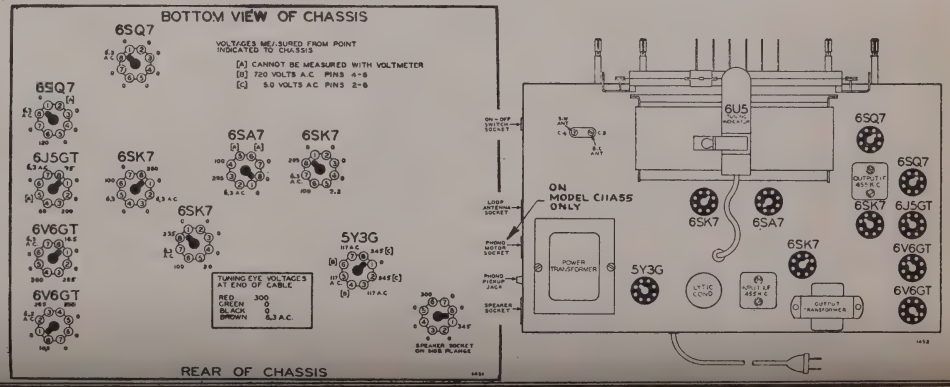


Setting the Pushbuttons

Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the slot on top of each pushbutton.

Next pull one of the pushbuttons all the way out as far as it will come. Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button **hard** all the way in to lock the station in place. Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard **enough** to lock it in place when setting up the station.



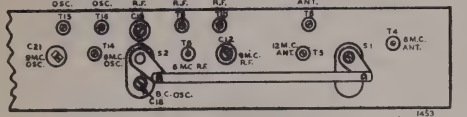
ALIGNMENT FOR MODEL C11A54 SERIES A MODEL C11A55 SERIES A MODEL 12A51 SERIES A

Do not realign the band spread scales adjustment. When adjustment is necessary proceed as follows.

Tune set to high frequency end of dial scale on any band.

Rotate each iron core until the fine score marks are even with the edge of the coil forms.

You are now ready to continue with the trimmer adjustments as shown on the alignment chart.



PARTS LIST FOR MODEL C11A54 SERIES A MODEL C11A55 SERIES A

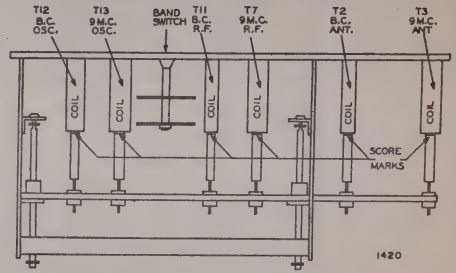
Part No.	Schematic Diagram Reference	Description	No. Used In Set
		RESISTORS	
13019	R3, R6	1 Megohm—½ Watt Resistor—20%	2
130218	R5	5M Ohm—½ Watt Resistor—10%	1
130232	R8	25M Ohm—½ Watt Resistor—10%	1
130239	R4	250 Ohm—½ Watt Resistor—10%	1
	R11	1 Megohm—In Tuning Eye Cable	1
130174	R9	50 Ohm—½ Watt Resistor	1
101275	R23	Volume Control (2 8 Megohm)	1
125180	R30, S3	Tone Control and Phono-Radio Switch (1 Megohm)	1
13070	R12	500 Ohm—½ Watt Resistor—10%	1
13082	R13	10M Ohm—½ Watt Resistor—10%	1
130317	R16	250 Ohm—2 Watt Resistor—10%	1
13094	R21, R24, R27	50M Ohm—½ Watt Resistor—10%	3
130192	R19	2M Ohm—½ Watt Resistor—10%	1
130235	R15	1500 Ohm—½ Watt Resistor—10%	1
130218	R26	5M Ohm—½ Watt Resistor—10%	1
130172	R29	250M Ohm—½ Watt Resistor—10%	1
13019	R20	1 Megohm—½ Watt Resistor—20%	1
13020	R14	100M Ohm—½ Watt Resistor—20%	1
1307	R25	40M Ohm—½ Watt Resistor—10%	1
130238	R22	400M Ohm—½ Watt Resistor—20%	1
1303	R7, R17, R18, R28	500M Ohm—½ Watt Resistor—20%	4
130232	R1, R2	25M Ohm—½ Watt Resistor—10%	2
10667	R10	16M Ohm—3.5 Watt Resistor—10%	1
		CONDENSERS	
10020	C6	.1 x 200 Volt Tubular Condenser	1
10047	C2	.002 x 600 Volt Tubular Condenser	1
10074	C7, C8	.1 x 400 Volt Tubular Condenser	2
124138	C12	9 Mc., R.F. Adjustable Trimmer Condenser	1
124139	C13	B.C., R.F. Adjustable Trimmer Condenser	1
124143	C3, C4	B.C. and 9 Mc. Dual Adjustable Antenna Trimmer Condenser	1
124144	C18	B.C. Oscillator Adjustable Trimmer Condenser	1
124145	C21	9 Mc. Oscillator Adjustable Trimmer Condenser	1
1292	C5, C14	.0005 Mica Type Condenser—20%	1

SIGNAL GENERATOR

	Setting	Antenna	To Radio	Band Switch	Setting	To Maximum
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	On Top of Output I.F.
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	On Top of Input I.F.
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C21—Osc. (See Trimmer View) C12—R.F. (See Chassis View) C4—Ant.
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14—Osc. (See Trimmer View) T8—R.F. (See Trimmer View) T4—Ant.
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15—Osc. (See Trimmer View) T9—R.F. (See Trimmer View) T5—Ant.
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16—Osc. (See Trimmer View) T10—R.F. (See Trimmer View) T6—Ant.
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C18—Osc. (See Trimmer View) C13—R.F. (See Chassis View) C3—Ant.
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11—R.F. Rotate Core T2—Ant. (See Iron Core Adjustment View)

Part No.	Schematic Diagram Reference	Description	No. Used In Set
		CONDENSERS	
129165	C19	.00005 Mica Type Condenser—10%	1
129168	C11	.00001 Mica Type Condenser—20%	1
129167	C20	.0002 Silver Mica Type Condenser—3%	1
1009	C29, C30	.05 x 200 Volt Tubular Condenser	2
10037	C37	.003 x 600 Volt Tubular Condenser	1
10013	C28, C35	.05 x 400 Volt Tubular Condenser	2
1001	C26	.1 x 400 Volt Tubular Condenser	1
10065	C23, C24	.015 x 600 Volt Tubular Condenser	2
10022	C27	.05 x 200 Volt Tubular Condenser	1
100134	C34	.006 x 120 Volt Tubular Condenser	1
10061	C9, C10	.02 x 600 Volt Bakelite Condenser	2
11969	C25	Electrolytic Filter Condenser. 16 Mfd. x 350 Volts	1
119112	C15, C16, C17	Electrolytic Filter Condenser. 30 Mfd.; 30 Mfd.; 10 Mfd. x 450 Volts	1
		or	
119112B	C15, C16, C17	Electrolytic Filter Condenser 30 Mfd.; 30 Mfd.; 10 Mfd. x 450 Volts	1
1292	C1, C22	.0005 Mica Type Condenser—20%	2
12912	C36	.00025 Mica Type Condenser—20%	1
12939	C33	.00005 Mica Type Condenser—20%	1
129161	C31, C32	.0001 Mica Dual Condenser—10%	1
		TRANSFORMERS	
105115B	T19	Output Transformer for Speaker	1
104217	T21	Power Transformer. 50 to 60 Cycles 105-125 Volt Primary	1
104218	T21	Power Transformer. 25 to 60 Cycles 105-125 Volt Primary	
		COILS	
10962	T11	B.C., R.F. Coil with Iron Slug	1
10958	T8	6 Mc. R.F. Coil with Iron Slug	1
10959	T7	9 Mc. R.F. Coil with Iron Slug	1
10960	T9	12 Mc. R.F. Coil with Adjusting Screw	1
10961	T10	15 Mc. R.F. Coil with Adjusting Screw	1
110161	T12	B.C., Osc. Coil with Iron Slug	1
110156	T14	6 Mc. Osc. Coil with Adjusting Screw	1
110157	T13	9 Mc. Osc. Coil with Iron Slug	1
110158	T15	12 Mc. Osc. Coil with Adjusting Screw	1
110159	T16	15 Mc. Osc. Coil with Adjusting Screw	1
111195	T2	B.C., Ant. Coil with Iron Slug	1
111189	T4	6 Mc. Ant. Coil with Iron Slug	1
111190	T3	9 Mc. Ant. Coil with Iron Slug	1
111191	T5	12 Mc. Ant. Coil with Adjusting Screw	1
111192	T6	15 Mc. Ant. Coil with Adjusting Screw	1

COIL DATA
MODEL C11A54 SERIES A
MODEL C11A55 SERIES A
MODEL 12A51 SERIES A



VIEW LOOKING AT BOTTOM OF CHASSIS

MODEL C11A55 SERIES A
RECORD CHANGER PARTS LIST
Part No. 104267

4316	Motor, 60 Cycle 115 Volt
4422	Motor Mounting Kit consists of rubber grommets, screw sleeves, washers, and nuts
4233	Motor Mounting Grommet
3231	Motor On-Off Switch
4406	Line Cord and Plug
4425	Rubber Idler Wheel with Spring Clip
0 4324	Idler Wheel Tension Spring
0-4319	Turntable
4423	Upper and Lower Shelf Blade Assembly
4426	Pickup Cartridge (N1 or L40) with screws
4428	Pickup Arm Assembly complete less cartridge
4292	Rubber Pickup Rest Bumper
4262	Reject Return Spring
4427	Reject, 10"-12", or Auto-Man Buttons with screws
4424	Needle Screw

Model C11A55 has an Oak RC/1 record changer. See Rider's "Automatic Record Changers and Recorders" book.

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ALIGNMENT INSTRUCTIONS

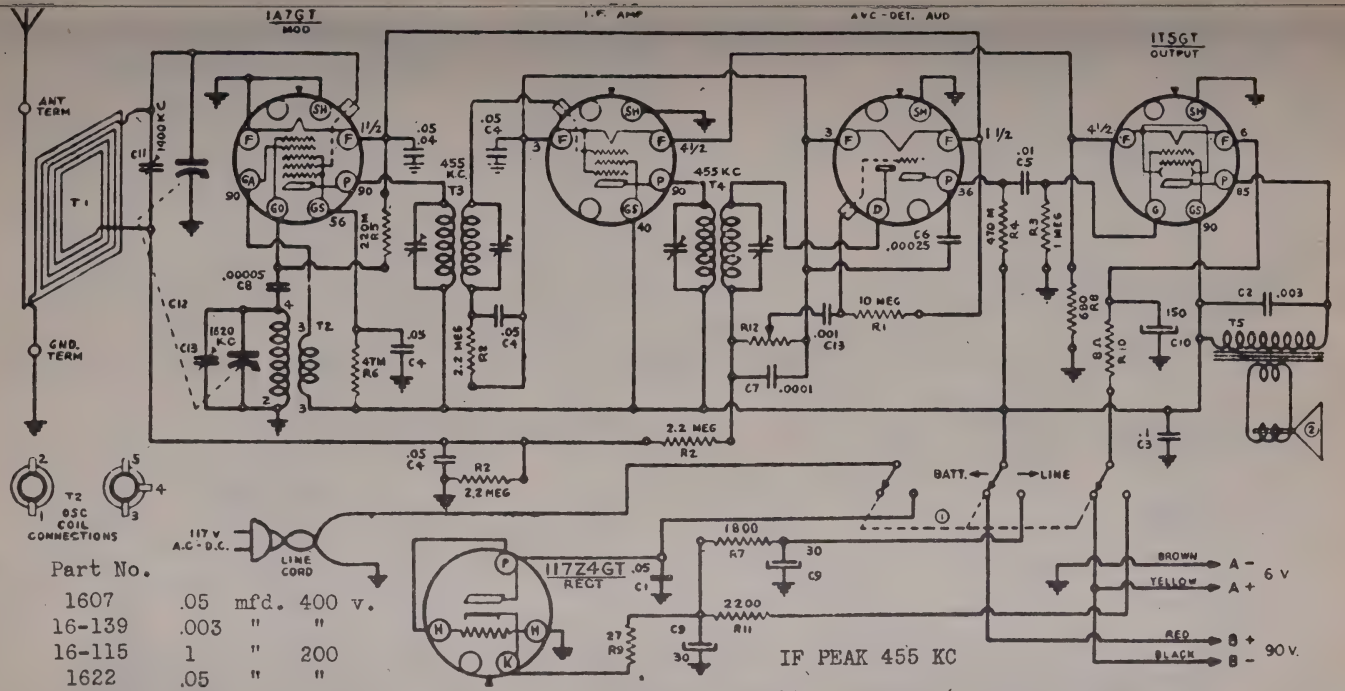
The receiver and generator should be allowed to warm up for a few minutes. The volume control should be set at maximum. The following chart gives connections and operations in their order for proper alignment of this receiver.

SEE CIRCUIT DIAGRAM FOR TRIMMER LOCATIONS

Generator Frequency	Connection at Radio	Dummy Antenna	Range Switch Setting	Dial Setting	Trimmers to Tune	Approx. Sensitivity .05 Watt O. P.
I. F. 456 k.c.	Center Stator of Var. Cond.	.1 Mfd.	B. C.	H. F. End	I. F. Trans. Tune to Max.	65 to 75 Mv.
B. C. 1650 k.c.	Ant.	200 Mmf.	B. C.	H. F. Limit of Travel	B. C. Osc.	—
1400 k.c.	"	"	"	1400— See Note "A"	B. C. RF. " " Loop Tune to Max.	20 Mv.
600 k.c.	"	"	"	600— Rock Rotor	Padder	15 Mv.
11.6 m.c.	Ant.	400 Ohms	S. W.	11.6 m.c.	S. W. Osc	40 to 50 Mv.
9.6 m.c.	Ant.	400 Ohms	S. W.	Check Dial at 9.6 Mc.		

Note "A" If the pointer is not at 1400 kc with a 1400 kc signal it may be loosened from the dial cord and moved to correct the calibration. This should be checked across the band to arrive at the optimum condition.

Note "B" Care should be taken not to align on the image frequency. This may be checked by rotating the dial of the signal generator. Another signal should be heard at dial frequency plus 912 kc. This signal should be checked carefully on all short wave bands, making sure the lowest frequency signal agrees with the dial setting in frequency and that it is the stronge.. of the two.



Code	Part No.		
C 1	1607	.05 mfd.	400 v.
C 2	16-139	.003 "	"
C 3	16-115	1 "	200
C 4	1622	.05 "	"
C 5	16-121	.01 "	"
C 6	1504	.00025 mfd.	mica
C 7	1501	.0001 "	"
C 8	1503	.00005 "	"
C 9	18-266	30-30 "	150 w.v. Electrolytic
C 10	18-271	150 "	25 w.v.
C 11	20-129	Trimmer on loop	
C 12	19-172	2 gang variable cond. also C 13	
C 13	16-124	.001 mfd. 400 v. Tubular cond.	
T 1	82-25	Loop Antenna	
T 2	10-310	Oscillator Coil	
T 3	10-379	1st I.F. Transformer	
T 4	10-343	2nd I.F. Transformer	
T 5	----	Output Transformer	
1	69-151	Power Switch	
2	79-314 A	5" P.M. Speaker	
R 1	60-193	10 Megohm 1/4 w.	
R 2	60-179	2.2 " "	
R 3	60-195	1 " "	
R 4	60-178	470 M Ohm "	
R 5	60-180	220 M " "	
R 6	60-177	47 M " "	
R 7	60-257	1800 " "	
R 8	60-379	680 " "	
R 9	60-651	27 Ohms	
R10	60-128	8 "	
R11	60-652	2200 "	
R12	24-150	1 megohm Volume control	

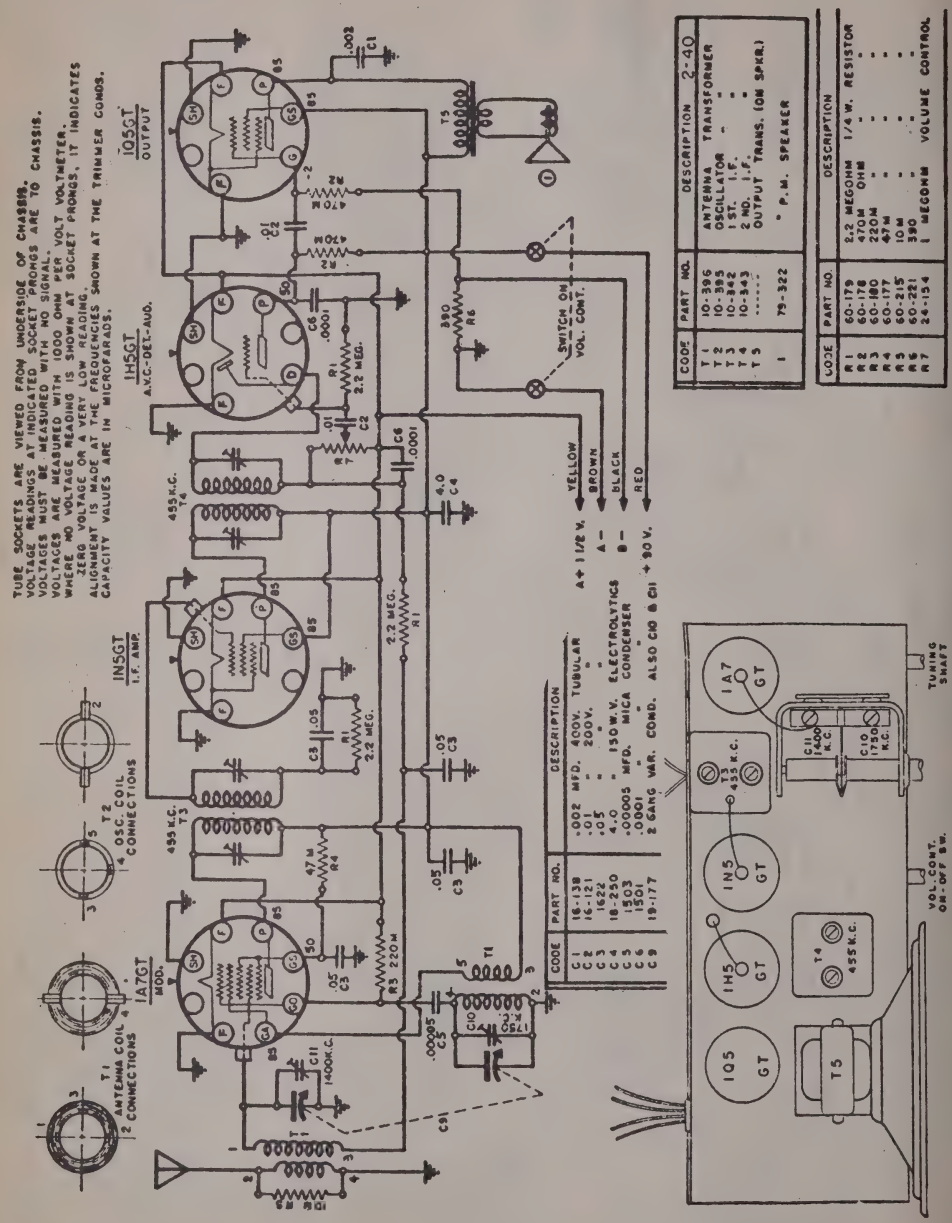
FOR CONVENTIAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII

GAMBLE-SKOGMO, INC.

MODEL 2543

MODEL 2402

GAMBLE-SKOGMO, INC.


TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT ENCIRCLED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH A TYPE 1000 OHMS PER VOLT VOLTMETER.
VOLTAGES ARE MEASURED WITH 1000 OHMS PER VOLT VOLTMETER.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONGS, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDS.
CAPACITY VALUES ARE IN MICROFARADS.
1A7GT MOD.
1N5GT I.F. AMP.
1H5GT A.V.C.-DET.-AUD.
1O5GT OUTPUT
T1 ANTENNA COIL 2 CONNECTIONS
T2 4 OSC. COIL CONNECTIONS
455 K.C.
A+ 1 1/2 V.
A-
B-
+ 90 V.
YELLOW
BROWN
BLACK
RED
SWITCH ON VOL. CONT.
TUNING SHAFT
VOL. CONT. ON-OFF SW.
1O5 GT
1H5 GT
1N5 GT
1A7 GT
T5
T4 455 K.C.
T3 455 K.C.
C11 1400 K.C.
C10 1750 K.C.

CODE	PART NO.	DESCRIPTION
C1	16-138	.002 MFD. 400V. TUBULAR
C2	16-121	.01 " " "
C3	1622	.05 " " "
C4	18-250	4.0 " 150 W.V. ELECTROLYTICS
C5	1803	.00005 MFD. MICA CONDENSER
C6	1501	.0001 " "
C9	19-177	2 GANG VAR. COND. ALSO C10 & C11

CODE	PART NO.	DESCRIPTION 2-40
T1	10-396	ANTENNA TRANSFORMER
T2	10-395	OSCILLATOR " "
T3	10-342	1 ST. I.F. " "
T4	10-343	2 ND. I.F. " "
T5	.....	OUTPUT TRANS. (ON SPKR.)
1	73-322	* P.M. SPEAKER

CODE	PART NO.	DESCRIPTION
R1	60-179	2.2 MEGOHM 1/4 W. RESISTOR
R2	60-178	470M OHM " " "
R3	60-180	220M " " "
R4	60-177	47M " " "
R5	60-215	10M " " "
R6	60-221	390 " " "
R7	24-154	1 MEGOHM VOLUME CONTROL

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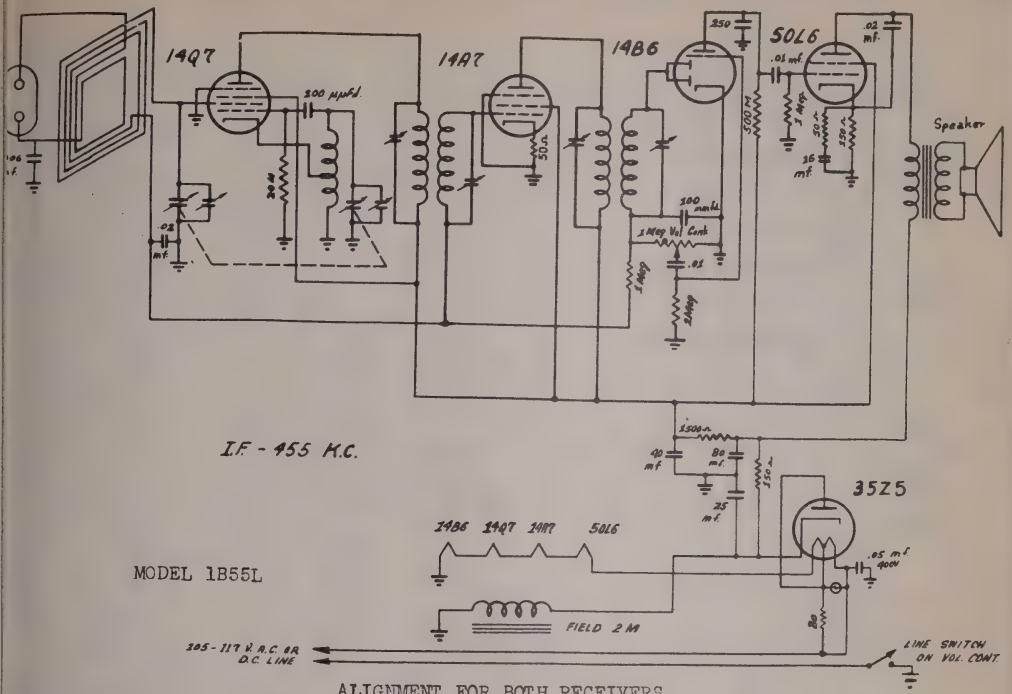
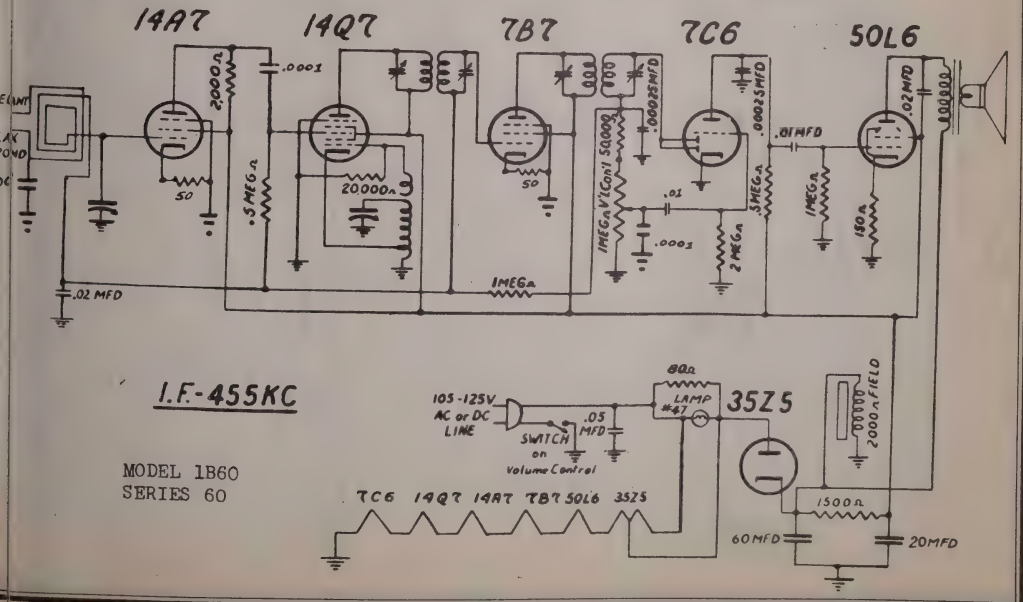
GAROD ELECTRONICS CORP.

MODEL 1B55L
MODEL 1B60, Series 60

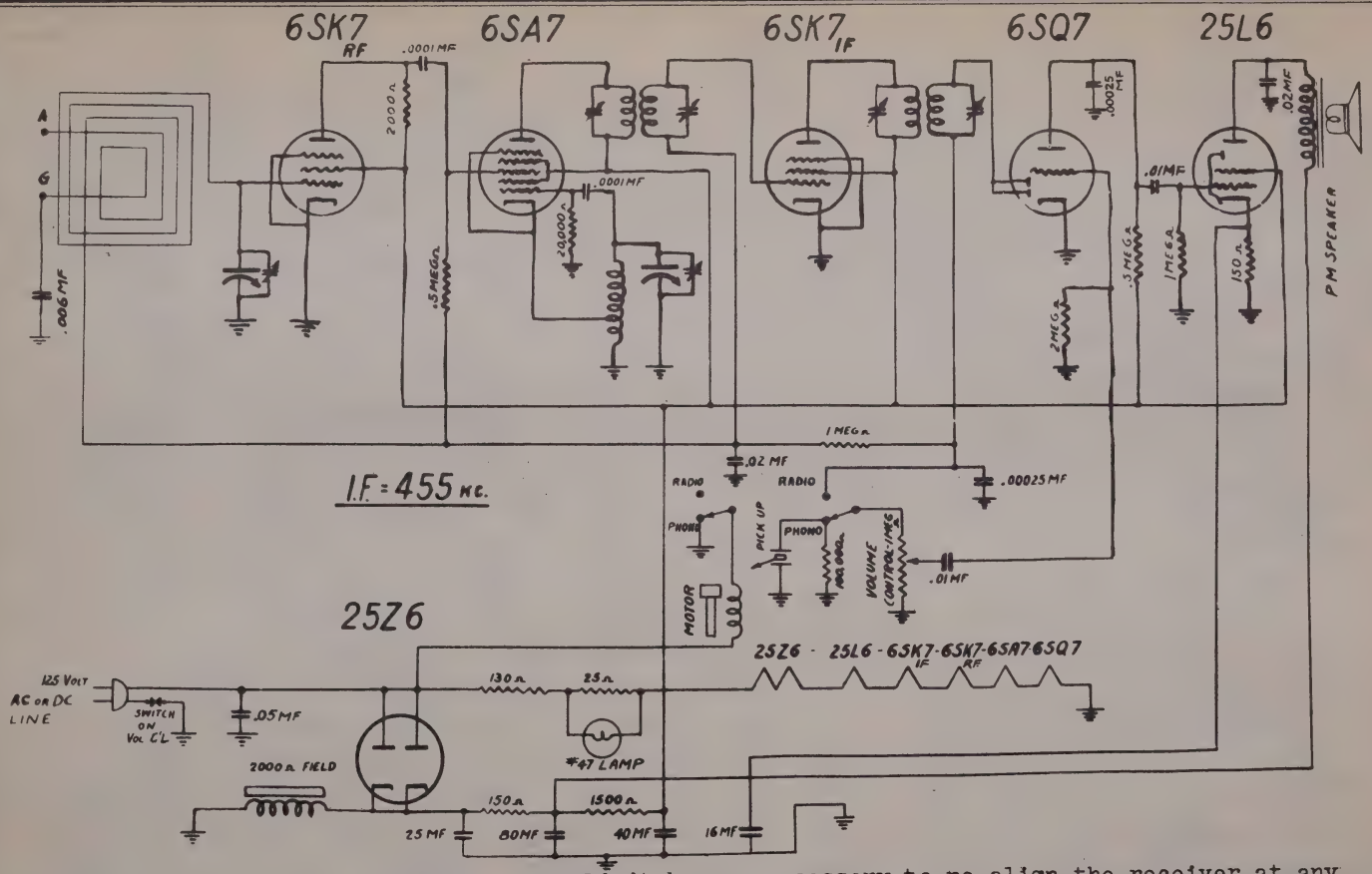


ALIGNMENT FOR BOTH RECEIVERS

Should it become necessary to realign the receiver at any time, proceed in the usual manner by first adjusting the I.F. transformers, for maximum output as indicated by an output meter connected across the voice coil. Then turn the dial to 1500 KC. Set the signal generator (or 1500 KC local station) to this frequency and tune in the signal by means of the oscillator trimmer on the variable condenser, (Front section). Then adjust the antenna trimmer for maximum output. No other adjustments are necessary.



©John F. Rider

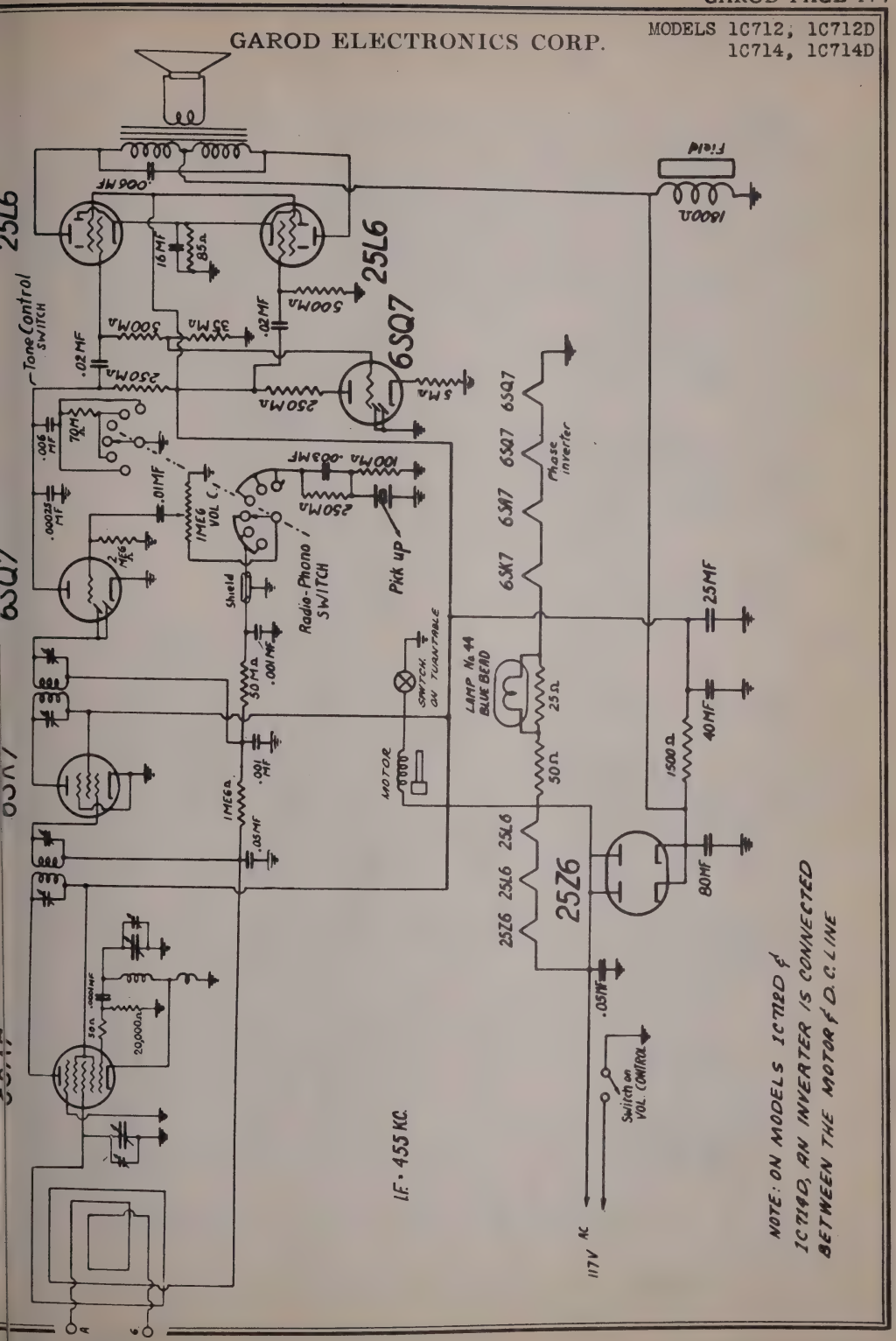


MODEL 1G611D IS THE SAME EXCEPT AN AC-DC INVERTER IS CONNECTED BETWEEN THE MOTOR AND DC LINE.

ALIGNMENT - Should it become necessary to re-align the receiver at any time, proceed in the usual manner by first adjusting the I.F.transformers, for maximum output as indicated by an output meter connected across the voice coil. Then turn the dial to approximately 1400KC. Set the signal generator (or 1400KC local station) to this frequency and tune in the signal by means of the oscillator trimmer on the variable condenser (front section). Then adjust the antenna trimmer for maximum

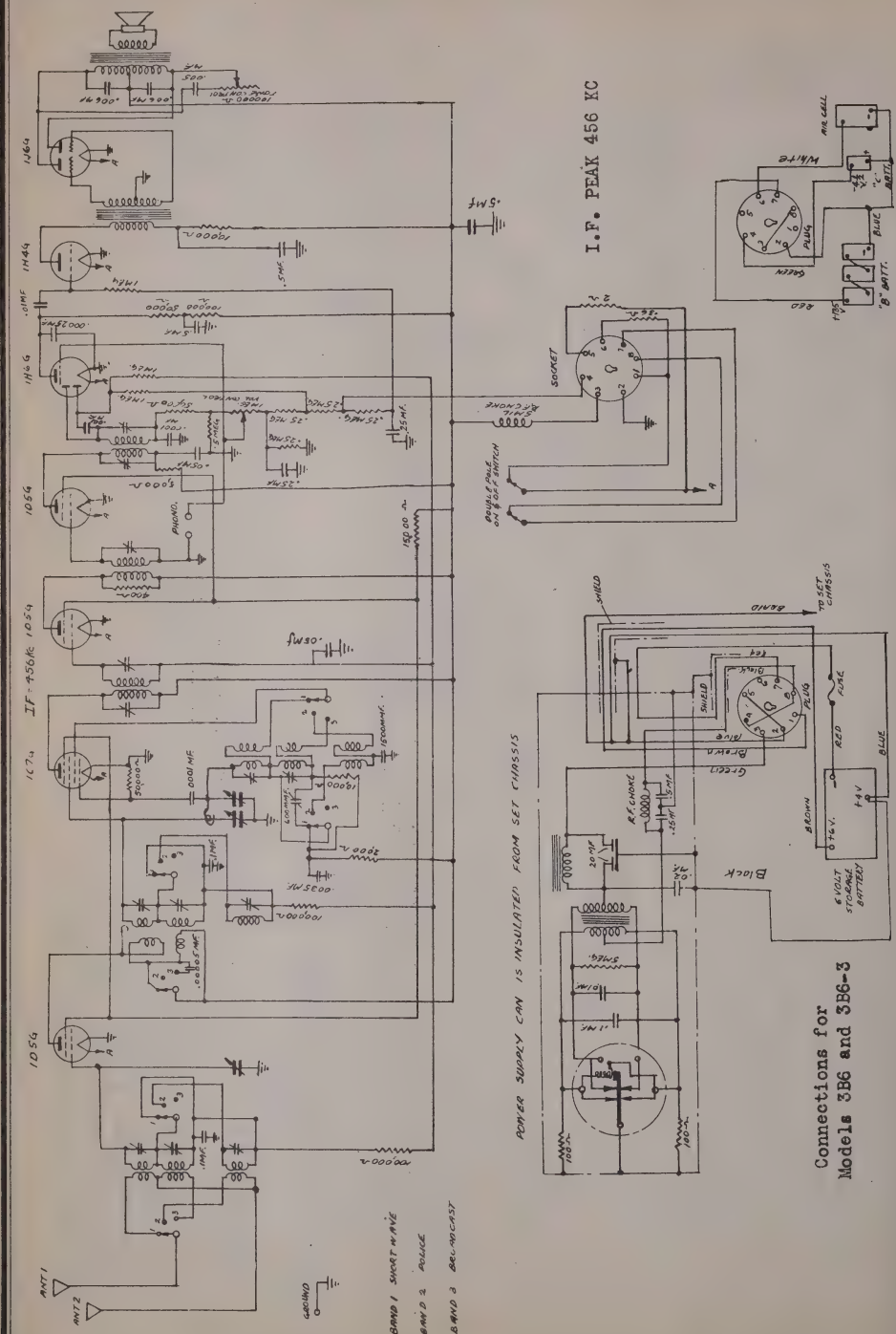
GAROD ELECTRONICS CORP.

MODELS 1C712, 1C712D
1C714, 1C714D



MODELS 3B2, 3B2-3
MODELS 3B6, 3B6-3

GAROD ELECTRONICS CORP.


I.F. PEAK 456 KC
IF - 456 Kc
Connections for Models 3B2 and 3B2-3
Connections for Models 3B6 and 3B6-3
POWER SUPPLY CAN IS INSULATED FROM SET CHASSIS
ANT 1
ANT 2
GROUND
BAND 1 SHORT WAVE
BAND 2 POLICE
BAND 3 BRD. CAST
1R4
1H4G
1H4G
1H5G
1C7G
1D5G
1D5G
PHONO.
SOCKET
BATTERY
BLUE
RED
BROWN
GREEN
BLACK
YELLOW
WHITE
PLUG
FUSE
SHIELD
BAND
TO SET CHASSIS
6 VOLT STORAGE BATTERY
ANT. CELL
"B" BATT.
ANT.
GAIN
.05 Mf
.5 Mf
.1 Mf
.25 Mf
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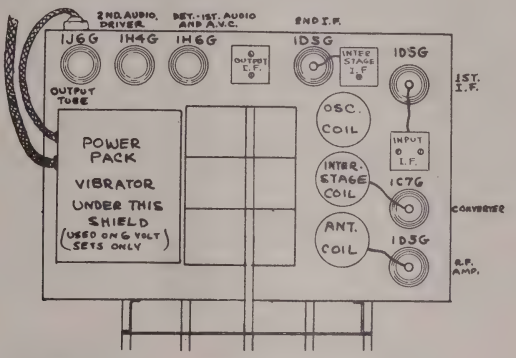
GAROD ELECTRONICS CORP.

CAUSES OF FAILURE TO OPERATE

1. First check all connections to batteries.
2. See that polarity is correct.
3. Check voltage of all Batteries across their terminals. "B" batteries should measure more than 35 volts (for a 45-volt Block), the "C" battery over 4 volts. An Air Cell should be replaced when the voltage falls below 2 volts. This also applies to a 2 volt storage cell. A 6 volt storage battery should not drop below 5.8 volts. If a charger has been installed, check by means of a volt meter as to whether the charger is delivering voltage and if an ammeter is available check the charging rate.
4. If all batteries are O.K., see if the fuse has been blown, as a result of a short circuit or excessive current due to a defective vibrator whose contacts are sticking. (For 6 volt operation). The vibrator may be reached by removing the screws holding the power pack can in place. Remove the vibrator from its socket and insert a new fuse. If when the vibrator is plugged in the fuse blows, it will be necessary to obtain a replacement vibrator from your dealer. Screw the cover back on again or noisy reception may result.
5. If the dial lights up with Pilot Light switch turned "ON," and the vibrator operates, as evidenced by a slight buzzing when the ear is placed close to the vibrator, it will be necessary to check all voltages, which should be approximately as indicated above. Exact voltages will be determined by the condition of the batteries.
6. If all voltages are approximately correct, check for alignment as described previously.
7. Short life of the Air Cell may be due to failure to turn the set OFF at night or continuous use of the pilot lights. The water level in the Air Cell must be maintained as indicated by the marker provided for that purpose.



INSTRUCTIONS FOR INSTALLATION AND OPERATION

CURRENT

This receiver may be operated from either of two types of Power Supply as follows:

1. A 6 volt storage battery, which may be an automobile battery, though a battery specially designed for radio use is to be preferred. If a 100 ampere hour battery is used, and the receiver is operated about three hours per day, it will require recharging after about three weeks of use. A preferred arrangement is to use a Wind-Driver generator which may be connected to the battery to automatically keep it fully charged. The only attention necessary in that case is to check the water level in the battery periodically. Where the Wind Velocity is low, a small Gasoline driven generator may be used which will operate about 15 hours on a gallon of gas, but since the charger is not in constant use, the cost of operation of the radio is very low, and besides, one or two small lamps can be operated from the same power source.

2. An "Air Cell," 3 "B" Batteries and a "C" battery will, when used, have a life of approximately 9 months for the air cell and about one year for the "B" and "C" batteries. The air cell can not be recharged but must be replaced by a new one. The exact life will depend upon the discharge rate, thus if it is used less than 3 hours a day, a longer life may be expected, and if used for example 6 hours per day, the life may be reduced to 6 months. Whichever type of power is most suited may be used, although results will be about the same in all cases.

INSTALLATION - Fig. 1 shows the connections to be used when operated from a 6 volt storage battery (and wind driven or gas engine generator).
NOTE THAT 2 OF THE CLIPS CONNECT TO THE SAME TERMINAL. THIS MUST BE DONE EXACTLY AS SHOWN. DO NOT SNAP ONE CLIP ON THE BATTERY LUG AND THE OTHER CLIP ON TO THE FIRST ONE OR CONSIDERABLE BACKGROUND NOISE WILL RESULT. DO NOT CONNECT BOTH WIRES TO THE SAME CLIP, EVEN THOUGH BOTH GO TO THE SAME TERMINAL. DO NOT SHORTEN OR LENGTHEN ANY OF THE BATTERY WIRES.

BE SURE THAT THE POLARITY OF THE BATTERIES IS AS SHOWN, OR THE RECEIVER WILL NOT OPERATE, OR TUBES MAY BE BURNED OUT.

BE SURE THAT THE ON-OFF SWITCH ON THE VOLUME CONTROL IS TURNED TO THE "OFF" POSITION BEFORE MAKING ANY CONNECTIONS AND CHECK THOROUGHLY BEFORE THIS SWITCH IS TURNED ON.

AIR CELL OPERATION

Figure 2 shows the connection when an air cell is to be used with "B" and "C" batteries. The Power Pack is linked to the receiver chassis by a flexible cord and plug. This is needed only for 6 Volt operation. For use with batteries, this plug is removed from the socket on the rear of the chassis. A special cord is inserted and connected as shown in Fig. 2.

A separate switch is provided for the pilot light, which may be turned ON for tuning and turned OFF to save battery drain without, of course, impairing the receiver operation. On storage battery operation, the pilot lights should be left ON, since this equalises the drain on all cells of the battery.

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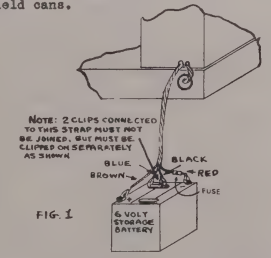
SERVICE NOTES FOR THE MODEL 3B6-3B2
7 TUBE, 3 BAND BATTERY SUPERHETERODYNE RECEIVER
ALIGNMENT PROCEDURE

Realignment of this receiver should not be attempted unless all other possible causes of faulty operation have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave-bands and an output meter for indicating the effect of adjustments are required.

It is important to remember that in receivers of this kind which are equipped with automatic volume control it is necessary to use the minimum possible signal from the signal generator; otherwise the A.V.C. action will tend to nullify the variations in output as the trimmers are adjusted.

I.F. ADJUSTMENT--The signal generator is set at 456 kc. and is connected to the grid of the first detector (1C7G). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the I.F. trimmers are adjusted for maximum output. These trimmers may be found on tops of the I.F. transformer shield cans.


NOTE: 2 CLIPS CONNECTED TO THIS STRAP MUST NOT BE JOINED, BUT MUST BE CLIPPED ON SEPARATELY AS SHOWN
BLUE
BROWN
BLACK
RED
FUSE
6 VOLT STORAGE BATTERY
FIG. 1

18 MEGACYCLE ADJUSTMENT--The high side of the signal generator is connected to the antenna lead of the receiver and the low side to the ground lead. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for short-wave band no. 1. The oscillator trimmer condenser is adjusted so that the 16 mc. signal is tuned in exactly at the 18 mc. calibration point, with the volume control on full and the signal generator adjusted for minimum imput. The antenna pre-selector and first detector trimmers are then adjusted in the order named for maximum output. These trimmers are located on the sides of the shield cans and are opposite the lower openings. This is the only adjustment on Band #1.

1500 K.C. ADJUSTMENT--With the band selector switch in position for operation on the Broadcast band and the receiver and signal generator both set at 1500 K.C. the procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is opposite the upper opening. The antenna preselector and interstage coil trimmers are located in the same positions on the corresponding shield cans.

The signal generator is set at 600 K.C. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 1500 K.C. adjustment should then be rechecked. The 600 K.C. Padder is located on the right chassis apron and is towards the rear.

3 MC. ADJUSTMENT--The band selector switch is set in position for operation of the Short Wave No. 2 band. The receiver and signal generator are both set at 3 M.C. and the procedure outlined above is repeated. The oscillator trimmer is found on the Police Band Coil located under the chassis and is towards the rear. The other trimmers for this band are located in similar positions on the corresponding coils.

The signal generator is set at 1.7 M.C. and the signal tuned in on the dial. The padder condenser for the police band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 3 M.C. adjustment should then be rechecked. The 1.7 MC. padder is located on the right chassis apron and is the front one of the two.

MODEL 3B6-3B2

TUBE	FUNCTION	FIL.	PLATE	SCREEN	OSC. PL.
1D5G	R. F. Amp.	2.0	135	67.5	
1C7G	Converter	2.0	135	67.5	80
1D5G	1st I.F. Amp.	2.0	135	67.5	
1D5G	2nd I.F. Amp.	2.0	125	67.5	
1H6G	Det. & 1st Audio	2.0	75		
1H4G	Driver	2.0	110		
1J6G	Audio Output	2.0	135		

All voltages are measured from socket terminals to chassis and with a 1000 Ohms per volt voltmeter.
The set must be in operation and the Wave Band Switch in broadcast position with battery fully charged and new "B" batteries.

Filament voltages are taken from filament prong to filament prong at tube socket.

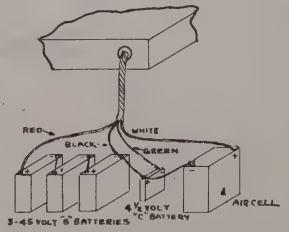


FIG. 2

MODEL 3B60

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MODEL 3B60
MODEL 3B70

GAROD ELECTRONICS CORP.

ALIGNMENT INSTRUCTIONS

Re-alignment of this receiver should not be attempted unless all other possible causes of unsatisfactory performance have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave bands, and an output meter for indicating the effect of adjustments, are required.

During the alignment procedure all adjustments should be made under the following conditions:

1) Line Voltage as indicated on instruction sheet.
2) Volume & Tone controls at maximum volume positions.
3) Minimum Input from signal generator.

If this procedure is not adhered to, all adjustments will appear very broad. This is due to the action of the automatic volume control.

I.F. Adjustment - Set the signal generator at 455 KC and connect to the grid of the 6SA7 converter tube thru a .1 MFD condenser. It is unnecessary to disconnect the grid from the rest of the circuit. Have the Band Switch in the #2 (Broadcast) position, and dial tuned to 1630 KC (condenser plates fully open). If hum modulation is encountered which is not cleared up by reversing the receiver's line plug, shunt a resistor of about 25000 ohms across the signal generator output.

The Input I.F. Transformer Trimmers - are both adjusted for maximum output as indicated by the output meter connected across either the voice coil or the primary coil of the loud speaker.

The Output I.F. Transformer trimmers - are adjusted for maximum output as indicated on the output meter. The Input I.F. should now be re-checked for maximum output.

Short Wave Band
Set the band switch to the third position which is the Short Wave Band. Connect the signal generator thru a standard dummy antenna, or thru a 400 ohm resistor to the antenna and ground leads of the receiver. Set the generator at 17.MC. Tune the variable condenser to 17.MC on the dial. Adjust the S.W. osc. trimmer (marked #1 on diagram and on chassis sketch) for maximum response. If response is had at two points on this trimmer, choose the looser setting (higher frequency). Next adjust the S.W. antenna trimmer #2 (mounted on top of S.W. antenna coil) for maximum response, while rocking the tuning condenser slightly from left to right.

Overseas Band - Set the band switch to the fourth position. Turn the dial control knob to the extreme high frequency end so that the condenser plates are entirely out of mesh. The signal generator is left connected as for the short wave band. The generator is set at 12 MC and the corresponding osc. trimmer #3 is adjusted until a response is indicated at the lower capacity setting of the trimmer. Now adjust the antenna trimmer #4 for maximum response. Set the generator at 9.4 MC and turn the variable condenser until the signal is picked up. The padder for this band, trimmer #5, is now adjusted for maximum output while rocking the condenser gang from left to right. The 12 MC adjustment should then be rechecked.

Broadcast Band
It is desirable to align this band on the loop. The signal generator is coupled to the receiver by means of a 2 or 3 turn loop which is placed about a foot from the receiver's loop. Set the Band Switch in the Broadcast position and condenser plates completely out of mesh. Set the signal generator at 1630 KC and adjust the broadcast oscillator trimmer #6 until a response is indicated on the output meter. The generator is now set at 1500 KC. Turn the variable condenser until a response is indicated. The dial pointer should now co-incide with the 1500 KC mark on the dial. Set the generator at 600 KC and turn the variable condenser control until a response is indicated. Adjust the broadcast oscillator padder condenser #7 for maximum response while "rocking" the gang condenser. The high frequency adjustments should now be re-checked.

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MODEL 3B70

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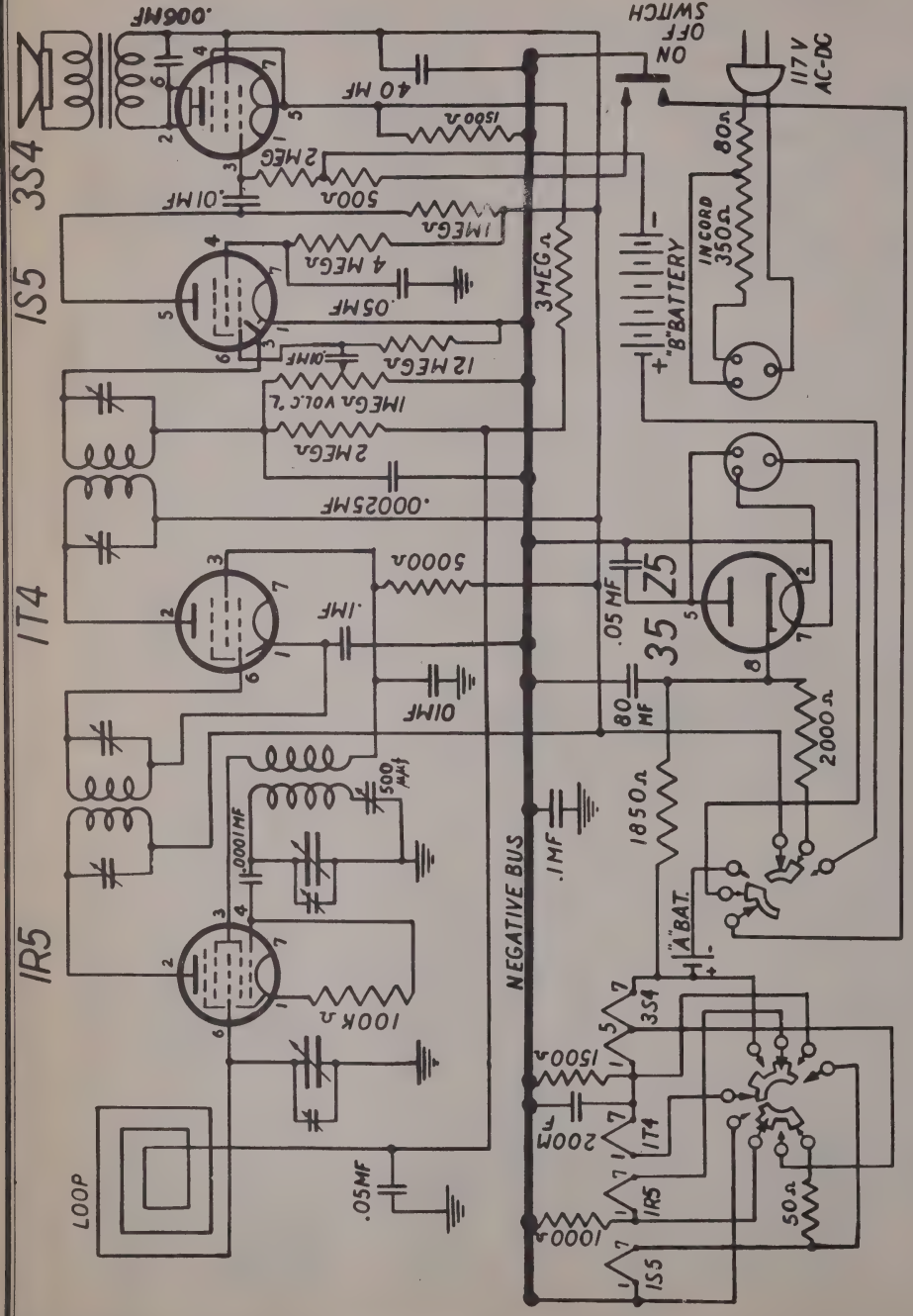
MODEL BP20

GAROD ELECTRONICS CORP.



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MODEL BP20
MODEL C200

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ALIGNMENT FOR MODEL BP20

ALIGNMENT - Should it become necessary to align the receiver, the signal generator is connected thru a small condenser to the grid of the First Detector Tube 1R5. The I. F. frequency is 455KC and the I.F. transformers are adjusted for maximum output as indicated on an output meter connected across the voice coil. The signal generator is now set to 1400KC and coupled loosely to the loop antenna by a coupling coil of one or two turns. If the dial pointer does not indicate this frequency, reset the oscillator trimmer (lower section of the Gang Condenser) so that it does. Now adjust the antenna (upper trimmer on Gang Condenser) for maximum output. Change the signal generator frequency to 600KC and tune in the signal. Adjust the 600KC padder to give maximum output while rocking the tuning condenser.

ALIGNMENT FOR MODEL C200

ALIGNMENT INSTRUCTIONS

Re-alignment of this receiver should not be attempted unless all other possible causes have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave band, and an output meter for indicating the effect of adjustments are required.

During the alignment procedure all adjustments should be made under the following conditions:

1) Line Voltage as indicated on instruction sheet.
2) Volume and Tone control at maximum volume positions.
3) Minimum Input from signal generator.

If this procedure is not adhered to, all adjustments will appear very broad. This is due to the action of the automatic volume control.

I. F. Adjustment - The signal generator is set at 455KC and is connected to the grid of the converter tube 6SA7 through a .5 MFD condenser. Be sure to connect a resistor of approximately 25,000 OHMS between the converter grid and ground so that the grid circuit is at ground potential for D.C. The grid need not be disconnected from the rest of the circuit.

The Input I.F. - Transformer trimmers are both adjusted for maximum output as indicated by the output meter connected across either the voice coil or the primary coil of the loud speaker.

The Output I.F. - Transformer trimmers are adjusted for maximum output as indicated on the output meter. The Input I.F. should now be re-checked for maximum output.

It is desirable to align the RF section on the loop. The signal generator is coupled to the receiver by means of a 2 or 3 turn loop. Set the switch to the RADIO position with condenser plates completely out of mesh. Set the signal generator at 1630KC and adjust the oscillator trimmer (front section of the variable condenser) until a response is indicated on the output meter. The generator is now set at 1500KC. Turn the variable condenser until a response is indicated. The dial pointer should now co-incide with the 1500KC mark on the dial. Now adjust the loop trimmer (rear section of the variable condenser) for maximum response. There are no other adjustments required.

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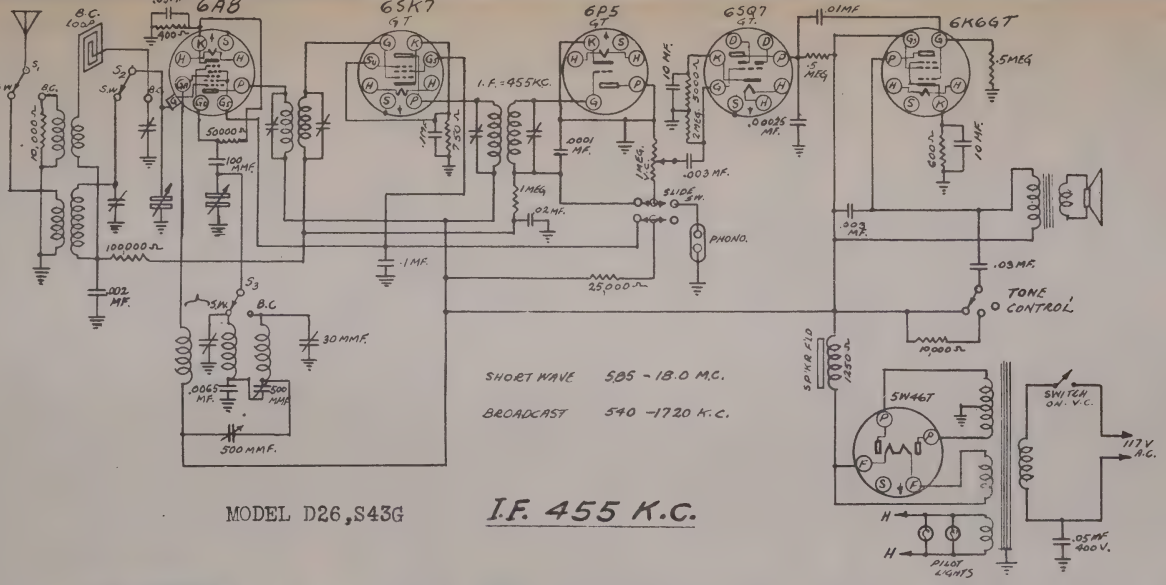


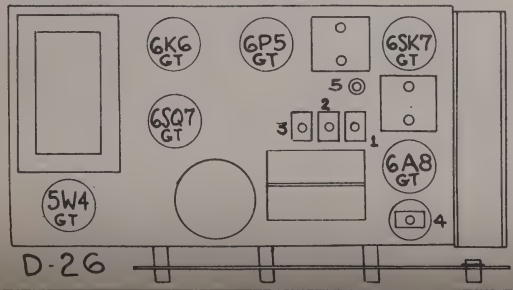
MODEL D26, S43G

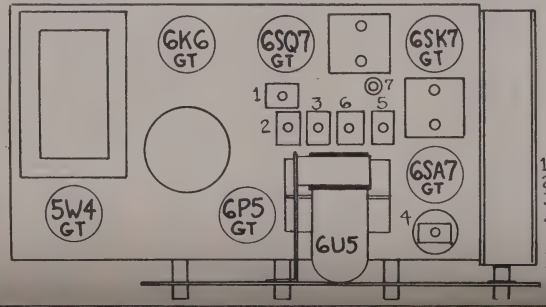
I.F. 455 K.C.

1-B'CAST-ANT-1500KC.
2-B'CAST-OSC-1720KC.
3-SHT-WVE-OSC-18M.C
4-SHT-WVE ANT-15M.C.
5-B'CAST-PAD-600KC.

MODELS S43G: This model is distinguished from Model #D-26 in that the Phono-Radio attachement is wired thru a cable directly to Phonograph unit. The Phono-Radio switch will therefore be found mounted to the motor board of the phono-graph instead of to the radio chassis

MODEL D26, S43G





MODEL D-42

1-POL.ANT.6.55M.C.
2-POL.OSC.-7.55M.C.
3-SHT WVE-OSC-24MC.
4-SHT-WVE-ANT-20MC.
5-B'CAST-ANT-1500K.C.
6-B'CAST-OSC-1720KC
7-B'CAST-PAD-600K.C

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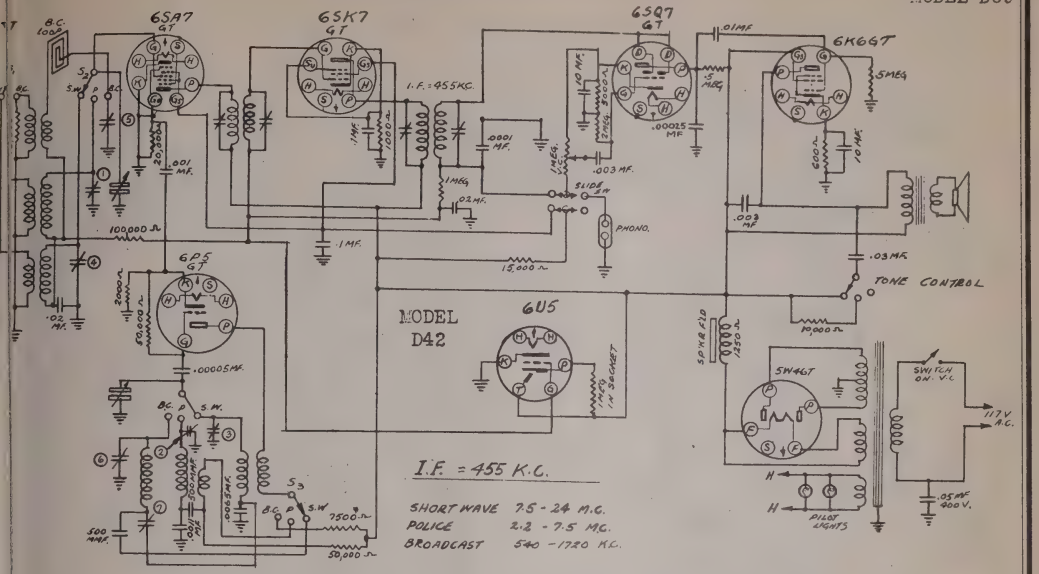
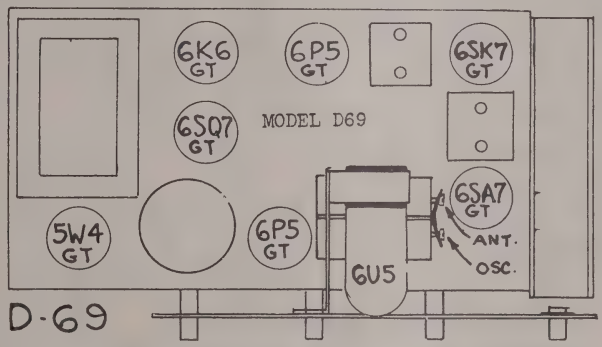
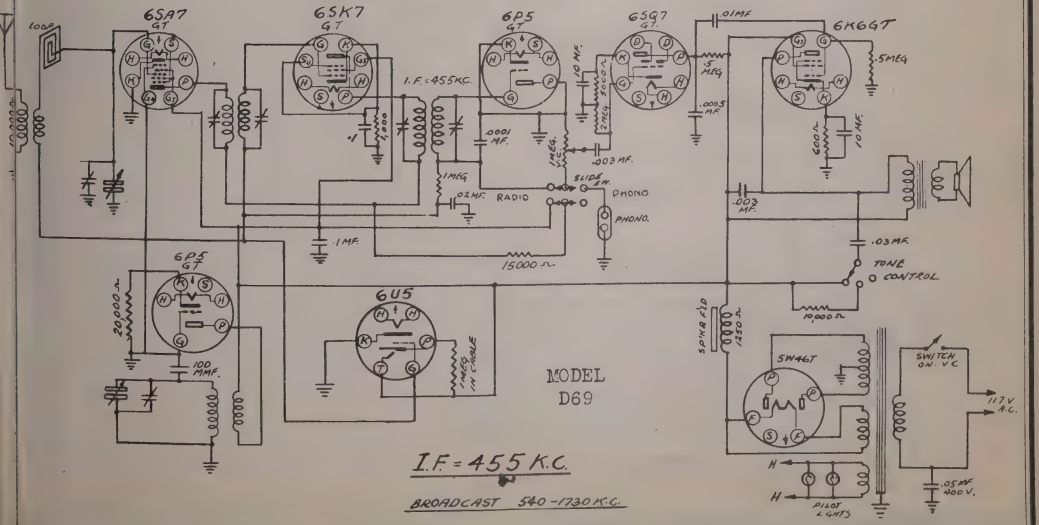
MODEL D42
MODEL D69





D-69



MODEL C200

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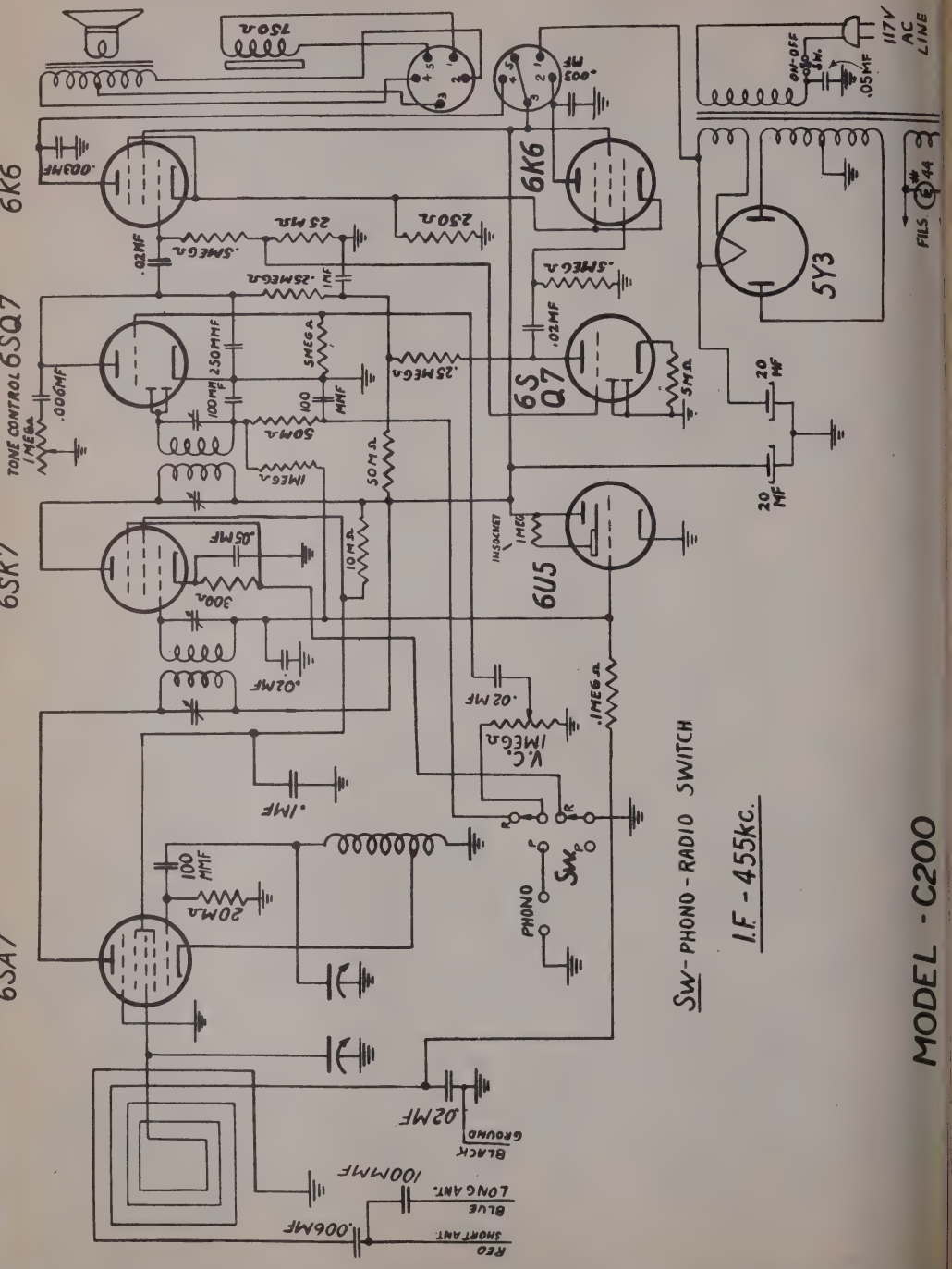

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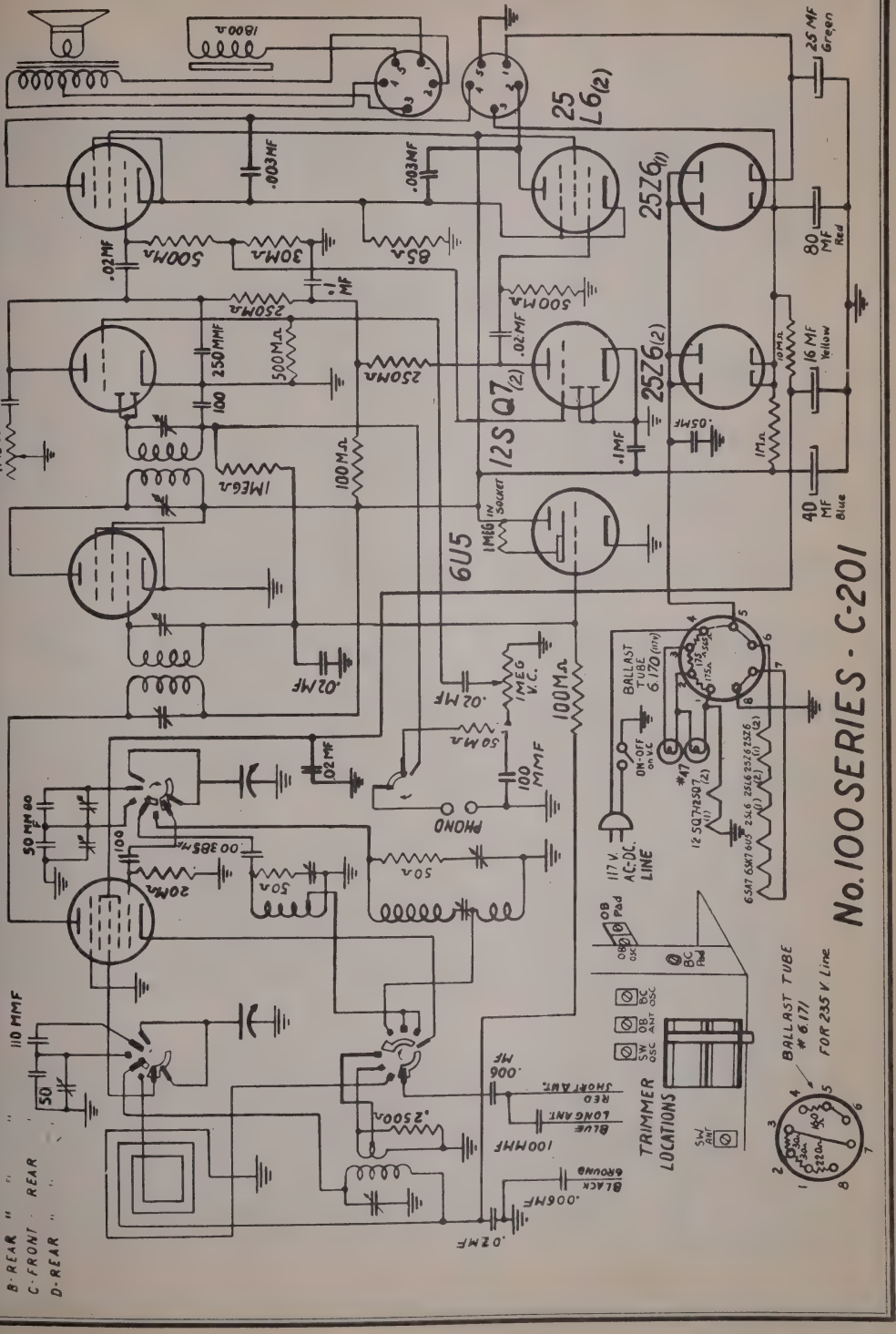
GAROD ELECTRONICS CORP.

MODEL C201, Series 100



MODEL C201, Series 100
MODELS C205, C210,
Series 80

GAROD ELECTRONICS CORP.

ALIGNMENT INSTRUCTIONS

Re-alignment of this receiver should not be attempted unless all other possible cuases have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave bands, and an output meter for indicating the effect of admustments are required.

During the alignment procedure all adjustments should be made under the following conditions:

1) Line Voltage as indicated on instruction sheet.
2) Volume & Tone control at maximum volume positions.
3) Minimum Input from signal generator.

If this procedure is not adhered to, all adjustments will appear very broad. This is due to the action of the automatic volume control.

I. F. Adjustment - The signal generator is set at 455 KC and is connected to the grid of the converter tube 6SA7 through a .5 MFD condenser. Be sure to connect a resistor of approximately 25,000 OHMS between the converter grid and ground so that the grid circuit is at ground potential for D.C. It is unnecessary to disconnect the grid from the rest of the circuit.

The Input I. F. Transformer trimmers - are both adjusted for maximum output as indicate by the output meter connected across either the voice coil or the primary coil of the loud speaker.

The Output I. F. Transformer trimmers - are adjusted for maximum output as indicated on the output meter. The Input I. F. should now be re-checked for maximum output.

Short Wave Band Adjustment - Set the band switch to the third position which is short wave band #1. Connect the signal generator thru a standard dummy antenna to the antenna and ground leads of the receiver. Set the generator at 17 MC turn the condenser until a response is indicated. The pointer should coincide with the 17 MC mark on the dial. Adjust the antenna trimmer for the short wave band for maximum output while rocking the condenser gang from left to right.

OVERSEAS - Set the band switch to the fourth position. Turn the dial control knob to the extreme high frequency end so that the condenser plates are entirely out of mesh. The signal generator is left connected as for the short wave band. The generator is set at 12 MC and the corresponding osc. trimmer is opened until a response is indicated at the lower capacity setting of the trimmer. Now adjust the antenna trimmer for maximum. Set the generator at 9.4 MC and turn the variable condenser until the signal is picked up. The padder for this band (see sketch) is now adjusted for maximum output while rocking the condenser gang from left to right. The 12 MC adjustment should then be rechecked.

Broadcast Band
It is desirable to align this band on the loop. The signal generator is coupled to the receiver by means of a 2 or 3 turn loop. Set the band Switch in the Broadcast position and condenser plates completely out of mesh. Set the signal generator at 1600 KC and adjust the broadcast oscillator trimmer until a response is indicated on the output meter. The generator is now set at 1500 KC. Turn the variable condenser until a response is indicated. The dial pointer should now co-incide with the 1500 KC mark on the dial. Set the generator at 600 KC and turn the variable condenser control until a response is indicated. Adjust the broadcast oscillator padder condenser for maximum response while "rocking" the gang condenser. The high frequency adjustments should now be re-checked.

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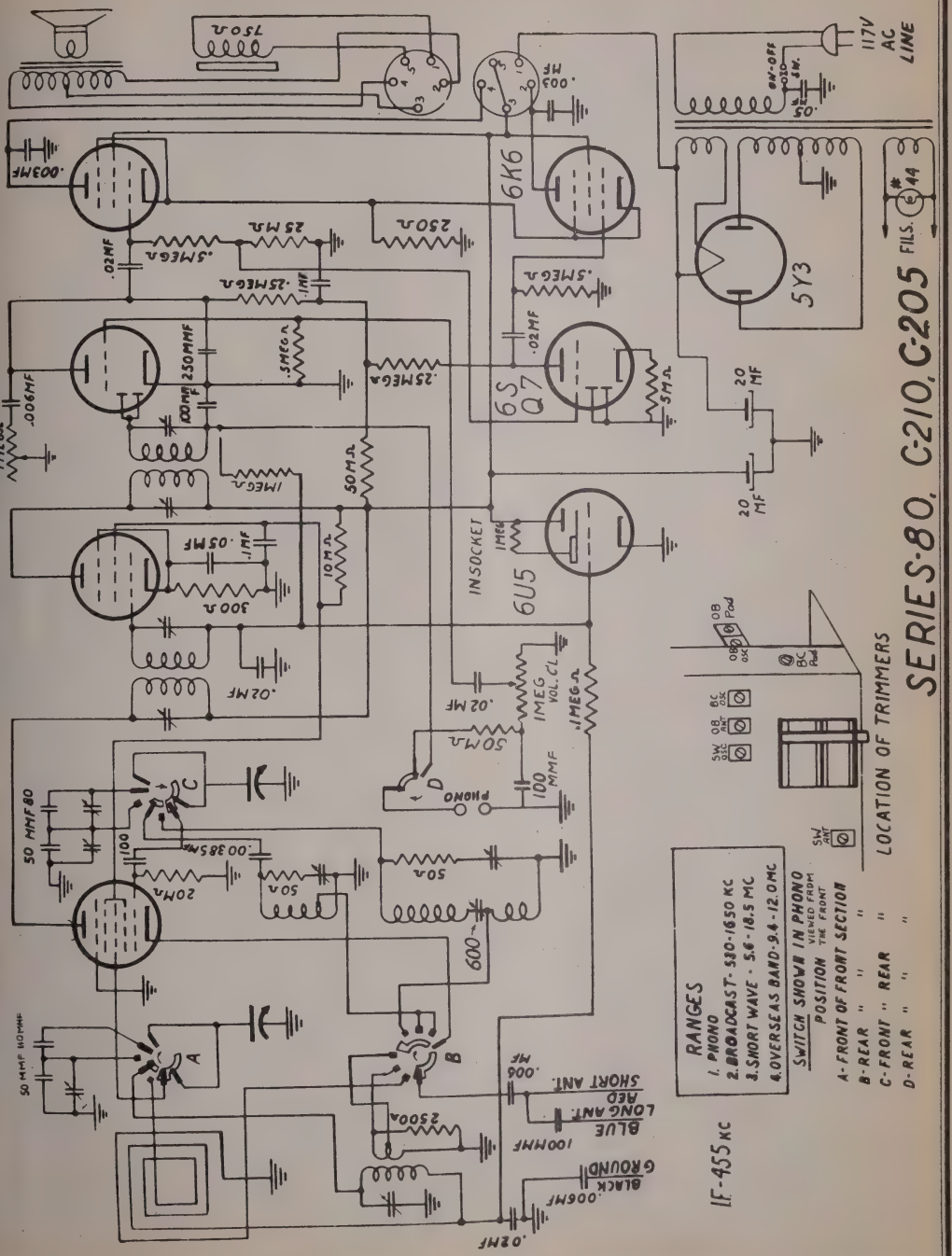
MODELS C205, C210,
Series 80

GAROD ELECTRONICS CORP.



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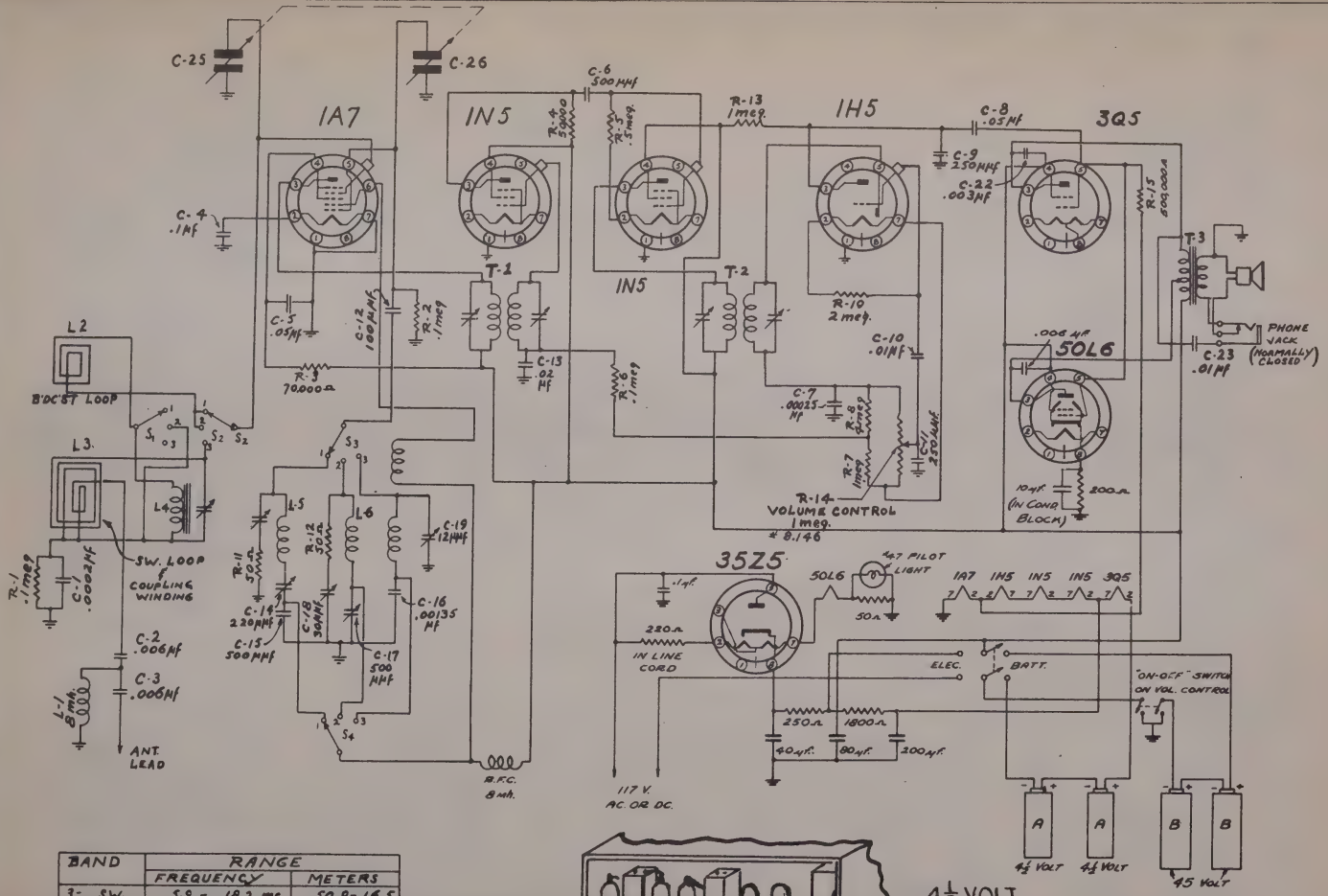
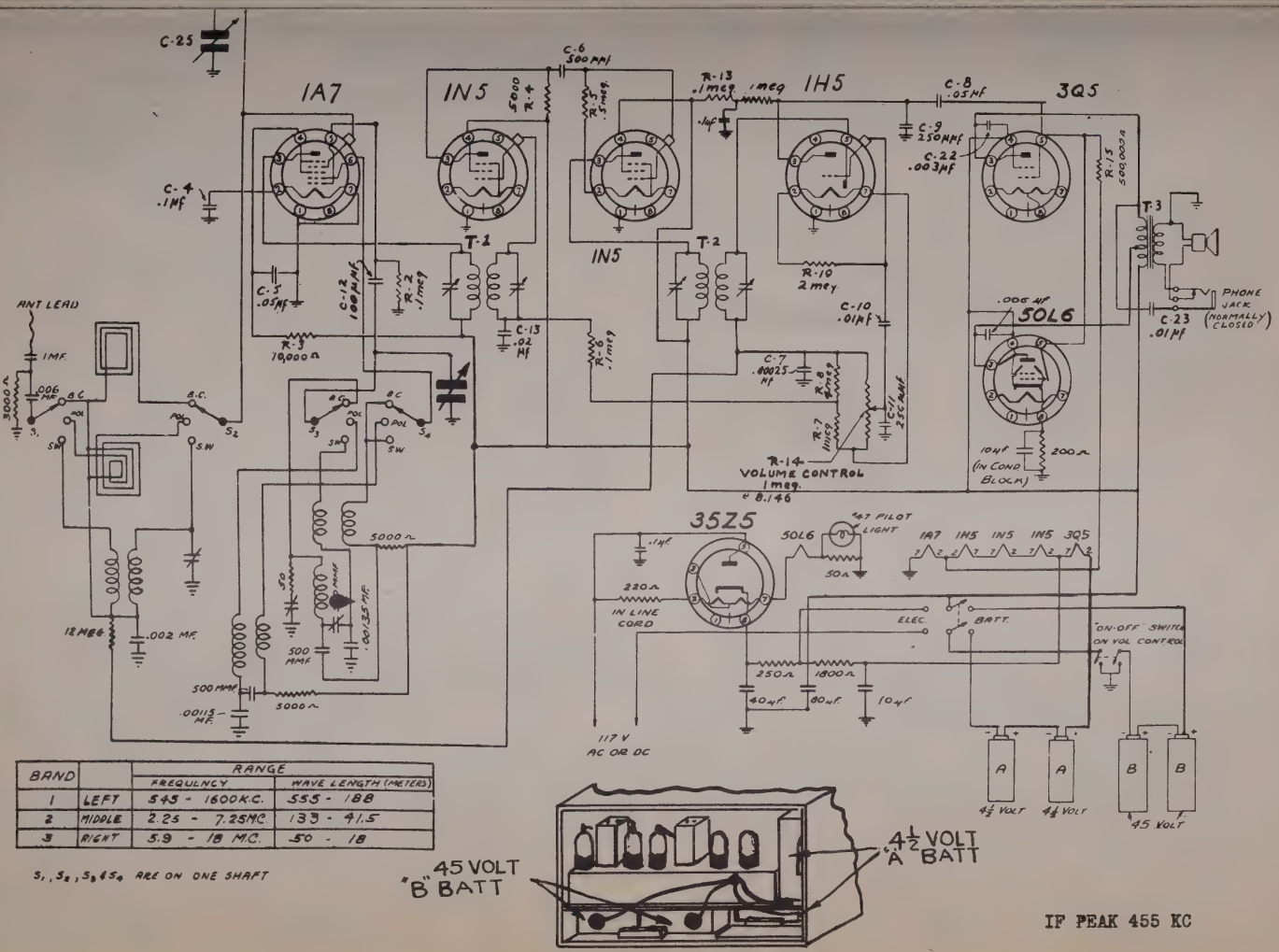


BAND	RANGE	
	FREQUENCY	METERS
3- SW.	5.9 - 18.2 mc	50.8-16.5
2- B'DC'ST	545 - 1550 kc	550-193
1- LW.	140 - 370 kc	2140-810

SWITCH POSITIONS 1,2,f3 ARE GANGED ON BAND SWITCH

IF PEAK 455 KC



BAND		RANGE	
		FREQUENCY	WAVE LENGTH (METERS)
1	LEFT	545 - 1600 KC.	555 - 188
2	MIDDLE	2.25 - 7.25 MC	133 - 41.5
3	RIGHT	5.9 - 18 MC.	50 - 18

$S_1, S_2, S_3 \& S_4$ ARE ON ONE SHAFT

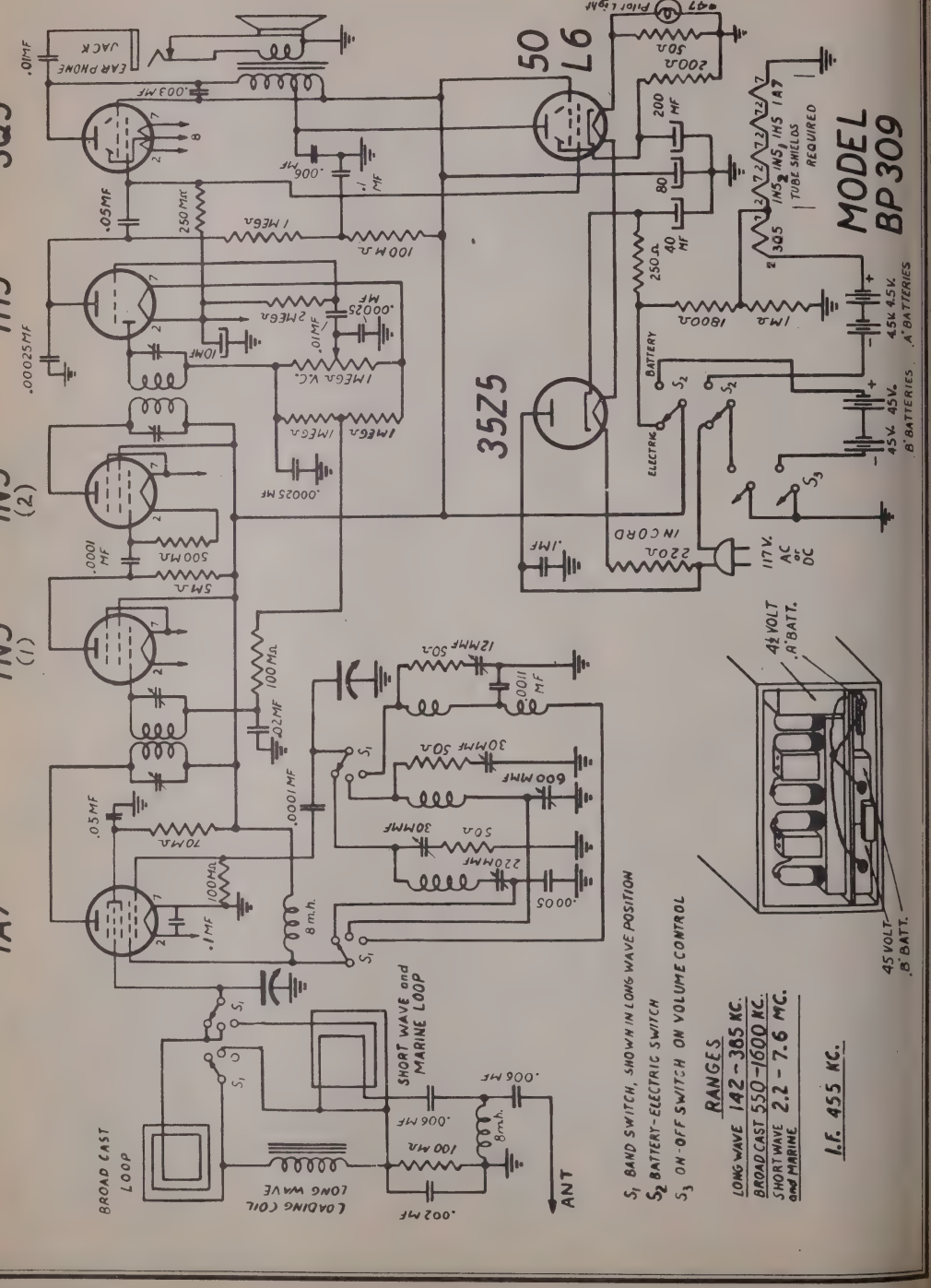
IF PEAK 455 KC

GAROD ELECTRONICS CORP.

MODEL BP306

MODEL BP309

GAROD ELECTRONICS CORP.



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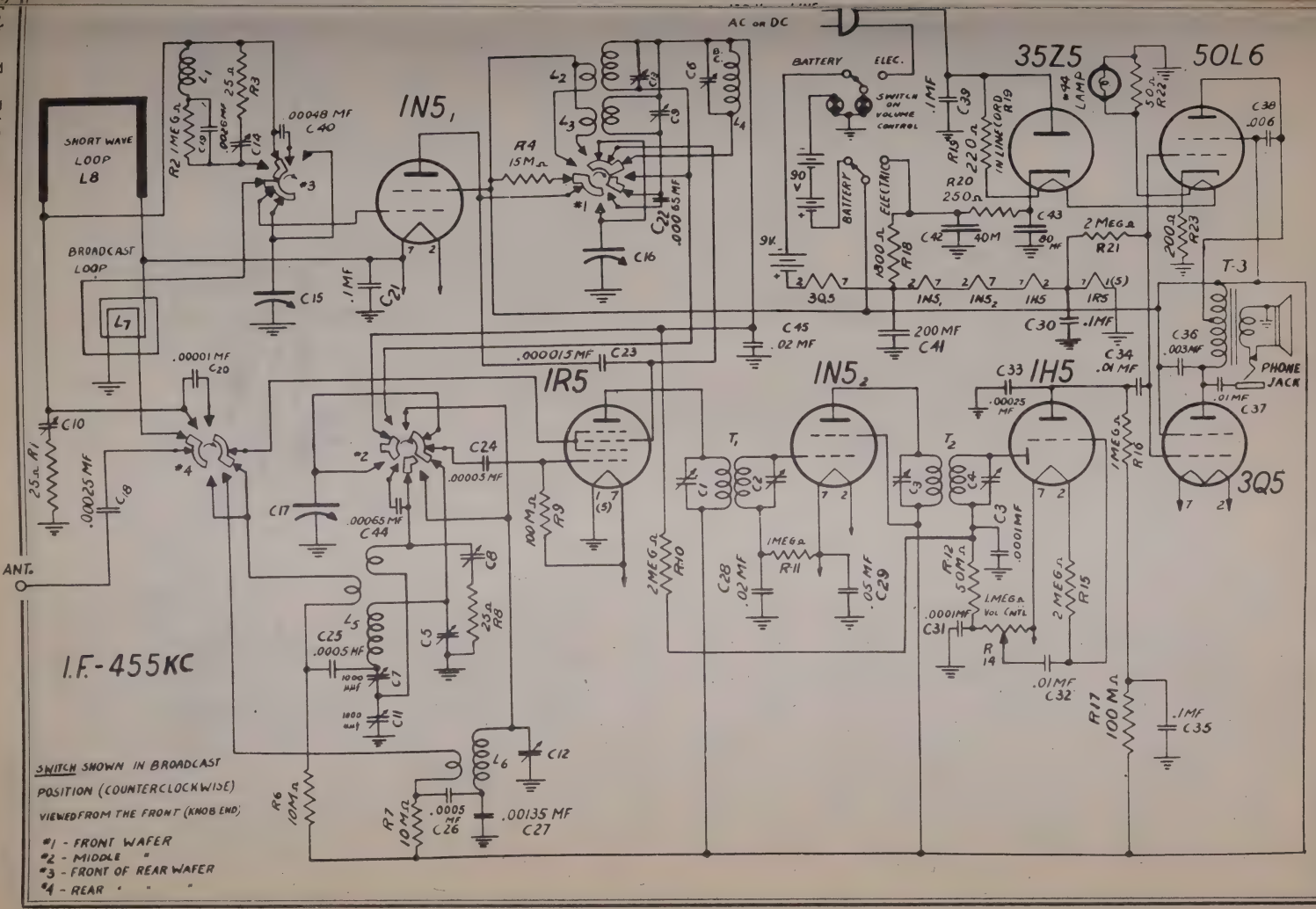

AC or DC
BATTERY
ELEC.
SWITCH ON VOLUME CONTROL
35Z5
50L6
.1MF C39
.006 C38
.006 C22
.006 C23
.006 C24
.006 C25
.006 C26
.006 C27
.006 C28
.006 C29
.006 C30
.006 C31
.006 C32
.006 C33
.006 C34
.006 C35
.006 C36
.006 C37
.006 C40
.006 C41
.006 C42
.006 C43
.006 C44
.006 C45
.006 C20
.006 C21
.006 C16
.006 C15
.006 C14
.006 C13
.006 C12
.006 C11
.006 C10
.006 C9
.006 C8
.006 C7
.006 C6
.006 C5
.006 C4
.006 C3
.006 C2
.006 C1
.006 C17
.006 C18
.006 C19
.006 C30
.006 C31
.006 C32
.006 C33
.006 C34
.006 C35
.006 C36
.006 C37
.006 C38
.006 C39

MODEL BP310

GAROD ELECTRONICS CORP.

ALIGNMENT PROCEDURE

All adjustments except the IF should be made on Loop operation. A loop consisting of two turns of heavy wire about one foot in diameter and placed about two feet from the set loop should be connected to the signal generator. For IF adjustment the "hot" side of the signal generator may be connected to the front section of the Three Gang Variable condenser thru a blocking condenser (.05 mfd). The condenser is set with the plates fully open and the Band Switch in the Broadcast position.

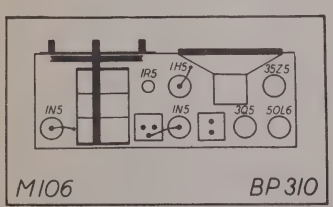
IMPORTANT. In taking the chassis out of the cabinet for servicing, it becomes necessary to disconnect the SHORT WAVE loop. Do not unsolder the lugs from the rod, but instead unsolder the leads from the lugs. If these lugs are moved the Inductance of the loop will be changed and it will be impossible to align the SHORT WAVE Bands properly. Do not lengthen these leads or shorten them. To get at the trimmers for alignment, unsolder the loop leads, take out the chassis and with the chassis outside of the cabinet reconnect them.

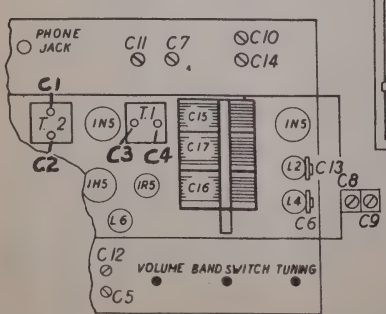
In aligning the series padders at 600KC and 9.5 megacycles, the variable condenser should be rocked back and forth until maximum output is obtained as indicated on the output meter. It is also advisable to do this while making the 17MC adjustment since there is some reaction between circuits.

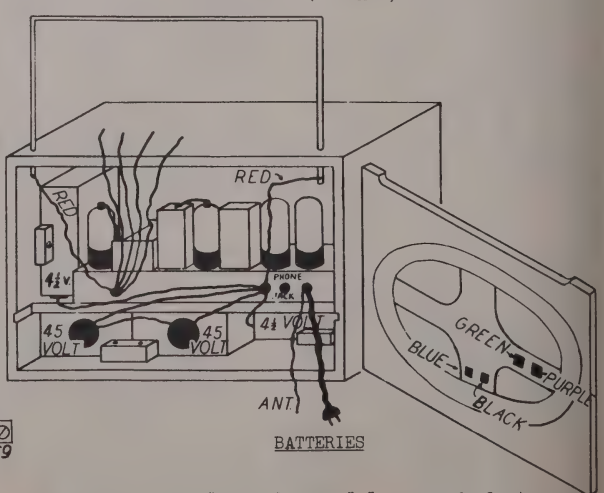
Proceed in accordance with the tabulation on the next page. For location of the trimmers SEE SKETCH. The position of the trimmers in the circuit is indicated in the circuit diagram by a corresponding number.

	SIGNAL GENERATOR FREQUENCY	BAND	ADJUST TRIMMERS FOR MAXIMUM OUTPUT IN SEQUENCE INDICATED (SEE SKETCH)	REMARKS
A	455 MC	I.F.	1--2--3--4	I. F. Trimmers
B	1500 KC	B.C.	5--6	Set dial to 1500 KC
C	600 KC	B.C.	7	Recheck adjustment "B"
D	17 MC	S.W.2	8--9--10	Set dial to 17 MC (rock condenser slightly)
E	9.5 MC	S.W.2	11	Recheck adjustment "D"
F	8.5 MC	S.W.1	12--13--14	

SENSITIVITY BROADCAST-LOOP OPERATION-75 MICROVOLTS PER METER (AVERAGE) FOR 50 MW OUTPUT ANTENNA - 5 MICROVOLTS (AVERAGE)
SHORT WAVE-LOOP OPERATION 100 MICROVOLTS PER METER (AVERAGE)







BATTERIES

2-EVEREADY #746, 4½ VOLT "A", or equivalent.

2-EVEREADY #482, 45 VOLT "B", or equivalent.

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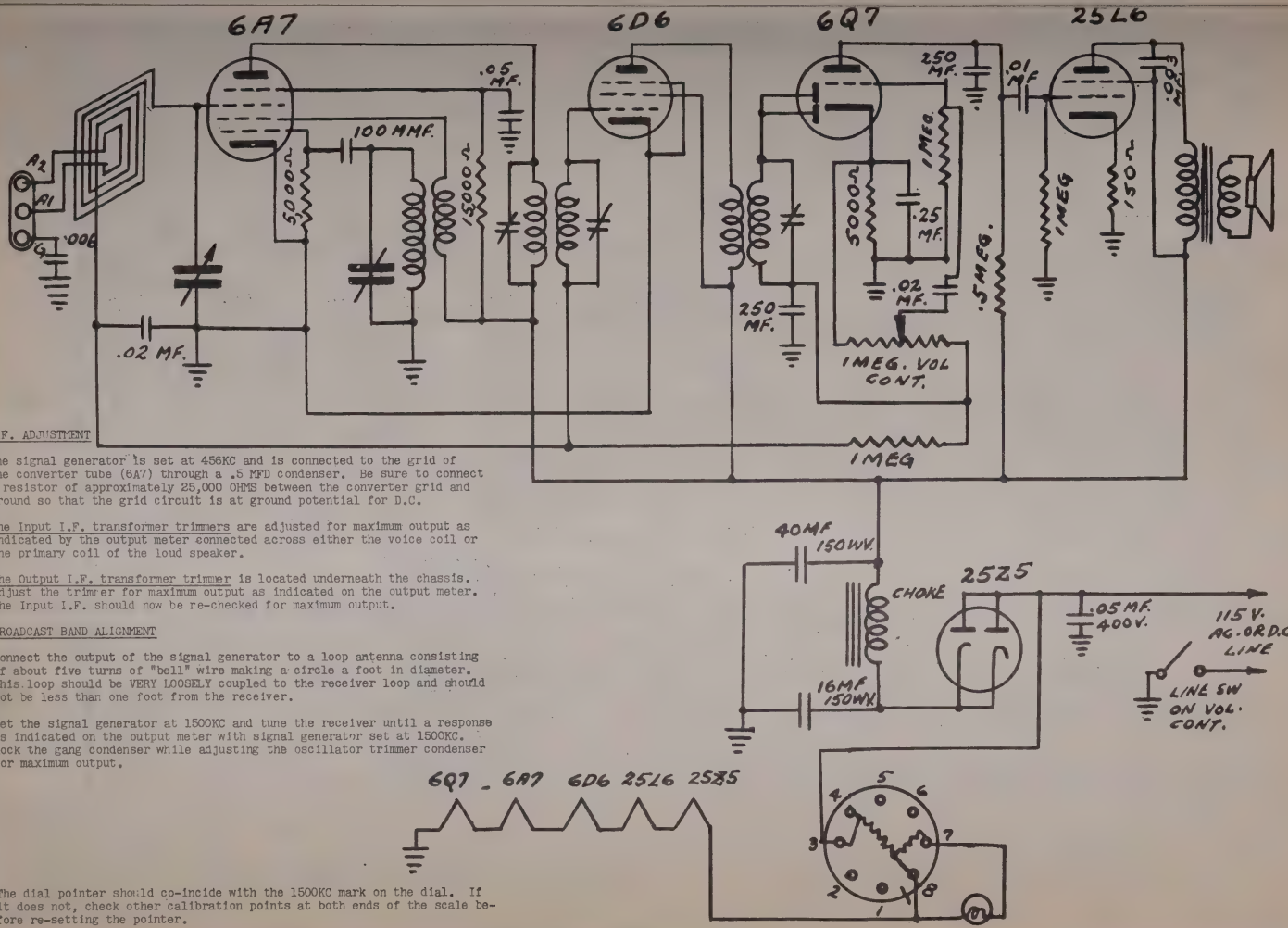

I.F. ADJUSTMENT

The signal generator is set at 456KC and is connected to the grid of the converter tube (6A7) through a .5 MFD condenser. Be sure to connect a resistor of approximately 25,000 OHMS between the converter grid and ground so that the grid circuit is at ground potential for D.C.

The Input I.F. transformer trimmers are adjusted for maximum output as indicated by the output meter connected across either the voice coil or the primary coil of the loud speaker.

The Output I.F. transformer trimmer is located underneath the chassis. Adjust the trimmer for maximum output as indicated on the output meter. The Input I.F. should now be re-checked for maximum output.

BROADCAST BAND ALIGNMENT

Connect the output of the signal generator to a loop antenna consisting of about five turns of "bell" wire making a circle a foot in diameter. This loop should be VERY LOOSELY coupled to the receiver loop and should not be less than one foot from the receiver.

Set the signal generator at 1500KC and tune the receiver until a response is indicated on the output meter with signal generator set at 1500KC. Rock the gang condenser while adjusting the oscillator trimmer condenser for maximum output.

The dial pointer should co-incide with the 1500KC mark on the dial. If it does not, check other calibration points at both ends of the scale before re-setting the pointer.

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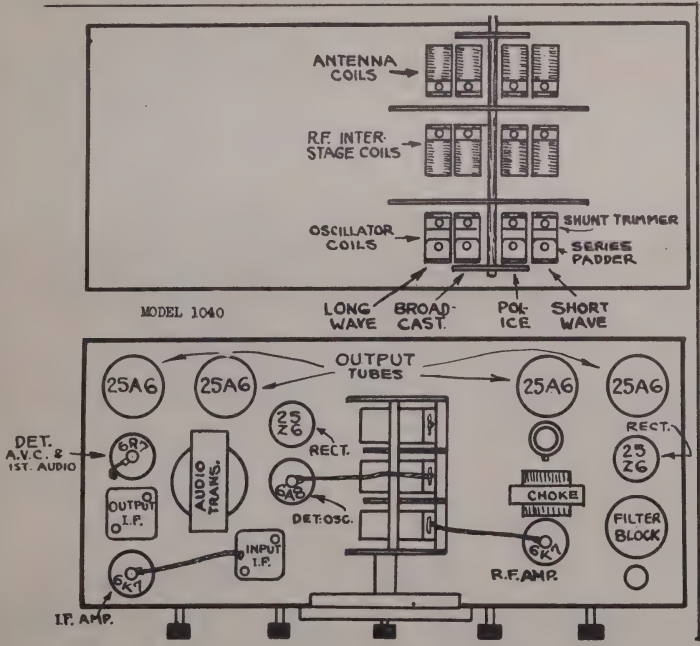
MODEL 3120 ALIGNMENT INSTRUCTIONS

Re-alignment of this receiver should not be attempted unless all other possible causes have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave bands, and an output meter for indicating the effect of adjustments are required.

During the alignment procedure all adjustments should be made under the following conditions:

1) Line Voltage as indicated on instruction sheet.
2) Volume & Tone control at maximum volume positions.
3) Minimum Input from signal generator.

If this procedure is not adhered to, all adjustments will appear very broad. This is due to the action of the automatic colume control



ALIGNMENT PROCEDURE MODEL 1040

I.F. ADJUSTMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (6A8). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on the tops of the I.F. Transformers.

18 MEGACYCLE ADJUSTMENT - The high side of the signal generator is connected to the antenna lead of the receiver and the low side to the ground lead. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no. 1. The oscillator trimmer condenser is adjusted so that the 18 mc signal is tuned in exactly at the 18 mc calibration point, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and interstage trimmers are then adjusted in the order named for maximum output. These trimmers are located as indicated in the bottom view of the chassis.

6 MEGACYCLE ADJUSTMENT - The signal generator is set at 6 megacycle and the signal tuned in on the dial. The short wave padding condenser is adjusted for maximum output, while the gang condenser is rocked slightly to the right and left. The 18 megacycle adjustment should then be rechecked.

I.F. Adjustment - The signal generator is set at 455 KC and is connected to the grid of the converter tube (6A8) through a .5 MFD condenser. Be sure to connect a resistor of approximately 25,000 OHMS between the converter grid and ground so that the grid circuit is at ground potential for D.C.

The Input I.F. Transformer trimmers - are both adjusted for maximum output as indicated by the output meter connected across either the voice coil or the primary coil of the loud speaker.

The Output I.F. Transformer trimmers - are adjusted for maximum output as indicated on the output meter. The Input I.F. should now be re-checked for maximum output.

Short Wave Band #1 Adjustment - Set the band switch to the third position which is short wave band #1. Connect the signal generator thru a standard dummy antenna to the antenna and ground leads of the receiver. Set the generator at 19MC turn the condenser until a response is indicated. The pointer should coincide with the 19MC mark on the dial. Adjust the antenna trimmer for the short wave band for maximum output while rocking the condenser gang from left to right.

Short Wave Band #2 - Set the band switch to the second position. Turn the dial control knob to the extreme high frequency end so that the condenser plates are entirely out of mesh. The signal generator is left connected as for band #1. The generator is set at 6.25MC and the Band #2 osc. trimmer is opened until a response is indicated, at the lower capacity setting of the trimmer. Set the generator at 6MC and turn the variable condenser until a response is indicated. The pointer should now coincide with the 6.MC mark on the dial. The antenna trimmer is then adjusted for maximum output while the condenser gang is rocked from right to left. Set the generator at 2.4MC and turn the variable condenser knob until a response is indicated. The padder for this band is now adjusted for maximum output while rocking the condenser gang from left to right. The high frequency adjustments should then be re-checked.

Broadcast Band
It is desirable to align this band on the loop. The signal generator is coupled to the receiver by means of a 2 or 3 turn loop. Set the Band Switch in the Broadcast position and condenser plates completely out of mesh. Set the signal generator at 1600 KC and adjust the broadcast oscillator trimmer until a response is indicated on the output meter. The generator is now set at 1400 KC. Turn the variable condenser until a response is indicated. The dial pointer should now co-incide with the 1400KC mark on the dial. Set the generator at 600KC and turn the variable condenser control until a response is indicated. Adjust the broadcast oscillator padder condenser for maximum response while "rocking" the gang condenser. The high frequency adjustments should now be re-checked.

5 MC. ADJUSTMENT - With the band selector switch in position for operation on band no. 2. and the receiver and signal generator both set at 5 mc. the procedure outlined above is repeated.

The signal generator is set at 1.8 mc. and the signal tuned in on the dial. The police band padder condenser is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 5 mc. adjustment should then be rechecked.

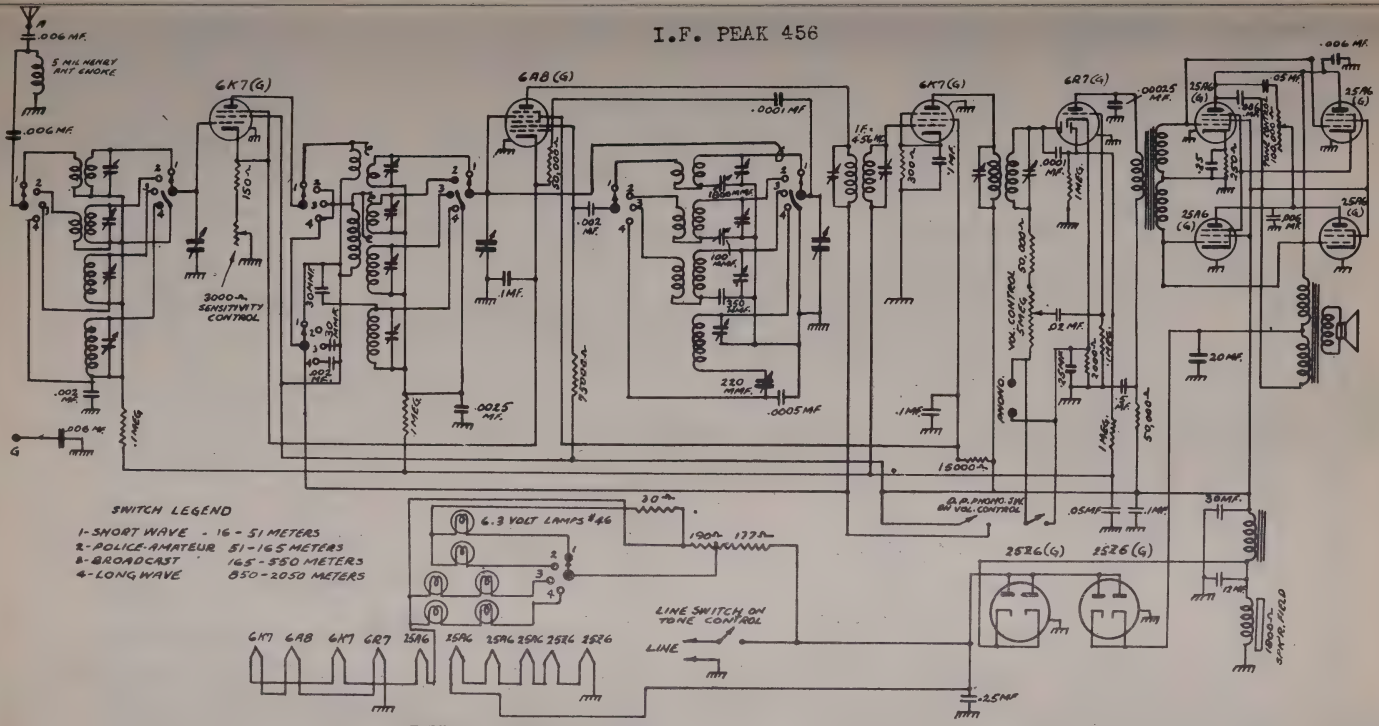
1500 KC. ADJUSTMENT - The band selector switch is set in position for operation on the no. 3. band. The receiver and signal generator are both set at 1500 kc. and the procedure outlined above is repeated.

The signal generator is set at 600 kc. and the signal tuned in on the dial. The broadcast padder condenser is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 1500 kc. adjustment should then be rechecked.

300 KC. ADJUSTMENT - The band selector switch is set in position for operation on band no. 4. The receiver and generator are both tuned to 300 kc. and the procedure outlined above is repeated.

The signal generator is set at 150 kc. and the signal is tuned in on the dial. The long wave padder condenser is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 300 kc. adjustment should then be rechecked.

I.F. PEAK 456


.006 MF.
5 MILLIHENRY ANT CHOKE
6K7(G)
6A8(G)
6K7(G)
6R7(G)
25A6 (G)
25Z6 (G)
3000-Ω SENSITIVITY CONTROL
.0001 MF.
.002 MF.
.1 MF.
.0025 MF.
.0005 MF.
220 MMF.
100 MMF.
350 MMF.
1.5 MEG
.1 MEG
.02 MF.
.05 MF.
.25 MF.
.8 MF.
.2 MF.
.1 MEG
.5 MEG
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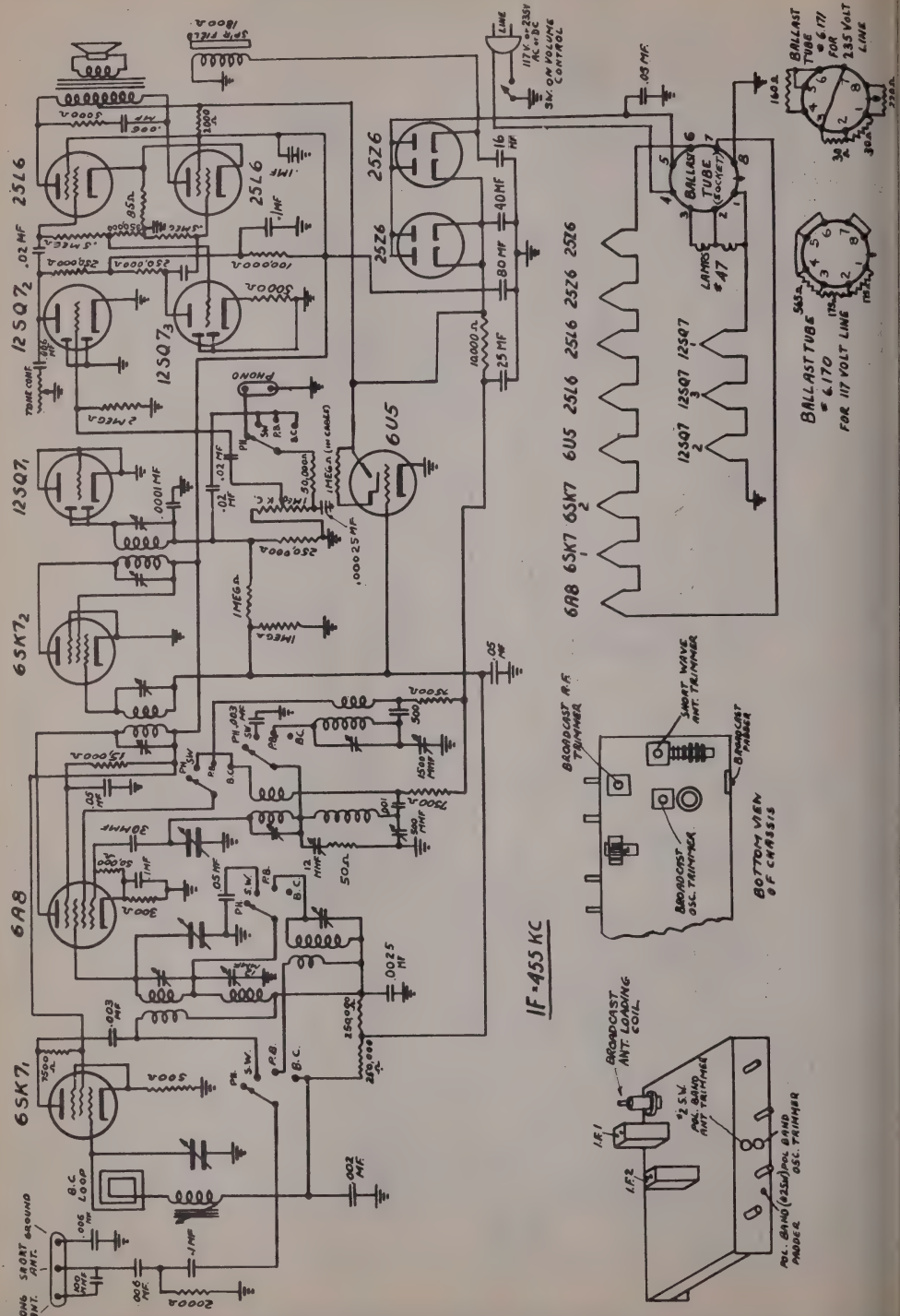
MODEL 3120

GAROD ELECTRONICS CORP.



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GENERAL ELECTRIC CO.

AUTOMATIC RECORD CHANGER

MODEL LRP-3

GENERAL

This record changer is designed for use on a 110-volt 50-cle power supply, but can easily be converted for 110-volt 6-cycle use by following the instructions under "Operation 50- or 60-cycle Power Supplies."

OPERATION

The record changer will play up to eight 12-inch or nine -inch records at one loading. It will not play 12-inch and -inch records intermixed. The last record will repeat aying until the mechanism is stopped.

To load the record changer, both lower shelf plates of the cord supports must be turned inward. This is done by asping the post just below the shelf plate and rotating until falls into the proper position. The stack of records rests er the spindle, on the two lower shelf plates.

The turntable switch is located at the front left corner of e motor board.

The Reject button is used to start the changer mechanism d to reject a particular record. To start the mechanism, to reject a record being played, merely push the Reject tton and release it. Rejecting can be done at any time after e needle has come in contact with the record, and will mediately start the mechanism on its change cycle.

The 10-12 button selects the position at which the pickup m drops onto the record, i.e. for 10-inch or 12-inch records spectively. No repositioning of the support discs is neces-ry for changing to different record size.

The Auto-Manual button prepares the record changer for ther automatic or manual operation. On Manual, the anger is used as an ordinary single-record player.

The mechanism should only be stopped while the needle riding on the record. After the last record has been played, ait until the pickup arm has gone through the change-rcle and has dropped on to the first grooves of the record, efore throwing the power switch "off." Then lift the pickup m and carry it to the pickup rest. Stopping the mechanism uring the change cycle will lock the pickup arm. To avoid amage to the mechanism, the pickup arm should only be andled with the Auto-Manual button in the Manual posi-on.

CAUTIONS

1. Never use force to start or stop the motor or any art of the record-changing mechanism.
2. The use of cracked or chipped records may damage the ickup and needle.
3. Do not leave the records on the record posts or on the rntable, as they may warp, particularly in warm climates. Warped records may slide upon one another and result in nsatisfactory reproduction. Warped records may be flat-ened by placing them on a flat surface with a heavy flat rticle placed on top of them for a few days.
4. The use of warped records may also jam the mech-nism. When the mechanism jams, turn off the power and otate the turntable by hand in the reverse direction, for bout ten turns.

CABINET LEVELING

For good operation, the record changer must be level. If the cabinet tilts to the left, the records may not drop smoothly and the pickup may drop and slide over the first grooves of the record. If the cabinet tilts to the right, the records may not drop smoothly, and the pickup may fail to enter the starting groove.

NEEDLE

This phonograph is equipped with a semi-permanent type needle and under normal operation should last for about four thousand playings. The needle should be inserted with the flat section to the screw and made secure. DO NOT CHANGE THE POSITION OF THE NEEDLE ONCE IT HAS BEEN IN USE. The needle screw should be tightened periodically.

TURNTABLE SPEED

The maximum allowable turntable speed is 81 rpm. The minimum allowable turntable speed, with the needle in the outside groove of a 12-inch record, is 76.6 rpm.

The number of records in the turntable makes practically no difference in the revolutions per minute (rpm).

OILING

All main moving parts of this record changer have oilless type bearings and should require no additional lubrication. However, a few drops of high-grade machine oil on the main bearings and friction surfaces, and to the oil wicks on both ends of the motor shaft may be applied at long intervals.

OPERATION ON 50- OR 60-CYCLE POWER SUPPLIES

The record changer is shipped from the factory adjusted for operation on a 50-cycle power supply. To change for 60-cycle operation, replace item (8) (Fig. 1) with the spare bushing supplied. (The spare bushing is shipped with each changer, tied to the frame with a piece of wire.) Sixty-cycle operation requires the smaller diameter bushing so as to reduce the turntable speed to 78 rpm. Note that if the mechanism is being operated on a 60-cycle power supply, and the turntable speed is too high, it means that too large a bushing is being used at (8) to drive the idler wheel (4), and that the smaller bushing should be used. Also, if the mechanism is being operated on a 50-cycle power supply, and the turntable speed is too low, it means that too small a bushing is being used at (8). Be sure the setscrew matches with the depression on the motor shaft and is securely tightened. When properly installed, the top of the bushing should be just a fraction below the top of the motor shaft.

MODEL LRP-3

GENERAL ELECTRIC CO.

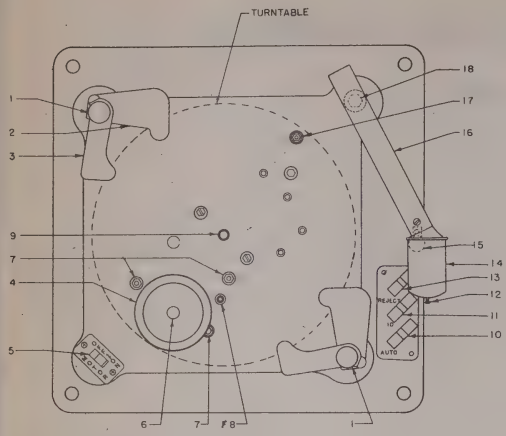

Fig. 1
Top view of record changer with turntable removed

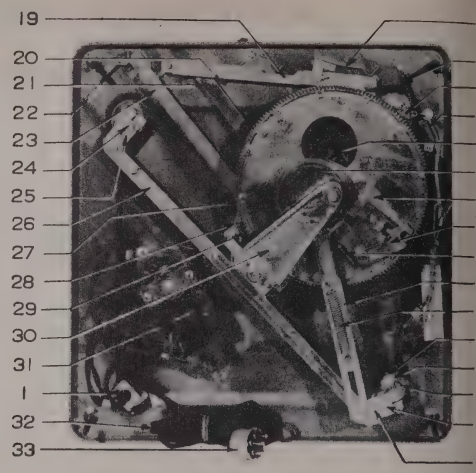

Fig. 2
Bottom view of record changer with mechanism about three fourths of the way through a change cycle

DESCRIPTION OF PRINCIPAL PARTS

Symbol	Function
1	Changer post
2	Lower blade
3	Upper blade
4	Idler wheel
5	Motor switch
6	Spring clip
7	Motor mounting grommet
8	Motor bushing
9	Turntable shaft
10	Auto-Manual button
11	10-12 button
12	Needle setscrew
13	Start-Reject button
14	Pickup
15	Pickup rest
16	Pickup arm
17	Dropping point adjusting screw
18	Pickup lift adjusting screw
19	Index link
20	Reject return spring
21	Reject link
22	Control spring
23	Manual link
24	Short changer blade shaft
25	Driving crank
26	Changer shaft tie bar
27	Large gear
28	Cam stop lever
29	Cam stop spring
30	Sub-frame
31	Motor
32	Line cord
33	Line cord plug
34	Control spring
35	Pickup crank spring
36	Pickup crank
37	Pickup cord
38	Position trip screw
39	Eccentric
40	Pawl latch
41	Starting pawl
42	Starting pawl spring
43	Eccentric arm
44	Eccentric arm spring
45	Post washer
46	Post nut
47	Driving crank
48	Long changer shaft
49	Driving crank
50	Pickup crank roller
51	Pickup lift pin
52	Ratchet pawl spring
53	Ratchet pawl
54	Ratchet latch
55	Ratchet spring
56	Ratchet trip
57	Cam groove
58	Pinion
59	Cam extension spring
60	Cam extension
61	Pawl latch spring
62	Cam rim

CYCLE OF OPERATION*

Pushing reject button (13) moves pawl latch (40) throug reject link (21) and releases starting pawl (41) which moved by starting pawl spring (42). The starting pawl (4 engages with lugs in pinion (58) and rotates the large ge (27) for approximately one revolution until the stop lev (28) rolls into the stop depression on the large gear. Th entire movement is one complete turn of the large gear an is one complete change cycle of the record changer. When th large gear turns, the eccentric (39) pushes the eccentric ar (43) through the eccentric arm spring (44). This moves th driving crank (49) and *turns the blades* (2) and (3). The oth set of blades are turned simultaneously through drivin crank (47), tie bar (26), and driving crank (25).

Pickup Arm

The lateral movement of the pickup arm is controlled durin a change cycle by the pickup crank roller (50) on the picku crank (36), following the cam groove (57) in the large ge (27).

The vertical movement of the pickup arm during a chang cycle is controlled by the pickup pin (51) riding on the ca rim (62) on top of the large gear. On records which do n have a starting groove, *the needle is pushed into the fir groove* by pickup crank spring (35). The tension of this sprin may be adjusted by bending the lug to which it is attache on the base.

Position Trip

When the needle travels to within 1¾ inches from the cen ter post, the pickup crank (36) moves the position trip scre (38) which is fastened to the pawl latch (40), and release the starting pawl (41), starting the change cycle.

Oscillating Trip

When the needle travels into the eccentric groove on th inside of a record, the ratchet pawl (53) on the pickup cran (36) moves the ratchet latch (54), and releases the ratche trip (56) which is moved by the ratchet spring (55). Th ratchet trip (56) moves the pawl latch (40) which release the starting pawl (41), and starts the change cycle.

The ratchet pawl (53) has a spring (52) which tends t hold the ratchet pawl (53) straight out from the end of th pickup crank (36).

* The cycle of operation can be studied conveniently by pushing th Reject button, and revolving the turntable by hand.

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Fig. 3
Bottom section view of record changer, with large gear removed

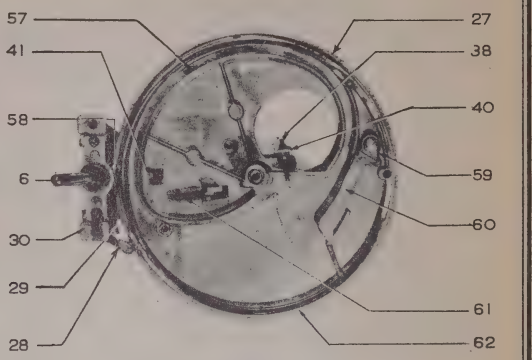

Fig. 4
Top view of the large gear and sub-frame, showing assembly in neutral position (not in change cycle)

SERVICE ADJUSTMENTS

The turntable is driven by means of an eccentric friction drive wheel. The driving power is transferred from the motor bushing (8) to the idler wheel (4) and then to the rim of the turntable. It is important therefore, that the motor bushing (8) and the idler wheel (4) be kept clean of grease, oil, dirt, or any foreign matter. Any quick drying solvent like naphtha is satisfactory for cleaning these parts. Only occasional lubrication is required—see OILING.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in a reverse direction.

Needle Drop Point

With the 10–12 button set for 10-inch records (number 10 showing), the needle should contact the record 4⅝ inches from the turntable shaft or about $\frac{1}{16}$ inch from the edge of the record. This dropping point is adjusted by the adjustment screw (17) on top of the record changer. Turning this screw clockwise causes the needle to drop farther from the turntable shaft, while turning this screw counterclockwise causes the needle to drop nearer the turntable shaft. Turn the screw only a fraction of a turn at one time, as about one-fourth turn of this adjustment screw changes the dropping point of the needle almost one fourth of an inch. The over-all range of this adjustment is secured in one turn of the adjustment screw.

Pickup Arm Lift

The lift of the pickup arm is adjusted by the adjustment nut (18) underneath the pickup arm. The top of the pickup arm (16) should rise to within about one-fourth inch from the under side of the lower blade. To lower the elevation of the pickup arm, turn the nut clockwise, and to raise the elevation, turn the nut counterclockwise.

Position Trip

The position trip is adjusted by turning the position trip screw (38). The trip should operate when the needle is moved to 1¾ inches from the center post. To trip earlier, or farther from the center post, turn the screw clockwise, while to trip later, or nearer the center post, turn the screw counterclockwise.

REPLACEMENT PARTS LIST

Stock Number	Description
	MOTOR ASSEMBLY
RB-211	BRACKET—Motor mounting bracket assembly
RB-655	BUSHING—Motor bushing for 50 cycle operation
RB-656	BUSHING—Motor bushing for 60 cycle operation
RG-310	GROMMET—Motor mounting grommet
RM-162	MOTOR—50-60-cycle motor
	MOTORBOARD ASSEMBLIES
RS-648	SHELF—Upper and lower shelf blades assembly
RB-654	BUTTON—Control button assembly; Reject, 1021-, and Auto-Man. buttons
RP-427	POST—Changer post
RS-649	SHAFT—Turntable shaft
RS-3152	SWITCH—Power switch
RT-948	TURNTABLE—Turntable
	OPERATING MECHANISM
RA-439	ARM—Eccentric arm assembly
RA-440	ARM—Eccentric arm
RB-212	BAR—Changer shaft tie bar
RB-213	BAR—Tie bar assembly
RB-403	BEARING—Upper bearing assembly
RB-657	BUSHING—Index bushing
RC-2080	CAM—Cam extension
RC-2081	CAM—Large gear cam
RC-2082	CRANK—Driving crank
RC-2083	CRANK—Pickup crank
RC-2084	CRANK—Pickup crank assembly
RF-209	FRAME—Sub-frame
RG-311	GEAR—Large gear assembly
RL-991	LATCH—Pawl latch
RL-992	LATCH—Ratchet latch
RL-993	LEVER—Cam stock lever

Stock Number	Description
	OPERATING MECHANISM (Continued)
RL-994	LINK—Index link
RL-995	LINK—Manual link
RL-996	LINK—Reject link
RP-428	PAWL—Starting pawl
RP-429	PAWL—Ratchet pawl
RS-650	SHAFT—Changer blade driving shaft
RS-651	SHAFT—Short changer blade shaft
RS-4079	SPRING—Cam extension spring
RS-4080	SPRING—Control spring
RS-4081	SPRING—Cam stop spring
RS-4082	SPRING—Eccentric arm slide spring
RS-4083	SPRING—Idler and tension spring
RS-4084	SPRING—Mounting spring
RS-4085	SPRING—Pawl latch spring
RS-4086	SPRING—Pickup crank spring
RS-4087	SPRING—Ratchet spring
RS-4088	SPRING—Ratchet pawl spring
RS-4089	SPRING—Reject return spring assembly
RS-4090	SPRING—Starting pawl spring
RS-524	STUD—Index bushing stud
RS-652	SUPPORT—Lower bearing support
RT-949	TRIP—Ratchet trip
RW-926	WHEEL—Idler wheel and clip assembly
	PICKUP ARM ASSEMBLY
RA-437	ARM—Pickup arm only
RC-8240	CORD—Pickup cord
RC-5016	PICKUP—Magnetic pickup head
RA-438	PICKUP—Magnetic pickup—complete
RL-806	COIL—Pickup coil
RS-8040	SCREW—Needle setscrew
RS-4096	SPRING—Pickup arm spring

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GENERAL INFORMATION

When connecting this record player to an AC/DC receiver insert a .25 mfd. 400 V. paper capacitor between the black lead of the record player and the chassis ground, and a .005 or .01 mfd. 400 V. paper capacitor between the green lead of the record player and the circuit tapped in the radio.

Radio Receiver Connections

There are several different methods which may be used to connect the record player to the radio receiver depending upon the provisions incorporated in the radio for handling phonograph connections and upon the type of installation desired. Several methods are outlined below for superheterodyne receivers.

The process of changing from radio reception to record-player operation and vice versa requires either the manual insertion of the record-player leads in the radio circuit each time the process is performed or the use of a switch to automatically perform the operation. The convenience of a switching arrangement will so far outweigh the labor involved in manual operation that the slight additional cost of a switch will pass unnoticed.

There follow several general methods of installation which should not be assumed to be comprehensive or all-conclusive.

Method No. 1.—(For radios equipped with phono pin-jack terminals.) These Models are equipped with a plug for connecting to radios equipped with a phono pin jack. The green lead of the record player is connected to the pin terminal and the black lead to the shield of the plug. Some radio models automatically switch to record-player operation when the plug is inserted in the terminal; other models require pushing or rotating a switch incorporated on the radio control panel.

Method No. 2.—(For radios equipped with phono terminals.) Consult the instruction pamphlet which was supplied with your radio to determine which phono terminals are for connections to the record player. There may be three or four terminals, depending upon the type of radio. Determine which terminal is connected to the high side of the volume control. For radio operation, there will be a link connection between this volume-control terminal and the radio diode load terminal. On a three-terminal board, the remaining terminal will be chassis-ground. On a four-terminal board one of the remaining terminals will be chassis-ground and the other a diode return.

Using manual insertion of the record player into the radio circuits, it is only necessary to remove the link from between the diode load and volume-control terminals and reinsert it between the diode load and chassis ground terminals (on a three-terminal board), or between diode load and diode return (on a four-terminal board). The green lead on the record player is then connected to the volume control terminal and the black lead to the chassis ground terminal. To return to radio operation, merely remove the link and reinsert between the diode load and volume-control terminals. It may not be necessary to disconnect the record-player leads when returning to radio operation depending upon the circuit design in your radio receiver. If the tone quality and volume are impaired when the record player remains connected, then it will be necessary to remove the record-player leads from the radio terminals each time you turn from record-player performance to radio reception.

Using switch operation requires the use of a double-pole, double-throw toggle or rotary switch. The general method of connection is as shown in Fig. 1.

The record player can remain permanently connected when using this method of switch connection.

Some late radio models have the switch already incorporated in the push-button assembly.

Method No. 3.—(For radios not equipped with phono or pin-jack terminals but on which phono terminals are to be located.) First, pull the radio power-cord plug out of the power-supply socket; then remove the radio receiver chassis from the cabinet to allow access to the high side of the volume control. Unsolder the lead from the high side of the volume control and solder it on to one lead of a two-conductor shielded pair. Solder the other conductor of the shielded pair to the high side of the volume control. This shielded pair should be long enough to extend to the outside rear of the radio chassis. Solder the shields to the chassis. Procure a three-terminal board and mount it on the shelf of the cabinet at the rear of the chassis. Connect the shield to one outside terminal and the new volume-control conductor to the other outside terminal, leaving the center terminal for the remaining conductor. Connect the record player to the two outside terminals. When record-player operation is desired, interconnect the center terminal and the shield terminal. When radio operation is desired, interconnect the center terminal and the volume-control terminal. It may be necessary, depending upon the circuit in your radio receiver, to remove the record-player leads from the terminals each time radio reception is to be enjoyed. Tone and volume performance will indicate connection requirements. A switch may be inserted to perform the changeover operations by connecting as shown in Fig. 1. (Read descriptive material pertaining to Fig. 1.)

Method No. 4.—Some radio models will permit satisfactory record-player operation with the green lead of the record player connected to grid of the first audio tube and the black lead connected to the chassis ground. This method, however, requires tuning the radio to a dead spot on the band and may, in addition, require shorting the antenna to ground. NOTE.—Do not remove radio grid lead from the first audio tube.

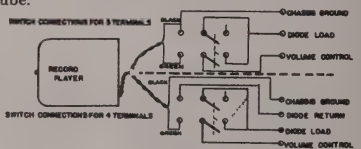
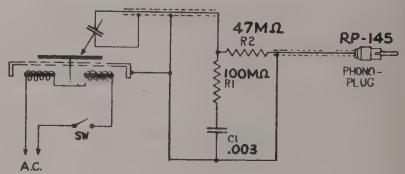
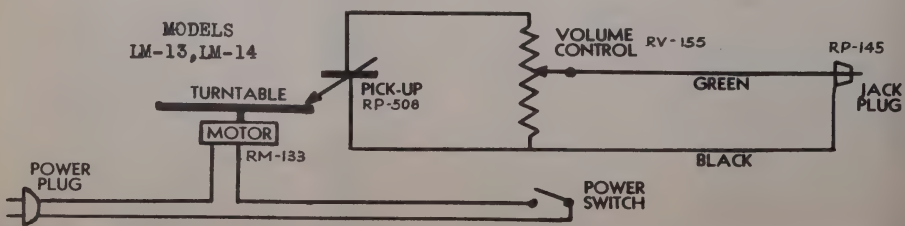


Fig. 1

MODELS LM-20, LM-21, LM-25

FOR SERVICE DATA ON RECORD CHANGER MODEL LRP-170, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS"





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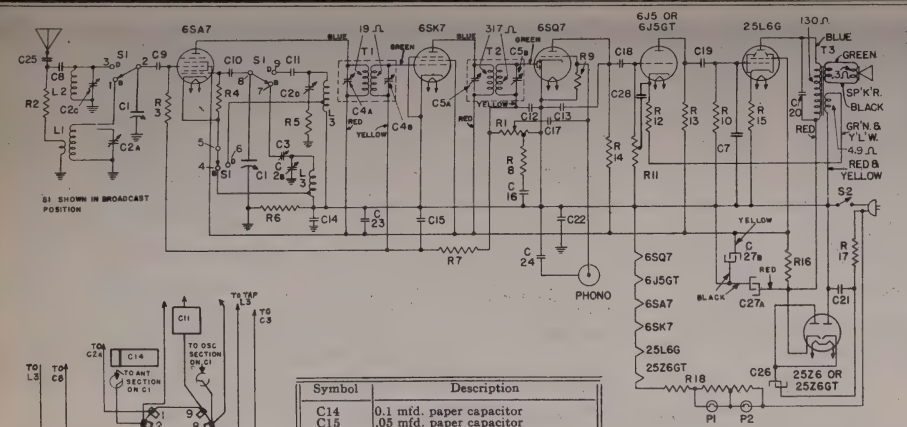
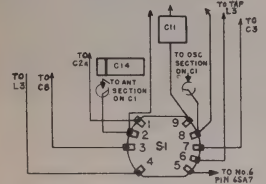




Symbol	Description
C1	Tuning condenser
C2A	"B" band antenna trimmer
C2B	"B" band oscillator trimmer
C2C	"D" band antenna trimmer
C2D	"D" band oscillator trimmer
C3	"B" oscillator padder
C7	220 mmf. mica capacitor
C8	6 mmf. mica capacitor
C9	100 mmf. mica capacitor
C10	47 mmf. mica capacitor
C11	3600 mmf. ±5% mica capacitor
C12, 13	220 mmf. mica capacitor

Symbol	Description
C14	0.1 mfd. paper capacitor
C15	.05 mfd. paper capacitor
C16	.015 mfd. paper capacitor
C17, 18	.005 mfd. paper capacitor
C19	.05 mfd. paper capacitor
C20	.01 mfd. paper capacitor
C21	.05 mfd. paper capacitor
C22	0.1 mfd. paper capacitor
C23	.01 mfd. paper capacitor
C24	0.1 mfd. paper capacitor
C25	.01 mfd. paper capacitor
C26	30 mfd. 250 V. dry electrolytic
C27A	40 mfd. 250 V. dry electrolytic
C27B	20 mfd. 250 V. dry electrolytic
C28	.01 mfd. paper capacitor
L1	"B" band Beam-a-Scope
L2	"D" band Beam-a-Scope
L3	Oscillator coil
R1	0.5 megohm volume control
R2	1000 ohms carbon resistor
R3	1.0 megohm carbon resistor
R4	33,000 ohms carbon resistor
R5	27 ohms carbon resistor

Symbol	Description
R6	470,000 ohms carbon resistor
R7	2.2 megohms carbon resistor
R8	22,000 ohms carbon resistor
R9	4.7 megohms carbon resistor
R10	100,000 ohms carbon resistor
R11	1.0 megohm tone control
R12	3300 ohms carbon resistor
R13	39,000 ohms carbon resistor
R14	470,000 ohms carbon resistor
R15	220 ohms carbon resistor
R16	3900 ohms 5 W. wire wound resistor
R17	30 ohms 2 W. wire wound resistor
R18	BL42D ballast resistor
S1	Band switch
S2	Power switch
T1	1st I.F. transformer
T2	2nd I.F. transformer
T3	Output transformer

Alignment Procedure

The location of trimmers is shown in Fig. 2. All RF trimmers are accessible through holes in the back cover or through the bottom of the cabinet.

The alignment procedure is given in table form. All IF alignments may be made with the chassis removed from the cabinet. However the RF alignments are made with the chassis and loop antennas securely bolted in the cabinet, as the relative position of the loop antenna with respect to the chassis materially affects it. The RF signal should be capacity coupled by placing a two foot wire for an antenna on the test-oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed on top of the receiver cabinet.

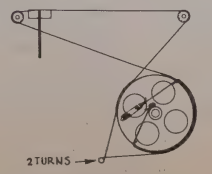


Fig. 1. Dial Stringing Diagram

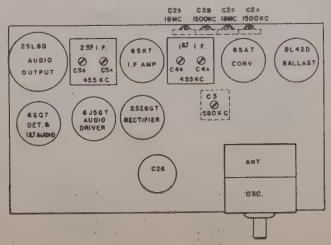


Fig. 2. Trimmer Location

GENERAL INFORMATION

Chassis Removal

Note: Care must be exercised in removing either the cabinet back or chassis to avoid changing the shape of either the short-wave or broadcast loop antenna. Any alteration in the loop will change its inductance and throw the receiver out of alignment.

ALIGNMENT CHART

Step	Connect Test-Osc. to	Test-Osc. Setting	Pointer Setting	Adjust Trimmers for Max. Output
1	6SK7 1F Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C5A & C5B
2	6SA7 Conv. grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C4a & C4b
3	Capacity Coupled	580 KC	"BC" Band 580 KC	C3**
4	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C2b (Osc.)
5	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C2a (Ant.)
6	REPEAT STEP 3			
7	Capacity Coupled	18 MC	"SW" Band 18 MC	C2d * (Osc.)
8	Capacity Coupled	18 MC	"SW" Band 18 MC	C2c** (Ant.)

* Use minimum capacity peak.
** Rock gang condenser when making alignment.

Special Service Information

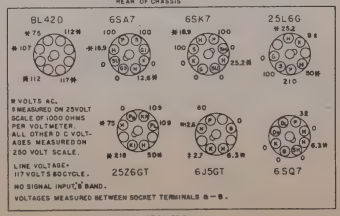
The following data will be very useful to servicemen equipped with vacuum-tube voltmeters or similar voltage-measuring instruments.

(1) Stage gains
Antenna Post to Converter Grid—4.3 at 1000 KC
Converter Grid to 6SK7 Grid—42 at 455 KC
6SK7 Grid to 6SQ7 Diode Plate—100 at 455 KC

(2) Audio gain
.06 volts, 400 cycles signal across volume control with control set to maximum will give approximately ½-watt speaker output.

(3) DC voltage developed across oscillator grid resistor (R4) averages 10.5 volts at 1000 KC or 8.0 volts at 10,000 KC.

* Variations of +10 or −20% permissible.



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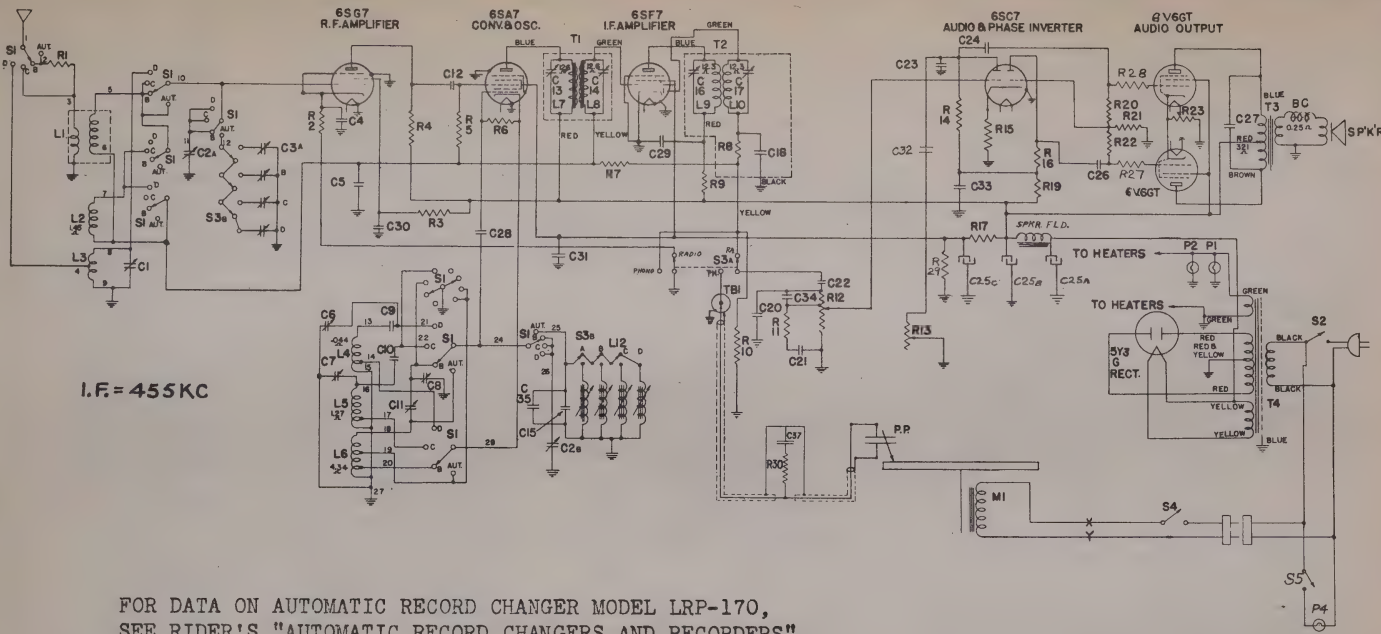

FOR DATA ON AUTOMATIC RECORD CHANGER MODEL LRP-170,
SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS"

Symbol	Description
C1	"D" Band trimmer
C2a, C2b, C3a, C3b, C3c, C3d	Tuning condenser / Push-button trimmer strip
C4	.01 mfd. 600-V paper
C5	.05 mfd. 600-V paper
C6	"B" Band osc. trimmer
C7	"C" Band osc. trimmer
C8	"D" Band osc. trimmer
C9	4700 mmf. ±5% mica
C10	2000 mmf. ±5% mica
C11	"B" padder
C12	100 mmf. mica
C15	600 mmf. silvered mica
C18	200 mmf. mica
C20	100 mmf. mica
C21	.0042 mfd. 600-V paper
C22	.005 mfd. 600-V paper
C23	220 mmf. mica
C24	.02 mfd. 600-V paper
C25a	15 mfd. 450-V
C25b	15 mfd. 400-V
C25c	10 mfd. 350-V
C26	.02 mfd. 600-V paper
C27	.002 mfd. 600-V paper
C28	47 mmf. mica
C29	.01 mfd. 600-V paper
C30	.01 mfd. 600-V paper
C31	.01 mfd. 600-V paper
C32	.005 mfd. 600-V paper
C33	.1 mfd. 600-V paper
C34	100 mmf. mica
C35	150 mmf. temp. compensating
C37	.001 mfd. 600-V paper
L1	"B" band loop
L2	"C" RF coil
L3	"D" Band loop
L4	"D" Band osc. coil
L5	"C" Band osc. coil
L6	"B" Band osc. coil
L12a, L12b, L12c, L12d	Push-button coil assembly
R1	1000 ohms, ½-watt carbon
R2	220 ohms, ½-watt carbon
R3	47,000 ohms, ½-watt carbon
R4	4700 ohms, ½-watt carbon
R5	47,000 ohms, ½-watt carbon
R6	22,000 ohms, ½-watt carbon
R7	2.2 meg. ½-watt carbon
R8	47,000 ohms, ½-watt carbon
R9	2700 ohms, ½-watt carbon
R10	470,000 ohms, ½-watt carbon
R11	68,000 ohms, ½-watt carbon
R12	2 meg. tap at 1 meg. (volume control)
R13	2 meg. with switch (tone control)
R14	470,000 ohms, ½-watt carbon
R15	3900 ohms, ½-watt carbon
R16	1 meg. ½-watt carbon
R17	12,000 ohms, ½-watt carbon
R19	100,000 ohms, ½-watt carbon
R20	330,000 ohms, ½-watt carbon
R21	100,000 ohms, ½-watt carbon
R22	330,000 ohms, ½-watt carbon
R23	220 ohms, 2-watt carbon
R26	470,000 ohms, ½-watt carbon
R27	1000 ohms, ½-watt carbon
R28	1000 ohms, ½-watt carbon
R29	47,000 ohms, 1-watt carbon
R30	180,000 ohms, ½-watt carbon
S1	Band-change switch
S2	Power switch (on tone control)
S3a, S3b	Push-button switch assembly
T1	1st I.F. transformer
T2	2nd I.F. transformer
T3	Output transformer
T4	50–60-cycle power transformer
TB1	Phono-jack
SPKR	12-inch electrodynamic 400-ohm field

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MODEL 30
MUSAPHONIC

The following data is taken with a vacuum-tube v tmeter or similar measuring device.

1) Stage Gains

Antenna post to RF Grid. . . . . 6.5 at 1000 KC
RF Grid to Converter Grid. . . . 10 at 1000 KC
Converter Grid to IF Grid. . . . . 45 at 1000 KC
Converter Grid to IF Grid. . . . . 60 at 455 KC
IF Grid to 6SF7 diode plate. . . 110 at 455 KC

2) Audio Gains

.09 volts, 400-cycle signal across volume control with control set to maximum will give approximately ½-watt output to speaker.

3) D-C voltage developed across oscillator-grid resistor R6 averages 7 volts at 1000 KC, 9 volts at 4000 KC, or 6 volts at 10,000 KC.

Variations of ±20% permissible. All readings taken w h minus 1½-volt fixed bias on AVC bus.

ALIGNMENT CHART

Step	Test Osc. Connection	Test Osc. Setting	Pointer Setting	Adjust Trimmers
1	6SF7 IF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C17 and C16 for Maximum
2	6SA7 Conv. Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C14 and C13 for Maximum
3	Capacity Coupled	580 KC	"BC" Band 580 KC	C11** for Maximum
4	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C8** (Osc.) for Maximum
5	Capacity Coupled	580 KC	"BC" Band 580 KC	C11** for Maximum
6	Capacity Coupled	5 MC	"SW1" Band 5 MC	C7** (Osc.) for Maximum
7	Capacity Coupled	17.8 MC	"SW2" Band 17.8 MC	C6* (Osc.) to signal
8	Capacity Coupled	17.8 MC	"SW2" Band 17.8 MC	C1** (Ant.) for maximum

* Correct peak is at low capacity.
* Rock gang condenser when making alignment.

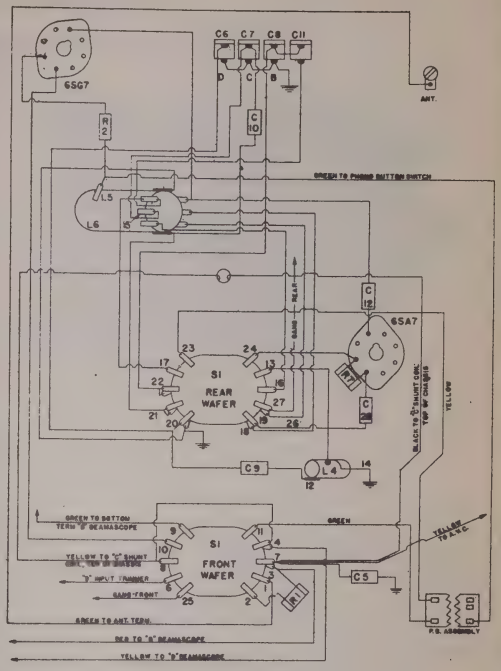

Fig. 2. Switch Wiring

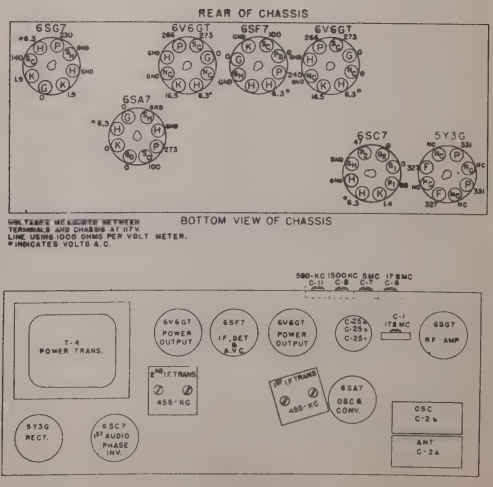

FIG. 5

MODEL LRP-32

AUTOMATIC RECORD CHANGER

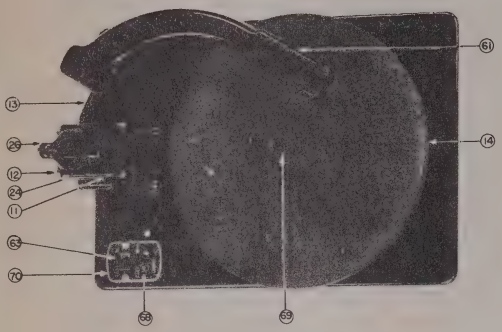

Fig. 1
Top View of Mechanism

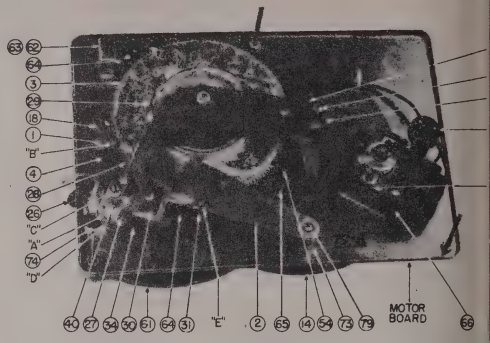

Fig. 2
Bottom View of Mechanism

GENERAL

This record changer is designed for use on a 115-volt 60-cycle power supply. It is of the fully automatic type, handling either 10- or 12-inch records. It will not, however, play 10- and 12-inch records intermixed.

Before checking a record changer in the cabinet, make sure the mounting bolts are released and the cardboard spacers removed; otherwise, the changer will not properly feed records from the magazine and the tone arm will not land correctly on the record. If adjustments are made with the changer bolted down and the mounting bolts then released, the adjustments will have to be remade.

During shipment the master gear may shift and become meshed out of time, so that if the changer is started under these circumstances, it will jam. To prevent this, be certain that the tone arm is free, that is, in the playing position before turning on the motor. If the changer is in "cycle" the motion of the tone arm will be restricted. The turntable should then be rotated backwards until the master gear (3) disengages from the drive shaft pinion gear (47). The foregoing operation is necessary only if out of time and should be an installation check.

AUTOMATIC OPERATION

Before operating the changer, be sure the tone arm is in the rest position, and can be moved freely by hand. If not, a "cycle" must be completed. To do this, push power switch to ON position, push control button to REJECT position and release. The mechanism will turn through the change cycle and after the tone arm is free the unit is ready for loading.

Insert spindle (69) in center post. Adjust record shelf (11) to the position of the size record to be played and flip the "Hold Down" arm (26) away from spindle. Load up to twelve 10-inch or ten 12-inch records. They should be supported by the record spindle at the center and the record shelf at the edge. Return the "Hold Down" arm to the top of the stack of records. Place the control button in "AUTOMATIC" position and turn the power on. Push the control button to "REJECT" if necessary. The mechanism will now operate and play automatically the records loaded on it. When the last record has dropped down, the mechanism will continue to repeat it.

Allow the mechanism to complete the changing cycle, that is, wait until the tone arm has just landed and starts playing the last record. Turn power OFF. Move tone arm off turntable. Remove record spindle and remove records.

MANUAL OPERATION

To operate the changer manually push the control butt to the "MANUAL" position and allow it to remain the When playing records manually do not use the spindle. It advisable to rotate the record shelf to the 12-inch positi and flip the hold down arm out of the way.

CAUTIONS

1. Never use force to stop or start the motor or any p of the record changer mechanism.
2. The use of cracked or chipped records may dam the crystal or sapphire.
3. Records should not be left on the record supports on the turntable as they may warp, particularly in wa climates.
4. The use of warped records may result in unsatisfact operation since they tend to slide on one another. War records may be flattened by placing them on a flat surf and loading them with a heavy article.
5. Handle the spindle (69) with care since a bent spin may cause changer to "wow."
6. SEE LUBRICATION.

CABINET LEVELING

For good operation the record changer must be level. not level the tone arm may land incorrectly and the reco may not drop freely.

CRYSTAL AND NEEDLE

The crystal is of the low-pressure type and is equipp with a permanent sapphire stylus which is not replacea in the field. Because of the low pressure the voltage outp is approximately one-half volt. The cartridge is mount between two viscoloid blocks to reduce noise and vibration

TURNTABLE SPEED

The motor is of the fixed speed type and cannot be vari The turntable is driven at the rim through the motor dr mechanism as shown in Fig. 8. Due to commercial toleran it is impossible to secure motors which will run exactly 78 RPM. Limits are from 76.59 to 80.00 RPM.

REMOVAL OF TURNTABLE

The turntable is threaded onto the drive shaft and m be removed by blocking the gears and rotating the turnta in a counterclockwise direction.

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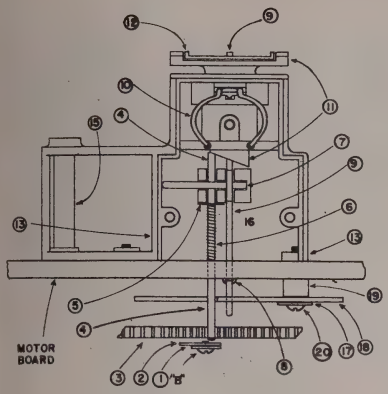

Fig. 3
Record Support Shelf and Post Mechanism

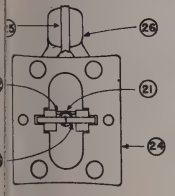

Fig. 4
Shelf Cover

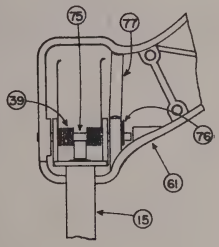

Fig. 5
Tone Arm Base & Support Bkt.

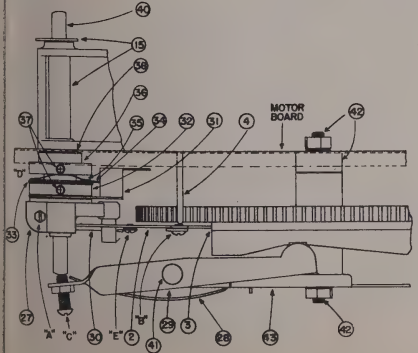

Fig. 6
Tone Arm Control Mechanism

LUBRICATION

CAUTION: ***Do not*** lubricate any of the following parts:

1. Friction trip assembly "D."
2. Tone arm support bracket tube (15).
3. Starting lever (50) and trip lever (54) at overlap.
4. Tone arm hinge pin (75).
5. Contact between trip finger (31) and trip lever (54).
6. Spring on end of trip lever (54).

Use light machine oil on the following parts:

1. Lift lever rivet (41).
2. Turntable drive shaft (48) at felt washer above motorboard and at felt washer (46).
3. Tone arm swing lever bushing (79).
4. Ejector cam bushing (19).
5. Starting lever at bearing pin (56) and at starting lever extension rivet.

Use light grease (Lubriplate or equivalent) on the following parts:

1. Record hold down spring rods upper (22) and lower (23).
2. At contact point between record shelf (11) and hold-down spring (10).
3. Interceptor shaft (4) at bearing point on motorboard.
4. Vertical cam (3A).
5. Horizontal cam (3B).
6. Master gear (3) and stud (42) (55).

CYCLE OF OPERATION

Fig. 9 shows the relative positions of the various levers, which contribute to the change cycle, at rest. Note that the back end of the trip lever (54) is over the back end of the starting lever (50). The distance the trip lever maintains over the starting lever determines to some degree the sensitivity of the tripping operation.

Assuming a record to be playing, the operation is as follows (see Fig. 9): The tone arm (61) moving in on the record causes the friction lever (34) to continually "pull in." The friction between the tone arm and this lever is determined by adjustment "D." As the friction lever (34) "pulls in" it pushes the trip finger (31) causing it to push on the trip lever (54). In the meantime the small extension on the upper part of the rotating drive shaft pinion gear (47) continually strikes the spring on the end of the trip lever causing it to move back. As long as these two operations continue no tripping takes place. But a sudden motion of the tone arm, such as produced by the trip groove at the end of the record, causes the entire mechanism to move in rapidly before the extension on the drive shaft pinion gear can push it back. Under this condition the trip lever moves off the back end of the starting lever allowing it to drop.

In its normal position the starting lever (50) has an extension at the gear end which lies between the starting pin (49) and the drive shaft gear extension (see Fig. 7). When the starting lever drops, as indicated above, the extension engages the starting pin (49) forcing the master cam and gear (3) to turn. The starting pin and starting lever extension engage long enough to allow the teeth to mesh and complete the rotation.

As the master cam and gear (3) rotates the vertical cam operates the lift lever (29) and through the lift rod (40) causes the tone arm to rise. At the same time the swing lever (2) follows the horizontal cam and, through the crank arm (27), causes the tone arm to move out beyond the edge of the record. In the meantime the ejector pin (52) on the master cam and gear has moved through about 100 degrees and engages the ejector cam. This motion transmitted through the rocker arm (9) causes the ejector (12) to move inward and push a record off its supports.

The swing lever (2), because of the tension spring (65), follows the horizontal cam and, through the crank arm (27), pulls the tone arm to its starting position. The vertical cam, in the meantime, lowers the tone arm, through the lift lever (29) and lift rod (40), onto the record. The feed-in spring (30) exerts a gentle pressure until the needle has reached the first record groove. This completes the cycle.

SERVICE ADJUSTMENTS

"A" Adjustment of 10-inch Landing Position. (See Fig. 6)

This adjustment is made by loosening the machine screw on the tone arm crank (27), positioning the tone arm (6)

and the crank (27) and retightening the screw. It will be noticed that the tone arm, on completing a cycle, does not come straight down on the record edge but curves inward as it comes down. This is due to the action of the feed-in spring (30). Therefore, the adjustment of the landing position is best made by a trial and error method. For example, if the tone arm lands inside the starting edge, estimate the distance and allow mechanism to complete changing cycle. Then holding the crank with one hand, push out on the arm with other. Try the landing by putting the mechanism through a cycle. If not correct, repeat until the correct position is found. The setscrew on the tone arm crank (27) must be loosened each time before adjustment and tightened afterward. Upon completion of the adjustment be sure the machine screw is very tight to avoid possibility of future slippage.

"B" Adjustment of 12-inch Landing Position. (See Figs. 3 and 6)

This adjustment is made by loosening the machine screw at the end of the swing lever (2) and positioning the link. When the support shelf (11) is rotated to the 12-inch position, the interceptor rod (4) moves down and acts as a stop for the swing lever, preventing it from moving in to the base of the horizontal cam (3B). Under this condition the swing lever cannot move the crank arm (27) as far as it did on the 10-inch position. The adjustment "B" should be made by the trial and error method until the arm lands correctly. If the 10-inch landing position must be readjusted for any reason the 12-inch landing position will also have to be readjusted.

"C" Vertical Lift Adjustment. (See Fig. 6)

The hex nut should be loosened and the screw adjusted until the tone arm just clears beneath a stack of records on the supports. The nut must then be tightened to maintain the position.

"D" Friction Trip Adjustment. (See Fig. 6)

A special Bristol setscrew wrench should be available (see parts list) to make this adjustment or a small screwdriver, the blade of which has been ground down, will suffice. The setscrew (37) on the upper collar (36) only need be loosened. The upper collar is threaded onto the lower collar (32) and the friction pressure, maintained by the spring washer (35), may be varied by rotating the upper collar with respect to the lower. Too much pressure on the friction lever may cause early tripping or may even cause the tone arm to be pushed back. On the other hand, too little pressure may cause the mechanism to fail to trip. Care must be used in making this adjustment and the use of oil must be avoided.

"E" Feed-in Spring Adjustment. (See Fig. 6)

The feed-in spring (30) must be adjusted so that it exerts a slight pressure on the tone arm crank (27). If a very small increase or decrease in pressure is required the spring may be bent, being very careful not to break it. Otherwise, the screw holding the feed-in spring to the swing lever (2) should be loosened, the position of the spring changed and the screw tightened.

Miscellaneous Adjustments. (See Fig. 9)

As mentioned under the cycle of operation, the tripping sensitivity is determined by the overlap of the trip lever (54) over the starting lever (50). The greater this overlap the more tripping action is required and conversely, the less the overlap the more sensitive the tripping action becomes. This overlap can be varied by bending the spring on the end of the trip lever (54). If the spring is bent away from the drive shaft pinion gear (47) the overlap will be decreased or if bent toward the drive shaft pinion gear the overlap will be increased. Great care must be exercised when bending this spring as it will break easily. It should be bent as near the outer end as practical, never close to the rivets.

The action of the ejector can be varied somewhat by changing the position of ejector pin (52) on the master cam and gear (3). This is accomplished by loosening the two screws holding the ejector pin to the master gear and positioning the ejector pin as required.

The starting lever (50) should be in such a position in relation to the starting pin (49) that the teeth will mesh properly. In case they do not, the starting lever must be bent accordingly. The starting pin should protrude about $\frac{5}{16}$ inch.

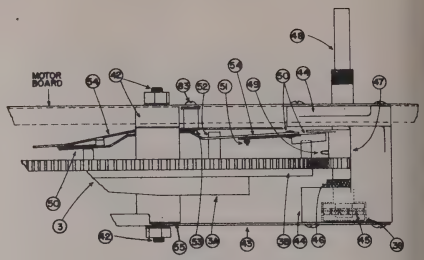

Fig. 7
Changer Drive Mechanism

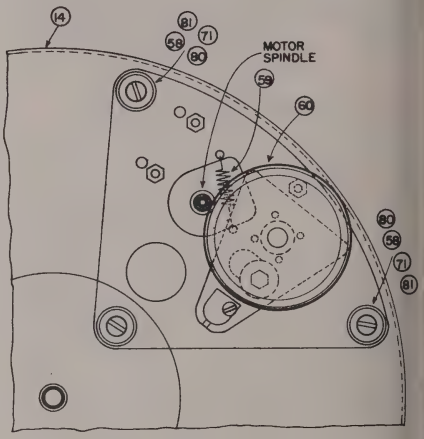

Fig. 8
Motor Drive Mechanism

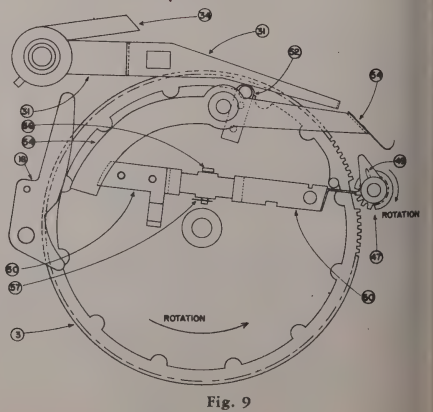

Fig. 9
Drive and Trip Mechanism

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SERVICE HINTS

Mechanism Trips Early

Adjustment "D" may be too tight or there may be too ttle overlap between the trip lever (54) and the starting ver (50). Bend spring on end of trip lever (54).

Mechanism Fails to Trip

Adjustment "D" may be too loose or there may be **oil on riction washer** (33). Or there may be too much overlap etween the trip lever (54) and the starting lever (50). Bend pring on end of starting lever (54).

Mechanism Continues to Cycle

The end of the starting lever (50) may not be rising above tarting pin (49). Starting lever (50) or the trip lever (54) lay be bent.

rregular Landing on 10- and 12-inch Records

Check the feed-in Spring (30). May be bent or out of adjustment. The spring may get on the wrong side of the crank arm (27) pin and result in no feed-in action at all.

Mechanism Jams

The end of the starting lever (50) may be bent or the gears may be out of time. The end of the starting lever may rise too high and catch on the pinion gear extension. This could be caused by a bent starting lever or a bent trip lever (54). Any excessive friction or rubbing could cause mechanism to slow down.

Mechanism Fails to Eject Records

The rocker arm (9) may be bent or it may be binding at the motorboard. The ejector pin (52) may need adjustment. Chipped or warped record may also be responsible.

"Wow"

A bent record spindle (69) will usually cause this. It could also be caused by a flat on the motor drive wheel (60).

REPLACEMENT PARTS LIST

Stock Number	Symbol	Description
RL-9011	1	LINK—12 in. landing adjustment link
RL-9012	2	LEVER—Swing lever and adj. link
RG-723	3	GEAR—Master gear and cam
	3A	CAM—Vertical cam (part of 3)
	3B	CAM—Horizontal cam (part of 3)
RS-9053	4	SHAFT—12 in. record interceptor shaft
RH-127	5	COTTER—H.P. cotter
RS-4101	6	SPRING—Interceptor shaft spring
RP-436	7	PIN—Ejector rocker arm pin
RS-4098	8	SPRING—Ejector rocker arm spring
RA-441	9	ARM—Ejector rocker arm
RS-4100	10	SPRING—Record support shelf hold-down spring
RS-656	11	SHELF—Record support shelf
RE-1000	12	EJECTOR—Record ejector
RP-434	13	POST—Record support and tone arm post (plastic)
RT-9002	14	TURNTABLE
RB-214	15	BRACKET—Tone arm bracket and tube assembly
RP-435	16	PLATE—Back cover plate
†	17	WASHER—No. 8 plain washer
RC-2089	18	CAM—Ejector cam
RB-660	19	BUSHING—Ejector cam bushing
†	20	SCREW—8/32 x 1 in. RHMS
RS-4105	21	SPRING—Hold-down arm spring
RP-437	22	PIN—Hold-down spring pin (upper)
RP-438	23	PIN—Hold-down spring pin (lower)
RC-2088	24	COVER—Record support cover (plastic)
RB-703	25	BAND—Rubber band
RA-443	26	ARM—Record hold-down arm
RA-444	27	ARM—Crank arm
RS-4099	28	SPRING—Lift lever spring
RL-9005	29	LEVER—Lift lever
RS-4106	30	SPRING—Feed-in spring
RP-759	31	FINGER—Trip finger
RC-2090	32	COLLAR—Lower collar
RW-141	33	WASHER—Trip lever friction washer (cork)
RL-9004	34	LEVER—Friction lever
RW-139	35	SPRING—Washer spring
RC-2091	36	COLLAR—Upper collar
RS-8041	37	SCREW—6/32 x ¼ in. Bristol setscrew
RW-138	38	WASHER—Cork washer
RS-4103	39	SPRING—Tone arm spring
RR-954	40	ROD—Tone arm lift rod
RR-955	41	RIVET—Lift lever rivet
RS-527	42	STUD—Master gear stud
RP-439	43	PLATE—Tie-plate
RB-218	44	BRACKET—Drive shaft support bracket
RB-405	45	BEARING—Thrust (ball) bearing
RW-142	46	WASHER—Felt washer
RG-722	47	GEAR—Drive shaft pinion gear
RS-9054	48	SHAFT—Drive shaft
RP-433	49	PIN—Starting pin
RL-9001	50	LEVER—Starting lever assembly
RS-4104	51	SPRING—Starting lever spring
RP-431	52	PIN—Ejector pin
RB-661	53	BUSHING—Trip lever bushing
RL-9003	54	LEVER—Trip lever
RW-143	55	WASHER—Thrust washer
RP-440	56	PIN—Starting lever pin
RH-127	57	COTTER—H.P. cotter
RG-312	58	GROMMET—Motor mounting grommet
*RS-493	59	SPRING—Motor drive tension spring
*RW-928	60	WHEEL—Motor drive wheel
RA-442	61	ARM—Tone arm (plastic)
RC-2092	62	COVER—Switch cover
RS-3153	63	SWITCH—Power switch
RR-956	64	ROD—Reject rod
RS-4102	65	SPRING—Swing lever spring
RM-164	66	MOTOR—60 cycle motor
*RP-040	67	PLUG—Motor plug (A.C.)
RK-1074	68	KNOB—Control button
RS-966	69	SPINDLE—Record spindle
RE-234	70	ESCUTCHEON—Switch escutcheon
RS-660	71	SPACER—Motor mounting spacer
RS-528	72	SHIM—Viscoloid dampening shim (crystal and motor)
RB-662	73	BUSHING—Swing lever bushing
RG-314	74	GROMMET—Rubber grommet
RP-432	75	PIN—Hinge pin
RH-128	76	COTTER—H.P. cotter
RC-2094	77	CLIP—Spring clip
†	78	SCREW—8/32 x 3/16 in. RHMS
†	79	SCREW—10/32 x 1 3/16 in. RHMS
†	80	SCREW—6/32 x ¾ in. RHMS
†	81	WASHER—No. 6 plain washer
†	83	SCREW—8/32 x 3/16 in. RHMS

* Used on previous changers.

† Purchase locally (not stocked).

PARTS NOT ILLUSTRATED

RW-144	WASHER—Slotted washer on drive shaft (top of motor-board)
RW-250	WRENCH—6/32 Bristol wrench
*RP-145	PLUG—Phono plug
RS-4112	SPRING—Reject rod spring
*RC-5010	CRYSTAL—Crystal cartridge
*RS-4124	SPRING—Conical Support Spring

John F. Rider

MODEL 40
MUSAPHONIC

GENERAL ELECTRIC CO.

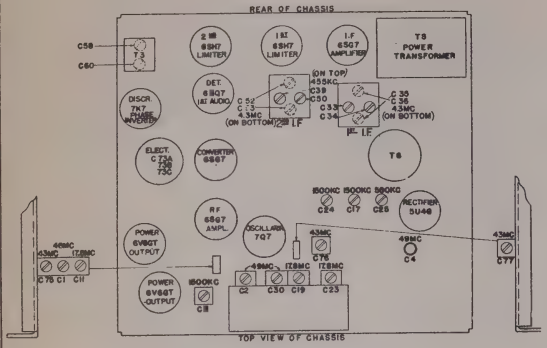

Fig. 2. Trimmer Location

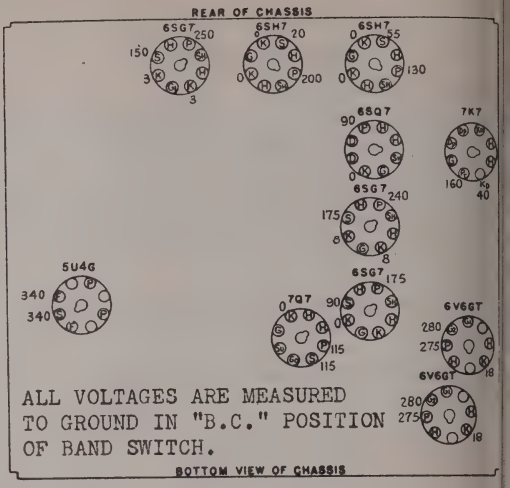

Fig. 1. Socket Voltages

SWITCH WIRING

The band switch terminals are numbered in the Switch Wiring Diagram, Fig. 6, to assist in locating the corresponding numbered points on the Schematic Diagram, Fig. 5. Switch section 1 in Fig. 6 is represented as S1, section 2 is represented as S2, etc., on the Schematic Diagram, Fig. 5.

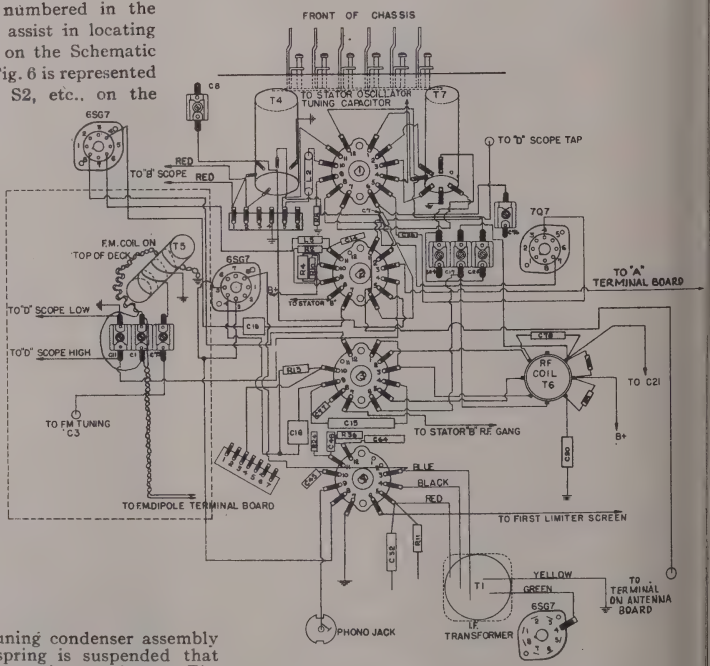

Fig. 6. Switch Wiring

Rotor Balance Spring

On the right-hand side of the tuning condenser assembly is a wire bracket from which a spring is suspended that connects to the drive drum of the tuning condenser. The proper adjustment of this spring counterbalances the weight of the condenser drive assembly and prevents backlash. For chassis mounted horizontally the spring must be in the rear notch of wire bracket.

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MODELS 60, 80
MODEL JM-1C

GENERAL ELECTRIC CO.

DELUXE AUTOMATIC RECORD CHANGER
and
RECORDING UNIT
USED IN *Musaphonic* MODELS 60 AND 80

RECORD CHANGER MODEL JM-1C

This deluxe automatic record changer and home recording unit is standard equipment in the above model receivers and is designed for operation on a 110-volt alternating-current source. The record changer will play up to fifteen 10-inch and 12-inch records intermixed, while the recording mechanism is designed to record on record blanks which have not been pre-grooved.

OPERATING CONTROLS

Power Controls

To turn power "on," press the red push button (AK) in Fig. 1 until the power switch clicks. To turn power "off" press down on tone arm rest (AH).

Index and Record-reject Control

This control consists of the switch knob (AI) pointer (AJ) and push button (AK). The selector knob provides for either manual or automatic operation of the mechanism. Turn pointer and knob assembly to "A" for automatic operation. Turn pointer and knob assembly to "M" for manual operation.

To reject a record being played, or to start the record changing cycle, push down on the red push button (AK) as far as it will go.

Record Holder Shelf Plates

These three assemblies consist of the selector plate (BA), center plate (BB) and shelf plate (BC). These plates are hinged so that they may be raised to a vertical position for clear access to the turntable.

GENERAL DESCRIPTION OF PHONO CHANGE CYCLE

An automatic record player for records of two sizes has three principal duties to perform. These duties are here performed by three mechanisms inter-connected and built together, but largely separate in their operation. The motion for each is originated in one central cam gear which has three different and individual cam surfaces. The cam gear (FK) is normally at rest while a record is being played, but is put into operation by contact of a latch lever (AD) (located in the cam gear) with the teeth of an intermediate drive gear (CI). This motion takes place only when the unit is put into a change cycle. The cam gear then turns one full revolution to complete the change cycle and stops in a neutral position.

1. THE RECORD CHANGING MECHANISM is brought into operation by a segment (CH) (or lever) with a roller (EJ) at one end which runs in a cam groove in the cam gear (FK) as it turns, which drives with an oscillating motion the three pulleys (FG) by means of a metal tape (DD). The pulleys are fastened to the lower ends of the changer shafts (DL), which in turn transmit their motion to the changer plates (BC) which are fastened with setscrews to the upper ends of the shafts. When the changer plate assembly is revolved, the record resting on the shelf plates (BC) is released to the turntable.

2. THE PICK-UP OPERATING MECHANISM is likewise brought into operation originally by a cam surface on the cam gear (FK) which operates a raising lever (CA) that receives a rocking motion from the cam gear (FK) through a roller (CD) which is part of the raising lever assembly. The flat spring on the opposite end of this lever (CA) is carried upward against a lifter pin (FW) which raises the pick-up (AG), thus lifting the needle from the record. This motion also moves the hollow pick-up shaft (FX) upward, pressing together the locating plate (ES), the cork friction disc, (EV) and swing bracket (FY). While the needle is raised from the record, the swing bracket (FY) receives an angular or swinging motion from the cam gear (FK) to a lever and link assembly (EK) and carries with it the locating plate (ES) which is directly connected to the pick-up. The pick-up (AG) is thus carried out beyond the turntable while the changer plates (BC) drop a record, and is then brought back to the proper position to start playing. If there is no record resting on changer plates (BC) when the cycle starts, the pick-up arm (AG) will then remain out beyond the turntable and descend on the pick-up rest (AH) automatically shutting off the motor after the last record has been played.

3. MECHANISM FOR BRINGING NEEDLE INTO CORRECT STARTING POSITION ON THE RECORD. This mechanism must operate fairly accurately for both 10-inch and 12-inch records. Partly due to this requirement, the starting position is not determined by the cam action, as this cam surface on the cam gear (FK) is so designed that the movement of the lever and link assembly (EK) would normally carry the pick-up arm (AG) farther toward the turntable shaft (BF) than would ever be desirable as a starting adjustment. Therefore, the travel of the pick-up arm (AG) toward the turntable shaft (BF) is stopped at the proper point for lowering onto the record by two eccentric adjusting studs on the locating plate (ES) which comes into contact with the stop arm (EQ) which is automatically pre-set by the record which is about to be released from the changer plates (BC) to the turntable. If a 12-inch record is about to be played, it rests on the center changer plate (BB) of the master changer post (which is located directly behind the pick-up arm (AG), causing same to push downward on center pin (EA) which in turn pushes downward on the center plate lifter lever (DF) which is pivoted on a hinge pin (DH) in the pulley (FG). This brings the upper end of center plate lifter lever (EB) toward the pulley hub. When the pulley is oscillated or driven by the tape (DD), the upper end of this lever (EB) will travel on the inside of the crescent shaped cam (EC). This will move the setting lever (EQ) (which is fastened to the same hub as the stop lever) in such a position that stop lever will contact the 12-inch eccentric adjusting stud on the locating plate which accurately measures the starting point of the needle on a 12-inch record. A 10-inch record which is about to be played will not rest on the center plate (BB), therefore the center plate and center pin (EA) and lever (DF) will be held upward by a spring (DI) on the pulley. The upper end of the center plate lifter lever (EB) will therefore be further away from the pulley hub and will travel on the outside of the crescent shaped cam (EC) moving the setting lever and stop lever (EQ) in such a position that stop lever will touch the 10-inch eccentric adjusting stud (ES) also on the locating plate which accordingly measures the starting point of the needle on a 10-inch record. After the last record has been dropped from the changer plates and played, the lower changer plate (BC) is pushed upward by the no-record control pin. The no-record selecting lever (EP) is also carried up so that when pulley is oscillated the no-record lever sweeps the setting lever and stop lever (EQ) to the position where the stop lever engages with a heel on the locating lever (ES) and holds pick-up (AG) out beyond the turntable. Then when the pick-up (AG) descends, it depresses the pick-up rest (AH), thereby tripping switch (CG) and shutting off the motor.

RECORDING MECHANISM DESCRIPTION

The recording unit which mounts on the main phono motor board by the hex nut (11) and the mounting screw (12), is shown in Fig. 4. This unit is not shown mounted in Figs. 1, 2 and 3 for purposes of clarity.

The gear (10) of the recording unit enmeshes with the main drive pinion gear (CJ). This pinion gear drives the recording arm through a friction clutch drive principle. Since this gearing mechanism is in operation continuously while the turntable is operating, it is important to place the recording arm on its rest when not in use.

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SERVICE NOTES AND ADJUSTMENTS

Oiling

The recorder and record changer mechanism should be lubricated once a year with a few drops of good light machine oil at each of the following points:

1. Three oil holes in motor gear housing.
2. Turntable spindle bearings.
3. Recorder pivot arm spindle.
4. All other bearing points.

Caution: Never oil the friction clutch at any time as it will cause slippage.

If squeaks are heard, compare the squeak with and without a load of records, as any stack of records in motion is apt to squeak with a pin through their centers.

This can be corrected by rubbing a little wax on the turntable shaft. See that all three ¼-inch round wicks in the motor frame are in position and are thoroughly saturated with oil (as it may not be if insufficient oil or too heavy oil has been used). Lift out all three motor wicks with tweezers. See if old oil has become "gummy" (commonly due to use of low-grade oil or low viscosity oil). If necessary, clean gummed-up wicks with kerosene. See that each is saturated with a fine oil, then before replacing them, drop a little fine oil into the holes. The gear box of the motor is packed with a semi-fluid grease at the factory, and it should never be necessary to take it apart for lubrication purposes.

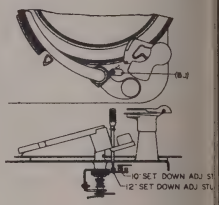
RECORD CHANGER AND RECORDING UNIT ADJUSTMENTS

Adjustments Nos. 1, 2, 3, 15 and 16 can be made from the top of the record player. All adjustments are correctly made at the factory and ordinarily need never be altered. However, should it become necessary to re-adjust due to tampering or accident, proceed as indicated in the following chart.

1

ADJUSTING LANDING POSITION OF NEEDLE ON RECORD

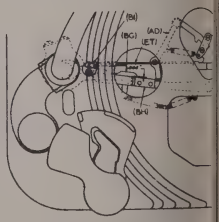
The position at which the needle lowers to the record can be adjusted by inserting a screw driver through hole (BJ) just in back of tone arm. For adjusting the 10-inch set-down, insert screw driver into the inside eccentric adjusting stud. For adjusting the 12-inch set-down, insert screw driver into the outside slotted stud Turn very slightly clockwise or counterclockwise to move needle landing in or out. The proper adjustment for the needle landing is ⅛ inch in from the outer edge of the record.



2

ADJUSTING TRIP CAM FOR CORRECT CLEARANCE BETWEEN TRIP LEVER AND TRIP ARM

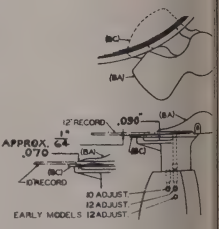
Insert screw driver through hole (BI) in main plate and locate it into slotted stud. Adjust eccentric cam so that the distance between the trip lever (BG) and trip arm (BH) is approximately .005 in. This can best be done by first adjusting the trip eccentric cam at (BI) so that there is no clearance or gap, then back off very slightly until trip lever (BG) is free to pulsate with the clutch motion or action of the release lever (ET). If the clearance is not sufficient between the trip lever (BG) and trip arm (BH) the pulsating motion of the clutch release lever (ET) will gradually cause the trip lever to move the trip arm enough to trip the trigger (AD) and start a change cycle. If gap is too great the trip lever will not move far enough to start a change cycle at the end of a record.



3

ADJUSTMENT FOR CHANGER PLATES

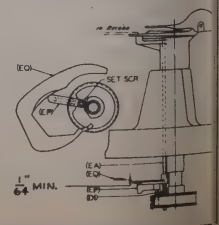
To adjust the distance between the selector plate (BA) and the shelf plate (BC) for 10-inch records, first select a 10-inch record that is approximately .070 in. thick. Then position it on changer and start a change cycle to revolve changer plates. Stop the turntable by hand just as the selector plate (BA) is about to touch the record, and shut off the motor. Then slowly turn the turntable by hand, allowing selector plates to contact edge of record so that it just slides over record, touching the surface lightly. Check all three selector plates and if any adjustment is necessary, it can be done by inserting a No. 10 Allen wrench in the setscrew holes located in the sides of the changer posts. Turn setscrew slightly clockwise to raise the selector plate and counterclockwise to lower it. The setscrew for adjusting the 10-inch record setting, and the one for 12-inch record setting is shown in the adjacent drawing. To adjust for 12-inch records, select a 12-inch record that is approximately .090 in. thick, then follow same procedure as for adjusting 10-inch records.



4

NO-RECORD SELECTING LEVER ADJUSTMENT

First be sure that spring tension on spring (DI) is strong enough to lift the center blade raising pin (EA) properly and fully, but not so strong that one 10-inch record will not fully depress pin and lever. Then with setscrew loose in no-record selecting lever (EP) and pin held down by weight of one 10-inch record. slide no-record selecting lever (EP) into position so that it will just clear under lower edge of the lower cam setting lever (EQ) by approximately 1/64 in. clearance. Then tighten setscrew and check adjustment with and without a record, also be sure that without a record, the fin on no-record selecting lever (EP) swings above cam setting lever (EQ) and portion of lever (EP), indicated by arrow, sweeps stop lever (EQ) on cam setting lever into position shown in upper illustration of adjustments 12 and 13.



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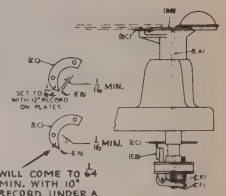
ADJUSTMENTS

5

LIFTER LEVER DIFFERENTIAL ADJUSTMENT

Place a 12-inch record over the turntable spindle so that the record rests on the shelf plates. Then check the center plate lifter lever (EB) and see that point of this lever will just slide inside of center arm lifter cam (EC). Then place a 10-inch record under the 12-inch record so that the 10-inch record will rest on shelf plate (BC) and the 12-inch record will then touch center plate (BB) which presses down center pin (EA) and accordingly moves lifter plate (EB) closer to outside face of lifter cam (EC) than it would without the 12-inch record on top of the 10-inch record. The lever (EB) should then follow the outside of the center arm lifter cam (EC). If it is necessary to re-adjust, this can be done by means of adjusting screw (CE) and lock nut (CF) to balance out the contact of lever (EB) on both sides of cam (EC) in relation to starting point of cam.



6

LIFTER LEVER CLEARANCE ADJUSTMENT

Check the distance between the leading edges of the center plate lifter lever (EB) and center arm lifter cam (EC) with a 12-inch record resting on the shelf plates. It should be a minimum of $\frac{1}{16}$ in. It should not be necessary to check this adjustment unless the tape clamp screws on the pulley (FG) have been loosened. To re-adjust after screws have been loosened, first set pulley so that when the slack in the tape line is taken up in the direction of forward motion of the tape segment (CH), there will be the necessary $\frac{1}{16}$ in. clearance as mentioned above.

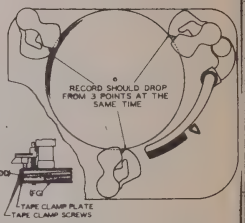
Note: If this adjustment is "OFF" most likely changer plate synchronization will also be off. Check adjustment No. 7.

7

CHANGER PLATE SYNCHRONIZATION

The synchronization of changer plates can be checked by placing one 10-inch record on the shelf plates. Then start a change cycle allowing it to continue until plates are just about ready to release the record. It can then be determined which plate is either slow or fast. This plate can then be adjusted by loosening the screws on the tape clamp which hold the tape (DD) from slipping in the pulley (FG). Then slightly move changer plate whatever is necessary to synchronize it with the other two plates so that record will drop evenly. Then tighten tape clamp screws securely. (Also check adjustment No. 6.)

Note: Tape line should have a very slight amount of slack. Check by grasping tape line with thumb and index finger and moving it in and out approximately $\frac{5}{8}$ in. with a moderate pressure.



8

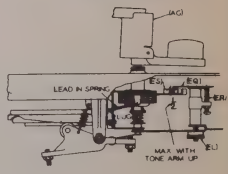
CLUTCH RELEASE LEVER ADJUSTMENT

The fork on clutch release lever (ET) should be adjusted so that it only slightly moves the friction clutch with a sharp kick rather than a wavy movement. To get more or less movement of the clutch, bend the release lever (as shown in upper illustration). Also be sure that both prongs of fork on release lever (ET) contact the pressure release sleeve (EU) simultaneously. At no time should fork ride the pressure release sleeve between impulses, as the clutch would then be held open and changer would not trip.

9

SETTING CAM ADJUSTMENT

By means of the adjusting screw (ER) set stop lever (EQ) so that there will be $\frac{1}{32}$ in. maximum overlap on eccentric studs (ES). If there is not enough overlap, the stop lever (EQ) will slide off instead of holding on eccentric studs (ES) on stop lug, while measuring set-down of tone arm (AG).



10

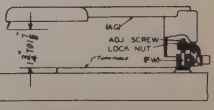
SLIDE-IN ADJUSTMENT

To adjust the power of the tone arm lead-in, bend the lug on lead-in spring to give it more or less tension; too much tension may cause needle to slide in on record. The knurled nut (EL) adjusts the distance tone arm will swing in, before clutch is disengaged. If clutch is still engaged after needle lands on record it may cause slide-in. Turning nut (EL) clockwise should correct slide-in if lead-in spring tension is correct.

11

TONE ARM HEIGHT ADJUSTMENT

This can be adjusted by means of an adjusting screw in the tone arm assembly (AG). The tone arm elevating pin (FW) presses against this screw which should be adjusted so that the distance between the point of needle (in tone arm) and the turntable is $1\frac{3}{4}$ in. to $1\frac{7}{8}$ in., which is the equivalent of approximately seventeen 10-inch records. When correct height adjustment is made, tighten lock nut on adjusting screw securely.



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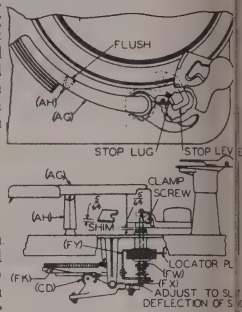
RECORD CHANGER AND RECORDING UNIT ADJUSTMENTS (Cont'd)

12
TONE ARM SWING ADJUSTMENT

First raise tone arm (AG) by hand and slightly loosen clamp screw on tone arm shaft head. Then start a change cycle and shut off power supply to motor when tone arm (AG) is being held in stop position above the tone arm rest (AH) and stop lever (EQ) (on setting cam assembly) is contacting stop lug on locator plate (which is part of the tone arm shaft assembly). Then insert a $\frac{5}{64}$-in. shim between tone arm shaft head and bearing race to set vertical clearance (which must be approximately $\frac{5}{64}$ in.) so that clutch will be engaged for moving trip lever when tone arm is down on record and align tone arm (AG) flush with tone arm rest (AH) as shown in upper illustration. Tighten clamp screw securely and remove $\frac{5}{64}$ in. shim, then check action of tone arm and adjust needle landing as in adjustment No. 1, if necessary.

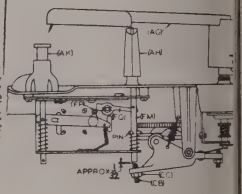


13
RAISING LEVER PRESSURE ADJUSTMENT

To make this adjustment first put unit into change cycle, then stop it when roller (CD) is at the highest point on the cam (FK), then loosen lock nut and turn screw under flat lifter spring clockwise until tone arm elevating pin (FW) and shaft (FX) are completely raised and flat spring contacts the tone arm shaft (FX) holding clutch assembly firmly in the high position against tone arm swing bracket (FY) and only slightly deflecting the flat spring. Then tighten lock nut securely.

14
SWITCH SHUT-OFF ADJUSTMENT

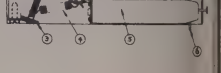
Start a change cycle by pressing push button (AK) so that roller (FP) holds switch latch (FQ) in a loaded position. Then stop turntable by hand when cam gear is in position (shown in illustration) and pin on rest shaft is sliding down decline from shoulder on cam gear, allow the rest shaft (FM) to come down gradually and when switch latch (FQ) trips, hold rest shaft in that position and adjust screw (CB) to within approximately $\frac{1}{32}$ in. from end of shaft (FM), tighten lock nut (CC) securely and check operation.



15
ADJUSTING DEPTH OF RECORDING NEEDLE CUT

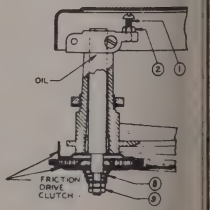
The adjustment for cut of needle pressure is thumbscrew (3) shown in illustration. This adjustment regulates the spring tension of pressure spring (4) on the pivoted cutting head (5), and by turning the thumbscrew to the left or right will increase or decrease the pressure on the needle.

The correct setting is determined by inspecting a cut record under a magnifying glass. The width of the groove should be approximately the same as the width of the uncut record surface between the grooves.



16
ADJUSTING HEIGHT OF RECORDING ARM

The adjusting height screw (1) and lock nut (2) are for adjusting the height of the recording arm above the turntable. The height of the tip of the needle is approximately $\frac{1}{8}$ in. from the record surface when the cartridge (5) is held by the screw (7) in the "UP" position. If it is necessary to adjust the height of arm to provide a final adjustment of the cutting needle pressure, loosen lock nut (2) and with screw driver, turn adjusting screw (1) counterclockwise to raise the arm or clockwise to lower the arm. Then tighten the lock nut.



TROUBLE SHOOTING

Cases of failure to operate satisfactorily will generally be found due to either neglect of proper lubrication, to tampering with the mechanism after it leaves the factory, or to injuries accidentally sustained as by external vibration or by impact of some heavy object. In addition, there is always the possibility that any kind of spring may "go dead" (cease to operate without any visible breakage), even though the utmost factory precautions are taken against it—or that setscrews ma work loose due to external vibration. For tightening set screws, an Allen (hexagon) wrench is required. Be sure tha setscrews are properly seated on the holes or flats provide Damage from tampering is likely to take the form of ben parts. Never bend any part during examination.

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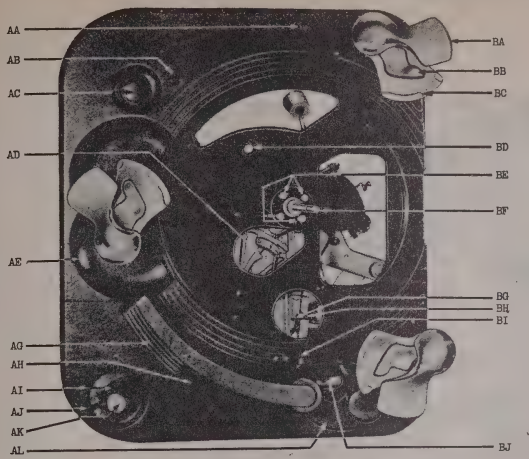
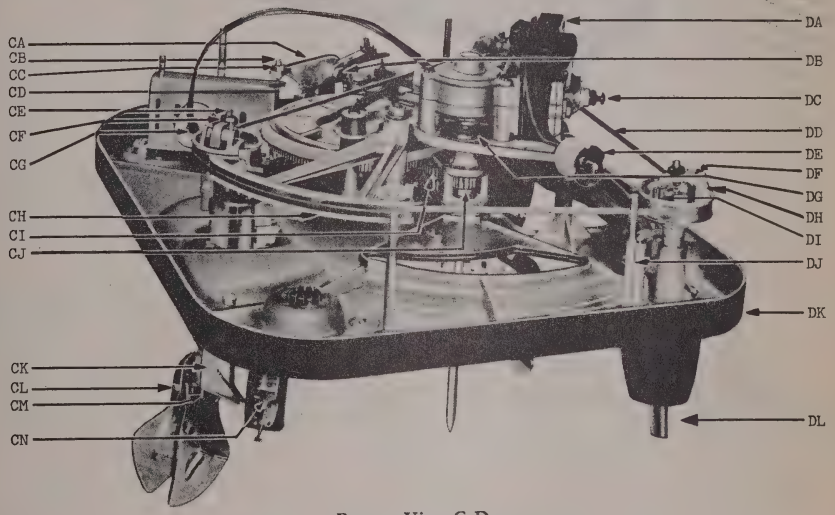


Top View A-B
Fig. 1



Bottom View C-D
Fig. 2

REPLACEMENT PARTS LIST—MODEL JM-1C RECORD PLAYER AND RECORDER

Symbol	Stock No.	Description
		RECORD PLAYER ASSEMBLY
AD	RL-967	LATCH—Cam latch and trigger assembly
AH	RR-854	REST—Phono tone arm rest support
AI	RK-1025	KNOB—Manual-automatic selector knob
AK	RB-643	BUTTON—Reject control button
BA	RP-2012	PLATE—Selector plate
BA, BB, BC	RX-092	ASSEMBLY—Changer plate assembly
BC	RP-2010	PLATE—Shelf plate
BB	RP-2011	PLATE—Center plate
BF	RS-960	SPINDLE—Turntable spindle and housing
BG	RL-968	LEVER—Trip-lever assembly
BH	RA-426	ARM—Trip arm assembly
CA	RX-093	ASSEMBLY—Raising lever assembly
CB, CE	RS-8020	SCREW—Adjusting screw
CD	RR-946	ROLLER—Raising lever arm roller
CG	RS-3106	SWITCH—Phono power switch
CH	RX-094	ASSEMBLY—Tape control segment assembly
CI	RG-718	GEAR—Intermediate gear assembly
CJ	RG-717	GEAR—Drive pinion gear
CK	RB-1127	BRACKET—Changer plate bracket
CL	RP-413	PIN—Plate hinge pin
CM	RP-414	PIN—Plate lifting pin
CN	RC-5010	CRYSTAL—Phono crystal pick-up
DA	RM-150	MOTOR—60 cycle phono motor
DA	RM-151	MOTOR—50 cycle phono motor
DB	RS-8021	SCREW—Raising lever trunion screw
DD	RT-938	TAPE—Cycling control tape
DF	RX-095	ASSEMBLY—Centerplate lifter assembly
DG	RC-2041	COUPLING—Motor coupling assembly
DH	RP-415	PIN—Plate lifter pin
DI	RS-4036	SPRING—Plate lifter spring
DL	RP-416	PIN—Plate post stem
EA	RP-417	PIN—Centerplate raising pin
EC	RC-2042	CAM—Center arm lifter cam
ED	RS-8022	SCREW—Arm lifter cam mounting screw
EG	RC-8211	CONNECTOR—Motor grounding lead
EH	RS-4035	SPRING—Swing lever spring
EI	RS-4034	SPRING—Trip arm spring

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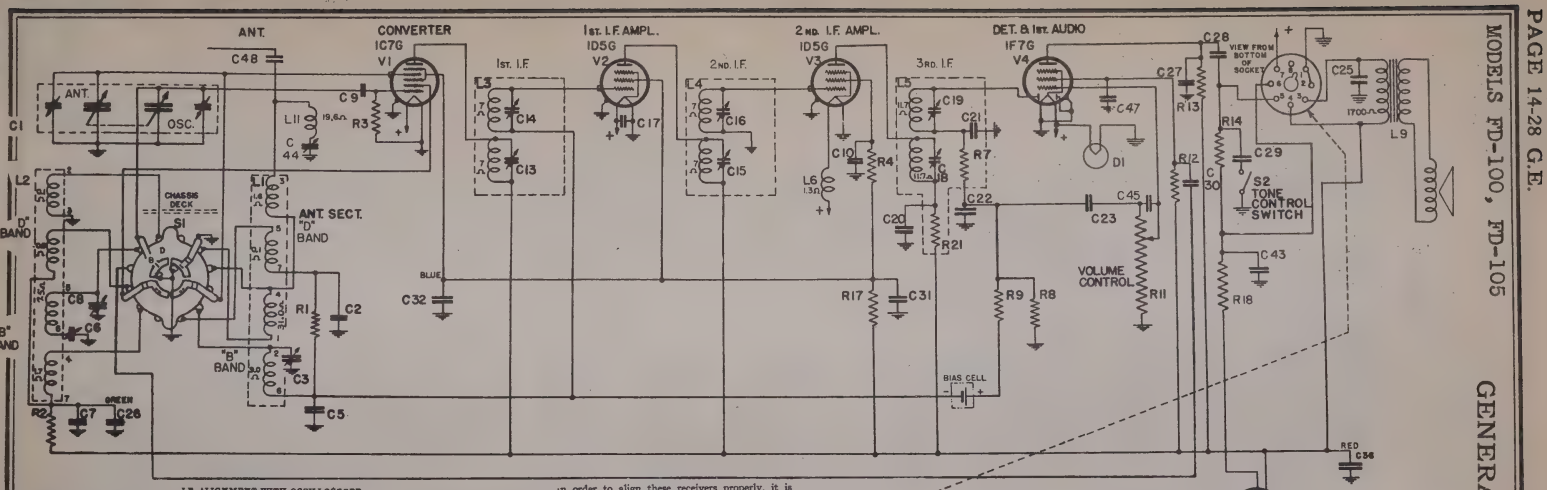
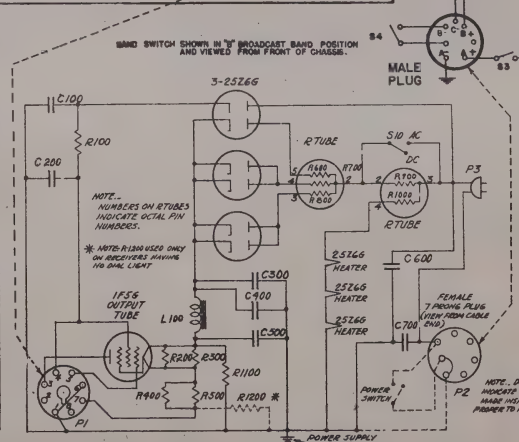
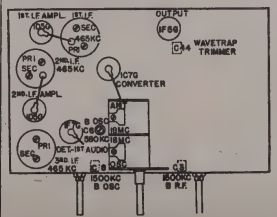






I.F. ALIGNMENT WITH OSCILLOSCOPE

Band Switch Setting	Input Frequency	Point of Input	Dummy Ant.	Trimmer	Remarks
1 Band "B"	465 K.C. Sweep	1st I.F. Grid	.05 MFD or Larger	3rd I.F. Sec. (C-19) 3rd I.F. Pri. (C-18)	Gang condenser plates closed—connect audio input of oscilloscope to ground and to the diode load terminal of the 3rd I.F. transformer—Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude.
2 Band "B"	465 K.C. Sweep	1st I.F. Grid	.05 MFD or Larger	2nd I.F. Sec. (C-16) 2nd I.F. Pri. (C-15)	
3 Band "B"	465 K.C. Sweep	Converter Grid	.05 MFD or Larger	1st I.F. Sec. (C-14) 1st I.F. Pri (C-13)	
4 Band "B"	465 K.C. Sweep	Antenna Post	250 MMF 400 ohms	Wave Trap Trimmer	Adjust trimmer for minimum amplitude.

I.F. ALIGNMENT WITH OUTPUT METER

1 Band "B"	465 K.C. with modulation	1st I.F. Grid	.05 MFD or Larger	3rd I.F. Sec. (C-19) 3rd I.F. Pri. (C-18)	Adjust trimmer for maximum output
2 Band "B"	465 K.C. with modulation	1st I.F. Grid	.05 MFD or Larger	2nd I.F. Sec. (C-16) 2nd I.F. Pri. (C-15)	
3 Band "B"	465 K.C. with modulation	Converter Grid	.05 MFD or Larger	1st I.F. Sec. (C-14) 1st I.F. Pri. (C-13)	
4 Band "B"	465 with modulation	Antenna Post	250 MMF 400 ohms	Wave Trap Trimmer	Adjust trimmer for minimum output.

R.F. ALIGNMENT WITH OUTPUT METER

1 Band "B"					Close gang plates—adjust pointer to first line at left end of tuning scale (530 K.C.).
2 Band "D"	18 MC with modulation	Antenna Post	250 MMF 400 ohms	Oscillator (18 MC) Antenna (18 MC) See Trimmer Location View	Connect output meter across Loudspeaker—tone control on "Bass" position—set osc. trimmer. While rocking the gang cond., adjust the antenna trimmer for maximum output.
2 Band "B"	1500 K.C. with modulation	Antenna Post	250 MMF 400 ohms	Osc. (C-8) Ant. (C-3)	Peak trimmers for maximum output with a low input signal.
4 Band "B"	580 K.C. with modulation	Antenna Post	250 MMF 400 ohms	Osc. Padder (C-6)	Adjust padder for a maximum output meter indication in vicinity of 580 K.C. while rocking the gang condenser.
3 Band "B"	1500 K.C. with modulation.	Antenna Post	250 MMF 400 ohms	Osc. (C-8)	As in operation No. 3.

In order to align these receivers properly, it is necessary to have the following test equipment:

1. A modulated test oscillator.
2. An output indicator such as an A-C. voltmeter with a scale reading of 100 to 150 volts. (Use a condenser to isolate the D.C.)
3. A screwdriver-type alignment tool.

To realize all the performance built into these receivers at the factory, alignment using cathode-ray equipment is to be preferred.

On the "D" Band (5600 to 18,000 K.C.) the oscillator operates on the *low* frequency side of the incoming signal; therefore, adjust the trimmer until the second oscillator peak is reached as the trimmer is *increased* in capacity. When the correct adjustment is made, it will be possible to tune the image of any signal on the "D" band 970 K.C. *higher* than the signal if the input is sufficiently high. Example: The image of 15 M.C. should be heard at 15,970 K.C.

The alignment procedure is given in table form.

The "Dummy Antenna" is the capacitor or capacitor and resistor used in series with the signal generator antenna lead.

Chassis Layout and Trimmer Locations

Symbol	Description
C1	Tuning Capacitor
C2	.0045 mfd., Paper Capacitor
C3	5-45 mmf., Trimmer Capacitor
C5	.1 mfd., Paper Capacitor
C6	300-500 mmf., Padder Capacitor
C7	.05 mfd., Paper Capacitor
C10	.05 mfd., Paper Capacitor
C17	.5 mfd., Paper Capacitor
C20	.1 mfd., Paper Capacitor
C21,22	250 mmf., Mica Capacitor
C23	.001 mfd., Paper Capacitor
C25	.0045 mfd., Paper Capacitor
C26	4 mfd., Dry Electrolytic Capacitor
C27	250 mmf., Mica Capacitor
C28	.05 mfd., Paper Capacitor
C32	.05 mfd., Paper Capacitor
C36	.05 mfd., Paper Capacitor
C47	.005 mfd., Paper Capacitor
C48	.002 mfd., Paper Capacitor
C100	30 mfd., Dry Electrolytic Capacitor
C300	50 mfd., Dry Electrolytic Capacitor
C400	100 mfd., Dry Electrolytic Capacitor
C500	100 mfd., Dry Electrolytic Capacitor
C600	100 mfd., Dry Electrolytic Capacitor
C700	.05 mfd., Paper Capacitor
R1	100,000 ohm Carbon Resistor
R2	10,000 ohm Carbon Resistor
R3	47,000 ohm Carbon Resistor
R4	10,000 ohm Carbon Resistor
R7	60,000 ohm Carbon Resistor
R8	220,000 ohm Carbon Resistor
R9	1,500 ohm Carbon Resistor
R11	2.2 megohm Carbon Resistor
R12	1.0 megohm Carbon Resistor
R13	270,000 ohm Carbon Resistor
R14	470,000 ohm Carbon Resistor
R17	53,000 ohm Carbon Resistor
R18	100,000 ohm Carbon Resistor
R100	2,200 ohm Carbon Resistor
R200	22 ohm Carbon Resistor
R300	1,800 ohm Carbon Resistor
R400	440 ohm Ballast
R500	220 ohm Ballast
R600	220 ohm Ballast
R700	150 ohm Ballast
R800	110 ohm Ballast
R900	220 ohm Carbon Resistor
R1000	33 ohm Carbon Resistor
R1100	1,800 ohm Carbon Resistor
R1200	33 ohm Carbon Resistor
L6	R.F. Filter Coil

Comb.

Comb.

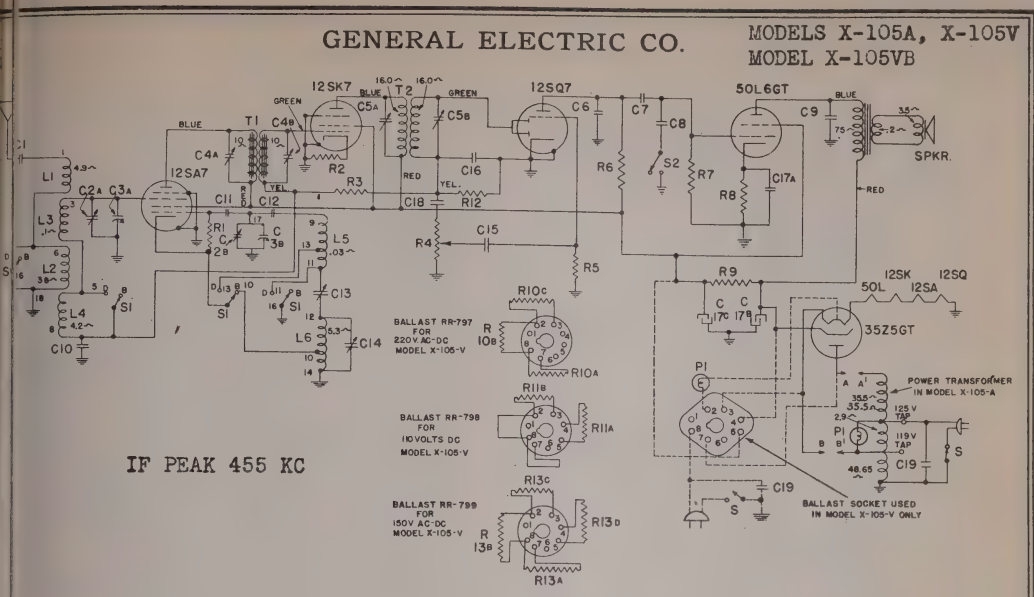


Fig. 1. Schematic Diagram Models X-105A and X-105V

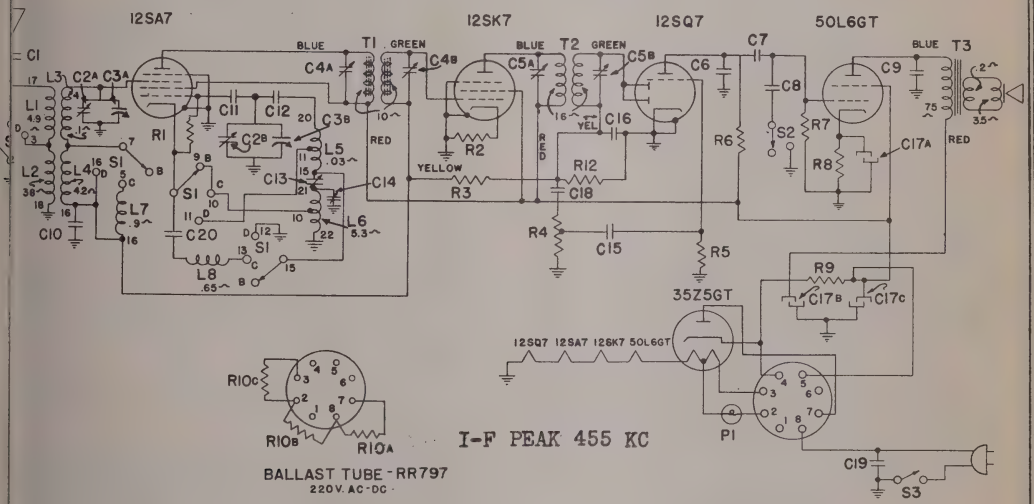
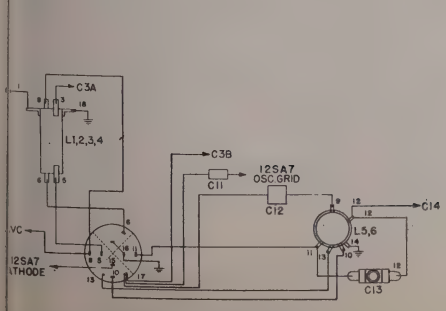
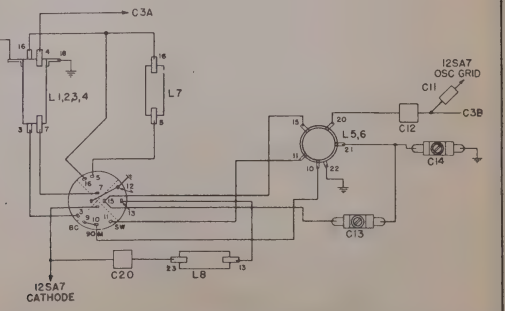


Fig. 2. Schematic Diagram Model X-105VB



Models X-105A, X-105V

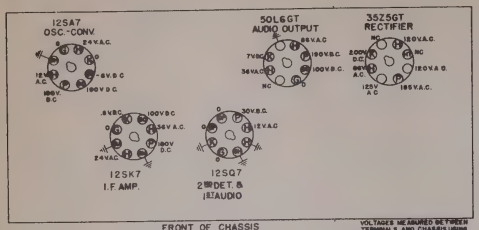
Switch Wiring



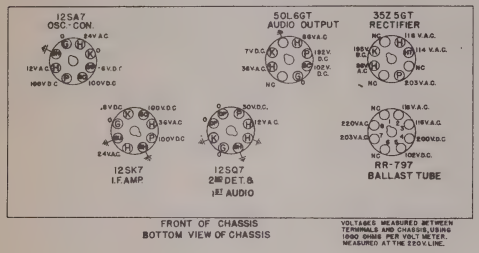
Model X-105VB

MODELS X-105A, X-105V
MODEL X-105VB

GENERAL ELECTRIC CO.



Model X-105A



Models X-105V, X-105VB

ALIGNMENT PROCEDURE
ALL MODELS

The alignment procedure, shown in table form, is made with the chassis removed from the cabinet.

Since the dial scale is not a part of the main chassis, it is necessary to use the special alignment scale glued to the back side of dial scale reflector plate. Use can then be made of the rear pointer guide as the tuning reference pointer. Before making the alignment, close the condenser plates completely. Then viewed from the rear, the pointer should be slid along the cord until the left hand edge of the pointer slide corresponds to the first mark on the right side of the rear scale. After making the alignment on this basis, it may be found after reassembly in the cabinet that the gang closed position of the pointer does not correspond to the first mark on the dial. If this is the case, slide the pointer on the drive cord until it is directly behind the first mark on the dial. This will make the calibration correct without further alignment.

Output meter alignment is preferable and the meter may be connected across the voice coil leads, t'.en turn volume control partially up. Keep the signal input as low as possible to avoid AVC action.

The special band on the Model X-105VB does not require alignment.

ALIGNMENT CHART

Step	Test—Osc. Connect to	Osc. Output Frequency	Pointer Setting	Tune Trimmer for Max. Output
1	12SK7 IF Grid in Series with .05 mfd.	455 KC	Standard Band 550 KC	C5A C5B
2	12SA7 Grid in Series with .05 mfd.	455 KC	Standard Band 550 KC	C4A C4B
3	Ant. Post in Series with 200 mmf. and 400 ohms	18.0 MC	Short-wave Band 18.0 MC	(C2B) Osc.* (C2A) Ant.**
4	Ant. Post in Series with 200 mmf. and 400 ohms	580 KC	Standard Band 580 KC	C13**
5	Ant. Post in Series with 200 mmf. and 400 ohms	1500 KC	Standard Band 1500 KC	C14**

* Use minimum capacity peak.
** Rock gang condenser for optimum peak.

PARTS LIST ALL MODELS

Stock No.	Symbol	Description
*RC-039	C-1	CAPACITOR—.01 Mfd., 600 V. paper
RC-7055	C-2a, 2b, 3a, 3b	CONDENSER—Tuning condenser and trimmers
*RC-293	C-6	CAPACITOR—470 mmf., mica
*RC-039	C-7	CAPACITOR—.01 Mfd., 600 V. paper
*RC-011	C-8	CAPACITOR—.002 Mfd., 600 V. paper
*RC-193	C-9	CAPACITOR—.008 Mfd., 600 V. paper
*RC-072	C-10	CAPACITOR—.05 Mfd., 200 V. paper
*RC-216	C-11	CAPACITOR—47 mmf., mica
*RC-365	C-12	CAPACITOR—2800 mmf., mica
RC-6550	C-13	CAPACITOR—640-790 mmf., "BC" padder
*RC-6537	C-14	CAPACITOR—2-18 mmf., "B" oscillator trimmer
*RC-039	C-15	CAPACITOR—.01 Mfd., 600 V. paper
*RC-274	C-16	CAPACITOR—330 mmf., mica
RC-5190	C-17a	CAPACITOR—20 Mfd., 25 V. dry electrolytic
	C-17b	CAPACITOR—40 Mfd., 250 V. dry electrolytic
	C-17c	CAPACITOR—30 Mfd., 250 V. dry electrolytic
*RC-023	C-18	CAPACITOR—.005 Mfd., 600 V. paper
RC-116	C-19	CAPACITOR—.02 Mfd., line capacitor
*RC-357	C-20	CAPACITOR—3600 mmf., mica (Model X-105VB)
*RQ-1295	R-1	RESISTOR—33,000 ohm, ½ W. carbon
*RQ-1227	R-2	RESISTOR—47 ohm, ½ W. carbon
*RQ-1343	R-3	RESISTOR—3.3 megohm, ½ W. carbon
RV-126	R-4	VOLUME CONTROL—2.0 megohm control
*RQ-1349	R-5	RESISTOR—5.6 megohm, ½ W. carbon
*RQ-1323	R-6, -7	RESISTOR—470,000 ohm, ½ W. carbon
*RQ-1239	R-8	RESISTOR—150 ohm, ½ W. carbon
*RQ-768	R-9	RESISTOR—3300 ohm, 3 W. carbon
RR-797	R-10a, 10b, 10c	RESISTOR—220 V. ballast tube
RR-798	R-11a, 11b	RESISTOR—110 V. ballast tube
*RQ-1323	R-12	RESISTOR—470,000 ohm, ½ W. carbon
RR-799	R-13a, b, c, d	RESISTOR—150 V. ballast tube

ALL MODELS
SPECIAL SERVICE INFORMATION

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains

(a) Antenna Post to Converter Grid at:
1000 KC....7.6
3000 KC....2.4
18000 KC....2.7

(b) IF on Converter Grid to IF on 12SK7 Grid:
455 KC....87

(c) IF Amplifier Grid to Diode Plates:
455 KC....66

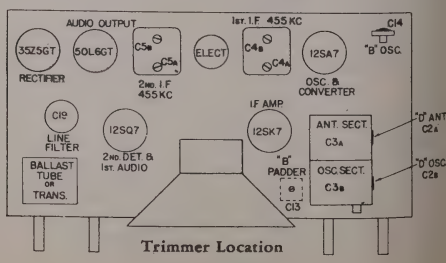
(2) Voltage across the diode load to give ½-volt speaker output at 400 cycles—.06 volts

(3) DC voltage developed across oscillator grid resistor (R1) at:
1000 KC....6.8 volts
3000 KC....6.0 volts
18000 KC....8.0 volts

Loud-speaker

The voice coil is accurately and permanently centered at the factory and should seldom give trouble. In case a voice coil needs recentering, it will be necessary to replace the entire cone and voice coil assembly. Assembly instructions accompany each replacement cone.

NOTE: In no case should the magnet be removed from the assembly position as it will lose magnetism.



ALL MODELS

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GENERAL ELECTRIC CO.

MODELS LFC-115, LFC-116
MODELS LFC-1118, LFC-1128,
LFC-1228

SUPPLEMENTARY TECHNICAL INFORMATION

MANUAL TUNING ASSEMBLY

Lock-in Dial Drive

This assembly is added to late production receivers to facilitate easier tuning particularly on the short-wave band. On early production receivers, on which a direct pressure drive was used, this drive may be installed, in most cases without removing the chassis from the cabinet. Fig. 1 shows the parts used in making up this assembly.

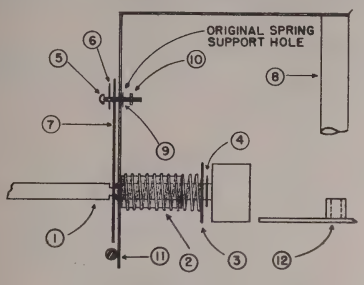

Fig. 1. Lock-in Dial Drive Assembly

The component parts are: (1) Tuning shaft, (2) Coil spring, (3) ¾-inch O.D. Washer, (4) 7/16-inch O.D. Washer, (5) 4-40 5/16-inch screw, (6) Spring mounting lug, (7) Spring cotter, (8) Condenser gang dial drive support post, (9) Lock washer, (10) 4-40 Hex. nut, (11) Gang condenser bracket, (12) Drive wheel.

When it is desired to add this assembly to an early receiver, it will be found helpful if the following steps are observed:

A—Remove Pt. 12 and original drive shaft (1).

B—Assemble parts shown, Fig. 1—Grease Pt. (4) and shaft where it passes through bushing and spring cotter.

C—Assemble short end cotter for clearance of wire welded to bracket.

D—Finger tighten nut (10) placing spring mounting lug (6) in vertical position.

E—**Connect original spring between drive assembly (12) and new spring mounting lug (6).**

F—Bend post (8) **if necessary** to allow approximately ⅛ inch clearance, between rubber drive and part (12)—Bend in direction of arrow to increase clearance.

G—Reassemble part (12) and end supporting bracket.

H—Solder nut (10) to screw (5) to prevent nut coming off after assembly or apply cement (Glyptal or equivalent) for same purpose. DO NOT TIGHTEN NUT (10) WITH A WRENCH. TIGHTEN ONLY LIGHTLY WITH FINGERS.

To engage the tuning control for manual tuning, press inward firmly while rotating the control counterclockwise, then clockwise until the holding clip releases which will be evidenced by a slight "click." The tuning control will now remain engaged and need merely be rotated in either direction until the desired station is tuned in.

To use the Touch Tuning keys the control is disengaged by pulling out on it until a "click" is heard signifying that the spring cotter has engaged. The Touch Tuning keys may now be used in the usual manner.

ELECTRICAL CIRCUIT CHANGES

The 820,000-ohm resistor, R58, connected between terminal 7 on band change switch wafer S2 and junction of R26 and R31, has been removed.

Band change switch wafer S4 has been replaced by an entirely new wafer. Contact 6, on this wafer, is connected to the screen of the 6SH7 1st limiter tube, instead of being grounded as originally shown. This serves the purpose of shorting out the screen during all but FM reception. Contact 7 has been grounded instead of being connected to the 2nd 6SG7 cathode. Contact 8 has been added and is connected to the 2nd 6SG7 cathode.

If replacement of the switch is necessary, it is recommended that the changer indicated be made at the same time. Should it be found desirable to make these changes without replacing the entire switch assembly, a new wafer S4 may be ordered. (See parts list.)

Tubular capacitor C42 may be changed from 0.004 mfd. to 0.003 mfd. and capacitor C54 may be changed from 47 mmf. mica to 0.01 mfd. paper.

ALIGNMENT DATA

In Table III of the original service notes, it was indicated in Step 5, that the Input Signal be fed directly to the "FM" antenna post. It is recommended that this be changed and that the Signal Generator be capacitively coupled to the built-in dipole. This is accomplished by connecting a lead to the output "high" part of the Signal Generator and running it near the built-in dipole. Trimmer C1 should then be peaked for maximum output.

An "FM" broadcast station may be used for this adjustment provided its frequency is near 46 MC (not over 47 MC and not under 45 MC) and provided its signal input is so low that the limiter circuit remains inoperative.

NOTE: The squelch circuit must be inoperative while these adjustments are being made.

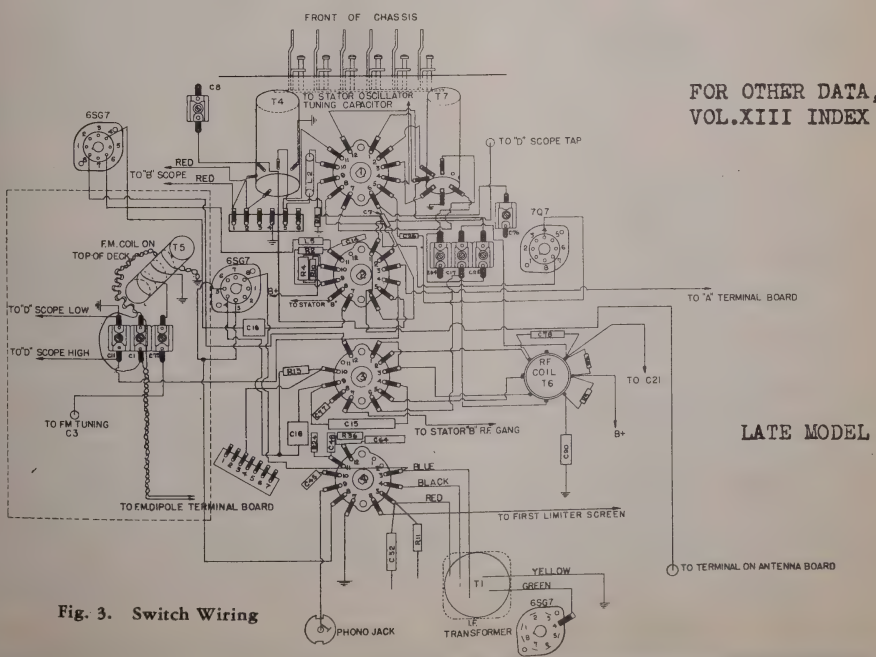

Fig. 3. Switch Wiring

FOR OTHER DATA, SEE VOL. XIII INDEX

LATE MODEL

MODEL HM-171
MODEL HM-185

GENERAL ELECTRIC CO.

TELEVISION RECEIVERS
(REVISED FOR NEW STANDARDS)

FOR ORIGINAL DATA SEE VOL.XI INDEX

CHANGES IN THE SCHEMATIC DIAGRAM

1- A RESISTOR OF 4700 OHMS IS CONNECTED ACROSS THE PRIMARY OF THE I.F. TRANSFORMER T7.
2- THE RESISTOR R123 IS CHANGED FROM 3900 TO 4700 OHMS.
3- A RESISTOR OF 4700 OHMS IS CONNECTED ACROSS THE PRIMARY OF THE I.F. TRANSFORMER T6.
4- A RESISTOR OF 220,000 OHMS IS CONNECTED BETWEEN THE JUNCTION OF R145 AND R146 AND GROUND.
5- A RESISTOR OF 330 OHMS IS INSERTED IN THE CONTROL GRID LEAD OF THE PICTURE TUBE.

REVISED TELEVISION ALIGNMENT PROCEDURE

The problem of aligning the several circuits in a television receiver is much more involved and requires more specialized equipment than the alignment of conventional radio receivers. Fortunately, the use of stable components in carefully engineered circuits of wide-band characteristic reduces to a minimum the necessity for alignment under normal operating conditions. Should alignment become necessary the following equipment will be needed:

(A) For Video I. F. Alignment
  (1) Cathode ray oscilloscope.
  (2) Wide-band sweep oscillator capable of sweeping from 7.5 to 15 MC.
  (3) Marker system either provided in sweep oscillator or from separate signal generator for locating 12.75 and 10.75 MC points.

(B) Sound I.F. Alignment
  (1) Cathode ray oscilloscope.
  (2) Wide-band sweep oscillator capable of sweeping from 7.75 to 8.75 MC.
  (3) Marker system either provided in sweep oscillator or from separate signal generator for locating 8.15 and 8.35 MC points.

(C) R.F. Alignment
  (1) Cathode ray oscilloscope
  (2) Wide-band sweep oscillator capable of sweeping the following bands:
    (a) 50 to 56 MC
    (b) 60 to 66 MC
    (c) 66 to 72 MC
    * (d) 78 to 84 MC

* Those receivers which were aligned at the factory for Band No. 4 must use this r-f sweep frequency.

VIDEO I.F. ALIGNMENT

	Input Freq.	Point of Input	Adjustments	Comments
1.				Connect vertical input cable of cathode ray oscilloscope across resistor R-182 of 6F8G video detector.
2.	7.5–15 MC Sweep	Control grid of 6AB7 (2nd video I.F.)		Connect output tap of video I.F. sweep oscillator to control grid of 6AB7 (2nd video I.F.). Connect ground lead to chassis. Turn contrast control (R-108) to about half of maximum or to a point which gives satisfactory vertical deflection without overloading. Set horizontal centering and gain controls on oscilloscope to give suitable horizontal deflection. Adjust sweep phase to give curve similar to Fig. 7, curve 1.

NOTE: If sweep oscillator has marker points internally supplied, steps 3 and 4 may be omitted.

	Signal Input	Point of Input	Adjustments	Comments
3.	Same as in No. 2 plus 12.75 MC	Same as in No. 2		Superimpose an accurately calibrated 12.75 MC signal in parallel with sweep signal. Signal will appear on sweep curve in oscilloscope as a wiggle, the center of which is a thin black line. With a pen or crayon mark this point on the screen of the oscilloscope. (NOTE: Hereafter the horizontal controls on the oscilloscope must not be touched.)
4.	Same as in No. 2 plus 10.75 MC	Same as in No. 2		Superimpose an accurately calibrated 10.75 MC signal in parallel with sweep signal. Mark screen at point where signal appears on curve as in No. 3 above.
5.	7.5–15 MC Sweep	Control grid 6AC7 (4th video IF)	Iron cores of detector transformer T-6	Do not touch horizontal controls of oscilloscope. Adjust iron cores of T-6 until curve appears similar to Fig. 7, curve 1, with relatively flat top, 12.75 MC mark at corner of one side and 10.75 MC mark at corner of other side. These conditions plus maximum amplitude insure correct alignment.
6.	7.5–15 MC Sweep	Control grid 6AB7-3rd video IF	Iron cores of 4th video transformer T-5	Adjust iron cores for maximum gain, flatness and proper centering between markers as described in step No. 5 and illustrated in Fig. 7, curve 1.
7.	7.5–15 MC Sweep	Control grid 6AB7 (2nd video IF)	Iron cores of 3rd video transformer T-4	Adjust primary and secondary iron cores for maximum gain, flatness and proper centering. See Fig. 7, curve 1.
8.	7.5–15 MC Sweep	Converter grid, 6F8G	Iron cores of 2nd video transformer T-3 & 1st video transformer T-4	Connect low tap to grid (on top of tube). Adjust primary and secondary iron cores for maximum gain, flatness and proper centering. See Fig. 7, curve 1.
9.	14.25 MC	Converter grid, 6F8G	Series iron core of 3rd video transformer T-4	Connect low tap to grid. Reduce horizontal gain to minimum. Adjust iron core for minimum line length.

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REVISED TELEVISION ALIGNMENT PROCEDURE CONT.

AUDIO I.F. ALIGNMENT

NOTE: In order to obtain frequency modulation detection in the sound channel with good fidelity, the audio I.F. amplifiers must be aligned to give a satisfactory selectivity curve for slope detection. For this reason a sweep generator and oscilloscope are necessary to obtain the resultant curve shown in Fig. 7, curve 3.

	Signal Input	Point of Input	Adjustments	Comments
1.	8.25 MC with 30% tone modulation	6F8G converter grid	Tune all audio I.F. iron cores	Use an oscilloscope or high resistance voltmeter across —audio output terminals of HM171 or volume control, R126, of the Model HM185. Set tone control for maximum high frequency response. Peak all trimmers for a maximum output.
2.	7.75 to 8.75 MC sweep	Grid of 2nd audio I.F., 6SK7		Connect oscilloscope input to chassis ground and junction of resistors (R204 and R125 in HM-171) (R125 and R196 in HM185) at diode load. Superimpose an accurately calibrated 8.15 MC signal in parallel with sweep signal. This signal will appear on sweep curve in oscilloscope as a wiggle at the center of which a mark should be made with pen or crayon on oscilloscope screen. (Hereafter the horizontal controls on the oscilloscope must not be adjusted.) Next an 8.35 MC signal mark should similarly be made.

NOTE: If sweep oscillator has marker points internally supplied, omit step 2.

3.	7.75 to 8.75 MC sweep	Converter grid 6F8G	Adjust iron cores of 1st audio I.F. coil L12 and the 2nd audio I.F. transformer T-9	With oscilloscope connected as in step 2, adjust cores until curve appears as in Fig. 7, curve 3 being sure that the steep side of curve lies between the 8.15 and 8.35 MC markers as indicated. NOTE: The shape of the curve between 8.15 and 8.35 MC must be straight, otherwise distortion will result in FM reception.

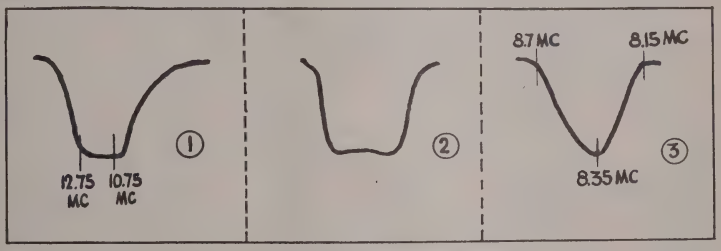


Fig. 7. Television Alignment Curves

TELEVISION ALIGNMENT PROCEDURE
R.F. ALIGNMENT

	Signal Input	Point of Input	Adjustments	Comments
1.			Band width adjustment coupling condenser	Turn C-78 in until tight, then open approximately 1/16 of a turn.
2.	50 to 56 MC Sweep	Antenna terminals	(L-8), (C-70), (C-67)	Connect oscilloscope to junction R124 and C25; open circuit R178, short R102 to ground. Depress No. 1 push button. Set tuning control to mid-rotation. Adjust L-8 until curve is centered between maximum horizontal sweep points. Adjust C-70 and C-67 for maximum amplitude. See Fig. 7, curve 2.
3.	60 to 66 MC Sweep	Antenna terminals	(L-9), (C-71), (C-68)	Depress No. 2 push button. Leave tuning control at mid-rotation point. Adjust L-9 for centering; C-71 and C-68 for maximum amplitude. See Fig. 7, curve 2.
4.	66 to 72 MC Sweep*	Antenna terminals	(L-10), (C-72), (C-69)	Depress No. 3 push button. Adjust L-10 for centering; C-72; C-69 for maximum amplitude. See Fig. 7, curve 2.
5.	Calibrated signal generator 55.75 MC, 65.75 MC, 71.75 MC** with 30% tone modulation.	Antenna terminals	(L8), (L9), (L10)	To align oscillator for various bands, set tuning control (C-3) at mid-rotation; then set brass slugs of coils L8, L9, L10 until maximum audio tone is heard.

* In some localities this sweep will be 78 to 84 megacycles.

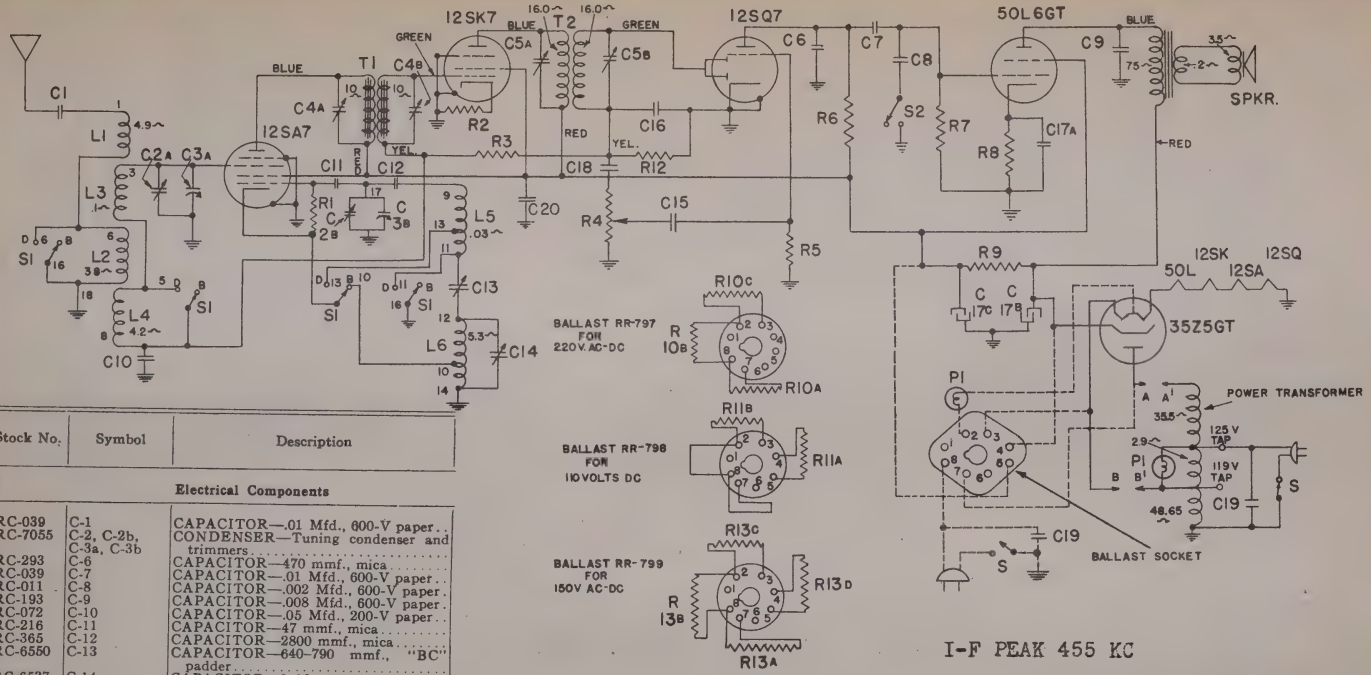
** 83.75 Megacycles when Band No. 4 is set up on the No. 3 key.

WAVE TRAP ALIGNMENT

1.	11.75 MC with 400 cycle modulation	Antenna terminals	Wave trap trimmer, C-95	Adjust for minimum signal response as seen on oscilloscope after connections made in Step 2 are re-established; then connect oscilloscope across R182.

OTHER SERVICE DATA SAME AS IN EARLY MODEL

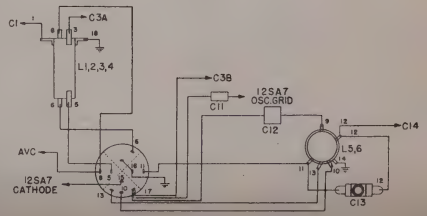
GENERAL ELECTRIC CO.



I-F PEAK 455 KC

Stock No.	Symbol	Description
		Electrical Components
*RC-039	C-1	CAPACITOR—.01 Mfd., 600-V paper.
*RC-7055	C-2, C-2b, C-3a, C-3b	CONDENSER—Tuning condenser and trimmers
*RC-293	C-6	CAPACITOR—470 mmf., mica
*RC-039	C-7	CAPACITOR—.01 Mfd., 600-V paper.
*RC-011	C-8	CAPACITOR—.002 Mfd., 600-V paper.
*RC-193	C-9	CAPACITOR—.008 Mfd., 600-V paper.
*RC-072	C-10	CAPACITOR—.05 Mfd., 200-V paper.
*RC-216	C-11	CAPACITOR—47 mmf., mica
*RC-365	C-12	CAPACITOR—2800 mmf., mica
*RC-6550	C-13	CAPACITOR—640-790 mmf., "BC" padder
*RC-6537	C-14	CAPACITOR—2-18 mmf., "B" oscillator trimmer
*RC-039	C-15	CAPACITOR—.01 Mfd., 600-V paper.
*RC-274	C-16	CAPACITOR—330 mmf., mica
	C-17a	CAPACITOR—20 Mfd., 25-V dry electrolytic
*RC-5190	C-17b	CAPACITOR—40 Mfd., 250-V dry electrolytic
	C-17C	CAPACITOR—30 Mfd., 250-V dry electrolytic
*RC-023	C-18	CAPACITOR—.005 Mfd., 600-V paper.
*RC-116	C-19	CAPACITOR—.02 Mfd., line capacitor
*RC-092	C-20	CAPACITOR—.05 Mfd., 600-V, paper.
*RQ-1275	R-1	RESISTOR—33,000 ohms, ½-W carbon
*RQ-1227	R-2	RESISTOR—47 ohm, ½-W Carbon
*RQ-1343	R-3	RESISTOR—3.3 megohm, ½-W carbon
*RV-153	R-4, S-3	VOLUME CONTROL—Volume control and power switch
*RQ-1349	R-5	RESISTOR—5.6 megohm, ½-W carbon
*RQ-1323	R-6, R-7, R12	RESISTOR—470,000 ohm, ½-W carbon
*RQ-1239	R-8	RESISTOR—150 ohm, ½-W carbon
*RQ-768	R-9	RESISTOR—3,300 ohm, 3-W carbon
*RR-797	R-10a, R-10b, R-10c	RESISTOR—220-V ballast tube
*RR-798	R-11a, R-11b	RESISTOR—110-V ballast tube

Stock No.	Symbol	Description
*RR-799	R-13a, R-13b R-13c, R-13d	RESISTOR—150-V ballast tube
*RL-1014	L-1, L-2, L-3, L-4	COIL—"B" and "D" Antenna coil
*RL-2057	L-5, L-6	COIL—"B" and "D" oscillator coil
*RS-3159	S-1	SWITCH—Band change switch
*RS-3108	S-2	SWITCH—Tone control switch
*RT-394	T-1	TRANSFORMER—1st I.F. transformer
*RT-395	T-2	TRANSFORMER—2nd I.F. transformer
*RT-4011	T-3	TRANSFORMER—Output transformer
*RT-0526	T-4	TRANSFORMER—Power transformer
*RS-1067	SPKR	SPEAKER—5-inch P.M. speaker



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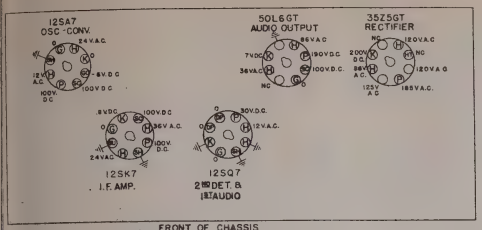
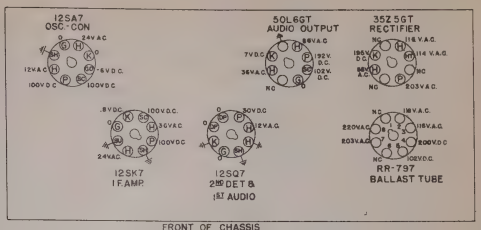
GENERAL ELECTRIC CO.

MODEL X-225A
MODEL X-225V



FRONT OF CHASSIS
BOTTOM VIEW OF CHASSIS

Model X-225A



FRONT OF CHASSIS
BOTTOM VIEW OF CHASSIS

Model X-225V

SERVICE DATA FOR BOTH MODELS

Power Supply

Model X-225A transformer has two primary voltage taps which allow operation at the voltages shown on the label. This receiver is connected at the factory to operate on the 125-volt tap (black and red). In localities where the line voltage does not exceed 120 volts, the transformer may be connected to use the 120-volt tap (black and yellow).

The Model X-225V is designed for use with the 220-volt ballast resistor RR-797 so that it may be operated from either an AC or DC power supply. However, this receiver can be converted to operate on the following line voltages as follows:

150-volt AC/DC (range 135-165 volts)

Remove ballast tube RR-797 from socket and substitute ballast tube resistor RR-799.

110-volt DC (range 100-120 volts)

Remove ballast tube RR-797 from socket and substitute ballast tube resistor RR-798.

When operated with these special ballast resistors and lower power supplies than 220 volts, the audio power output and socket voltages will be reduced.

ALIGNMENT PROCEDURE

The alignment procedure, shown in table form, is made with the chassis removed from the cabinet.

Since the dial scale is not a part of the main chassis, it is necessary to use the special alignment scale glued to the back side of dial scale reflector plate. Use can then be made of the rear pointer guide as the tuning reference pointer. Before making the alignment, close the condenser plates completely. Then viewed from the rear, the pointer should be slid along the cord until the left-hand edge of the pointer slide corresponds to the first mark on the right side of the rear scale. After making the alignment on this basis, it may be found after reassembly in the cabinet that the gang closed position of the pointer does not correspond to the first mark on the dial. If this is the case, slide the pointer on the drive cord until it is directly behind the first mark on the dial. This will make the calibration correct without further alignment.

Output meter alignment is preferable and the meter may be connected across the voice coil leads, then turn volume control partially up. Keep the signal input as low as possible to avoid AVC action.

SPECIAL SERVICE INFORMATION

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains
- (a) Antenna Post to Converter Grid at:
  - 1000 KC.....7.6
  - 3000 KC.....2.4
  - 18000 KC.....2.7
- (b) IF on Converter Grid to IF on 12SK7 Grid:
  - 455 KC.....87
- (c) IF Amplifier Grid to Diode Plates:
  - 455 KC.....66

(2) Voltage across the diode load to give ½-volt speaker output at 400 cycles—.06 volts

(3) DC voltage developed across oscillator grid resistor (R1) at:
- 1000 KC.....6.8 volts
- 3000 KC.....6.0 volts
- 18000 KC.....8.0 volts

ALIGNMENT CHART

Step	Test—Osc. Connect to	Osc. Output Frequency	Pointer Setting	Tune Trimmer for Max. Output
1	12SK7 I.F. Grid in Series with .05 mfd.	455 KC	Standard Band 550 KC	C5A C5B
2	12SA7 Grid in Series with .05 mfd.	455 KC	Standard Band 550 KC	C4A C4B
3	Ant. Post in Series with 200 mmf. and 400 ohms	18.0 MC	Short-wave Band 18.0 MC	(C2B) Osc.* (C2A) Ant.**
4	Ant. Post in Series with 200 mmf. and 400 ohms	580 KC	Standard Band 580 KC	C13*
5	Ant. Post in Series with 200 mmf. and 400 ohms	1500 KC	Standard Band 1500 KC	C14**

* Use minimum capacity peak.
** Rock gang condenser for optimum peak.

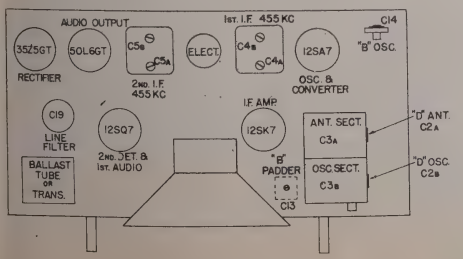


Fig. 3. Trimmer Location

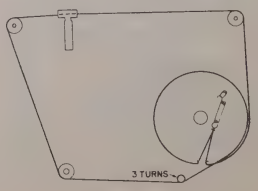


Fig. 4. Dial Stringing Diagram

MODEL HM-225B
MODEL HM-226B

GENERAL ELECTRIC CO.

TELEVISION SCHEMATIC DIAGRAM

PARTS DESCRIPTION LIST REVISED FOR NEW STANDARDS

Models HM-225B and HM-226B

SYMBOL	DESCRIPTION
C-1	47 mmf. mica L.P.F. capacitor
C-2	55-185 mmf. padder
C-3	20-200 mmf. trimmer
C-4	20-200 mmf. trimmer
C-5	20-200 mmf. trimmer
C-6	10 mfd. 450 V. dry electrolytic (See C-54, 81)
C-7	82 mmf. mica L.P.F. capacitor
C-8	20-200 mmf. trimmer
C-9	20-200 mmf. trimmer
C-10	2-12 mmf. trimmer
C-11	82 mmf. mica L.P.F. capacitor
C-12	.005 mfd. paper capacitor
C-13	47 mmf. mica L.P.F. capacitor
C-14	.005 mfd. paper capacitor
C-15	33 mmf. mica capacitor
C-16	4 mmf. mica L.P.F. capacitor
C-17	Air trimmer
C-18	150 mmf. mica capacitor
C-19	2-12 mmf. trimmer
C-20	2-12 mmf. trimmer
C-21	.005 mfd. paper capacitor
C-22	.005 mfd. paper capacitor
C-23	.005 mfd. paper capacitor
C-24	.005 mfd. paper capacitor
C-25	.01 mfd. paper capacitor
C-26	.005 mfd. paper capacitor
C-27	150 mmf. mica capacitor
C-28	.005 mfd. paper capacitor
C-29	.05 mfd. paper capacitor
C-30	330 mmf. mica capacitor
C-31	.005 mfd. paper capacitor
C-32	.005 mfd. paper capacitor
C-33	56 mmf. mica L.P.F. capacitor
C-34	.02 mfd. paper capacitor
C-35	.005 mfd. paper capacitor
C-36	33 mmf. mica L.P.F. capacitor
C-37	.005 mfd. paper capacitor
C-38	.005 mfd. paper capacitor
C-39	20 mfd. 25 V. dry electrolytic (See C-72)
C-40	.005 mfd. paper capacitor
C-41	.005 mfd. paper capacitor
C-42	100 mmf. mica capacitor
C-43	.005 mfd. paper capacitor
C-44	.05 mfd. paper capacitor
C-45	.005 mfd. paper capacitor
C-46	.005 mfd. paper capacitor
C-47	150 mmf. mica capacitor
C-48	0.5 mfd. paper capacitor
C-49	.05 mfd. paper capacitor
C-50	10 mmf. mica capacitor
C-51	0.1 mfd. paper capacitor
C-52	22 mmf. mica capacitor
C-53	0.5 mfd. paper capacitor
C-54	5 mfd. 450 V. dry electrolytic (See C-6, 81)
C-55	5 mfd. 450 V. dry electrolytic (See C-65)
C-56	.04 mfd. paper capacitor
C-57	0.1 mfd. paper capacitor
C-58	150 mmd. mica capacitor
C-59	.05 mfd. paper capacitor
C-60	.002 mfd. paper capacitor
C-61	470 mmf. mica capacitor
C-62	40 mfd. 25 V. dry electrolytic
C-63	470 mmf. mica capacitor
C-64	30 mfd. 450 V. wet electrolytic
C-65	30 mfd. 450 V. dry electrolytic (See C-55)
C-66	.05 mfd. paper capacitor
C-67	.02 mfd. paper capacitor
C-68	30 mfd. 450 V. wet electrolytic
C-69	.02 mfd. paper capacitor
C-70	.02 mfd. paper capacitor
C-71	.05 mfd. paper capacitor
C-72	40 mfd. 450 V. dry electrolytic (See C-39)
C-73	0.5 mfd. paper capacitor
C-74	.01 mfd. paper capacitor
C-75	30 mfd. 450 V. wet electrolytic
C-76	30 mfd. 450 V. wet electrolytic
C-77	.06 mfd. 4000 V. paper capacitor
C-78	.06 mfd. 4000 V. paper capacitor
C-79	.005 mfd. paper capacitor
C-80	30 mfd. 450 V. wet electrolytic
C-81	20 mfd. 450 V. dry electrolytic (See C-6, 54)
C-82	330 mmf. mica L.P.F. capacitor
C-83	20-200 mmf. trimmer
C-84	20-200 mmf. trimmer
C-85	.01 mfd. paper capacitor
C-86	.002 mfd. paper capacitor
C-87	.25 mfd. paper capacitor
C-88	20-200 mmf. trimmer
C-89	7 mmf. Temp. compensating capacitor
C-90	7 mmf. Temp. compensating capacitor
L-1	Wave trap coil
L-2	Wave trap coil
L-3	Wave trap coil
L-4	Wave trap coil
L-5	R.F. coil band No. 1
L-6	R.F. coil band No. 2
L-7	R.F. coil band No. 3
L-8	R.F. coil band No. 4
L-9	R.F. coil band No. 5
L-10	Osc. coil band No. 1
L-11	Osc. coil band No. 2
L-12	Osc. coil band No. 3
L-13	Osc. coil band No. 4
L-14	Osc. coil band No. 5
L-15	Wave trap assembly
L-16	Video diode choke
L-17	Video diode choke
L-18	Video cathode choke
L-19	Video choke
L-22	Video choke
L-23	Deflection yoke coil
L-24	Focus coil
L-25	Filter choke
R-1	1 megohm carbon resistor
R-2	2,200 ohms carbon resistor
R-3	10,000 ohms 1 W. carbon resistor
R-4	47,000 ohms carbon resistor
R-5	27,000 ohms carbon resistor
R-6	1.0 megohm carbon resistor
R-7	1,000 ohms carbon resistor
R-8	100,000 ohms carbon resistor
R-9	2,200 ohms carbon resistor
R-10	1.0 megohm carbon resistor
R-11	220,000 ohms carbon resistor
R-12	47,000 ohms carbon resistor
R-13	180,000 ohms carbon resistor
R-14	100,000 ohms carbon resistor
R-15	2,200 ohms carbon resistor
R-16	500,000 ohms volume control
R-17	2,200 ohms carbon resistor
R-18	150 ohms 7.4 W. wire wound resistor
R-19	1,500 ohms carbon resistor
R-20	2,200 ohms carbon resistor
R-21	2,700 ohms carbon resistor
R-22	82,000 ohms 2 W. carbon resistor
R-23	500,000 ohms tone control
R-24	10,000 ohms 1 W. carbon resistor
R-25	2,200 ohms carbon resistor
R-26	10,000 ohms carbon resistor
R-27	2,700 ohms carbon resistor
R-28	47,000 ohms carbon resistor
R-29	15 ohms wire wound resistor
R-30	3,300 ohms carbon resistor
R-31	2,200 ohms carbon resistor
R-32	6,800 ohms carbon resistor
R-33	1,500 ohms carbon resistor
R-34	1.0 megohm carbon resistor
R-35	270 ohms 2 W. carbon resistor
R-36	2,200 ohms carbon resistor
R-37	2,200 ohms carbon resistor
R-38	180 ohms carbon resistor
R-39	2,200 ohms carbon resistor
R-40	470 ohms carbon resistor
R-41	27,000 ohms carbon resistor
R-42	10,000 ohms carbon resistor
R-43	3,300 ohms carbon resistor
R-44	220,000 ohms carbon resistor
R-45	1.0 megohm carbon resistor
R-46	15,000 ohms 2 W. carbon resistor
R-47	10,000 ohms carbon resistor
R-48	4,700 ohms carbon resistor
R-49	470,000 ohms carbon resistor
R-50	820 ohms 2 W. carbon resistor
R-51	2,200 ohms carbon resistor
R-52	10,000 ohms brightness control
R-53	2.0 megohms vertical linearity control
R-54	10,000 ohms carbon resistor
R-55	1.0 megohm carbon resistor
R-56	1,000 ohms carbon resistor
R-57	2.2 megohm carbon resistor
R-58	10,000 ohms carbon resistor
R-59	1,500 ohms 6 W. wire wound resistor (See R-101)
R-60	2 megohms horizontal size control
R-61	220,000 ohms carbon resistor
R-62	220,000 ohms carbon resistor
R-63	220,000 ohms carbon resistor
R-64	220,000 ohms carbon resistor
R-65	2.0 megohms vertical size control
R-66	820 ohms 1 W. carbon resistor
R-67	10,000 ohms contrast control
R-68	180,000 ohms carbon resistor
R-69	100,000 ohms horizontal speed control
R-70	400 ohms 17.9 W. wire wound resistor
R-71	180 ohms 2 W. carbon resistor
R-73	1,000 ohms carbon resistor
R-74	6,800 ohms 1 W. carbon resistor
R-75	200 ohms 2 W. focus control
R-76	1.0 megohm carbon resistor
R-77	700 ohms 7.4 W. wire wound resistor
R-78	220,000 ohms carbon resistor
R-79	500,000 ohms vertical speed control
R-80	470,000 ohms 1 W. carbon resistor
R-81	2.2 megohms 1 W. carbon resistor
R-82	2.2 megohms 1 W. carbon resistor
R-83	2.2 megohms 1 W. carbon resistor
R-84	2.2 megohms 1 W. carbon resistor
R-85	2.2 megohms 1 W. carbon resistor
R-86	2.2 megohms 1 W. carbon resistor
R-87	220,000 ohms ½ W. carbon resistor
R-88	33 ohms 1 W. wire wound resistor
R-89	330 ohms carbon resistor
R-90	33,000 ohms 2 W. carbon resistor
R-91	1,000 ohms horizontal linearity control
R-92	220,000 ohms carbon resistor
R-93	39,000 ohms 1 W. carbon resistor
R-94	10 megohms carbon resistor
R-95	2.2 megohms carbon resistor
R-96	6,800 ohms carbon resistor
R-97	22,000 ohms 1 W. carbon resistor
R-98	10,000 ohms carbon resistor
R-99	700 ohms 7.4 W. wire wound resistor
R-100	400 ohms damping control
R-101	150 ohms 9 W. wire wound (See R-59)
R-102	100,000 ohms carbon resistor
R-103	100,000 ohms 1 W. carbon resistor
R-104	33,000 ohms 2 W. carbon resistor
R-105	470,000 ohms carbon resistor
R-106	270 ohms 2 W. carbon resistor
R-107	10,000 ohms carbon resistor
R-108	220 ohms carbon resistor
R-109	0.6 ohms carbon (2 in parallel-HM-226-7B only)
R-110	2.2 megohms carbon resistor
R-112	470,000 ohms carbon resistor
R-215	240 ohms 2 W. carbon resistor
R-216	47 ohms 1 W. insulated W.W. resistor
R-217	180 ohms 1 W. carbon resistor
T-1	Antenna transformer
T-2	1st audio I.F. transformer
T-3	2nd audio I.F. transformer
T-4	3rd audio I.F. transformer
T-5	Audio output transformer
T-6	2nd video I.F. transformer
T-7	3rd video I.F. transformer
T-8	4th video I.F. transformer
T-9	5th video I.F. transformer
T-10	Vertical oscillator transformer
T-11	1st video I.F. transformer
T-12	Horizontal output transformer
T-13	Low voltage power transformer
T-14	High voltage power transformer
T-15	Oscillator transformer
T-16	Vertical output transformer

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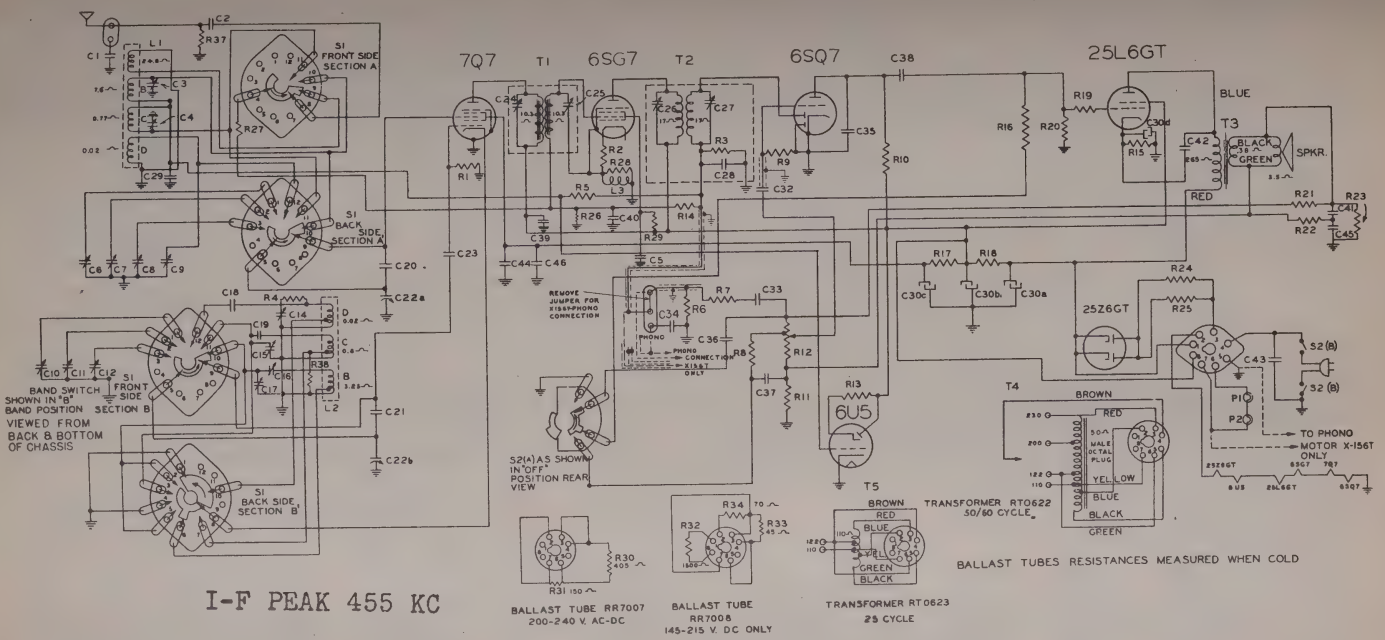

C-1	CAPACITOR—.01 mfd., 600-V paper	C-30d	CAPACITOR—20 mfd., 25-V dry electrolytic
C-2	CAPACITOR—.001 mfd., 600-V paper	C-32	CAPACITOR—.01 mfd., 600-V paper
C-3, 4	CAPACITOR—"B" and "C" antenna trimmer	C-33	CAPACITOR—.005 mfd., 600-V paper
C-5	CAPACITOR—.05 mfd. 600-V	C-34	CAPACITOR—.2 mfd., 400-V paper
C-6, 7, 8 & 9	TRIMMER—Antenna trimmer strip	C-35	CAPACITOR—220 mmf., mica
C-10, 11, 12, 14, 15, 16, 17	TRIMMER STRIP—Oscillator trimmer strip	C-36	CAPACITOR—.0015 mfd., 600-V paper
C-18	CAPACITOR—5600 mmf., mica	C-37	CAPACITOR—.002 mfd. 600 V paper
C-19	CAPACITOR—1800 mmf., mica	C-38, 39	CAPACITOR—.05 mfd. 600-V paper
C-20, 21	CAPACITOR—45 mmf., compensating capacitor	C-40	CAPACITOR—.05 mfd. 200-V paper
C-22a, 22b	CONDENSER—2-gang tuning condenser	C-41	CAPACITOR—.1 mfd. 200-V paper
C-23	CAPACITOR—40 mmf., compensating capacitor	C-42	CAPACITOR—.008 mfd. 1600-V paper
C-29	CAPACITOR—.05 mfd., 200-V paper	C-43	CAPACITOR—.02 mfd. 600 V.—AC
C-30a	CAPACITOR—40 mfd., 300-V dry electrolytic	C-44	CAPACITOR—.05 mfd., 600-V paper
C-30b	CAPACITOR—50 mfd., 250-V dry electrolytic	C-45	CAPACITOR—.05 mfd. 200-V paper
C-30c	CAPACITOR—20 mfd., 250-V dry electrolytic	C-46	CAPACITOR—470 mmf., mica
		R-1	RESISTOR—33,000 ohm, ½-W carbon
		R-2	RESISTOR—100 ohm, ½-W carbon
		R-3	RESISTOR—390,000 ohm, ½-W carbon
		R-4	RESISTOR—22 ohm, ½-W carbon
		R-5	RESISTOR—2.2 megohm, ½-W carbon
		R-6	RESISTOR—470,000 ohm, ½-W carbon
		R-7	RESISTOR—47,000 ohm, ½-W carbon
		R-8	RESISTOR—180,000 ohm, ½-W carbon
		R-9	RESISTOR—10 megohm, ½-W carbon
		R-10	RESISTOR—330,000 ohm, ½-W carbon
		R-11	RESISTOR—270 ohm, ½-W carbon
		R-12	VOL. CONTROL—2 meg. volume control
		R-13	RESISTOR—1 megohm, ½-W carbon
		R-14	RESISTOR—4.7 meg., ½-W carbon
		R-15	RESISTOR—180 ohm 1-W carbon
		R-16	RESISTOR—390,000 ohm, ½-W carbon
		R-17	RESISTOR—3900 ohm, 1-W carbon
		R-18	RESISTOR—3300 ohm, 2-W carbon
		R-19	RESISTOR—1000 ohm, ½-W carbon
		R-20	RESISTOR—470,000 ohm, ½-W carbon
		R-21	RESISTOR—8.2 megohm, ½-W carbon
		R-22	RESISTOR—220 ohm, ½-W carbon
		R-23	RESISTOR—1500 ohm, ½-W carbon
		R-24	RESISTOR—330 ohm, 2-W carbon
		R-25	RESISTOR—270 ohm, 2-W carbon
		R-26	RESISTOR—3.9 meg., ½-W carbon
		R-27	RESISTOR—1 megohm, ½-W carbon
		R-28	RESISTOR—100,000 ohm, ½-W carbon
		R-29	RESISTOR—22,000 ohm, ½-W carbon
		R-30, 31	RESISTOR—200–240 volt ballast
		R-32, 33, 34	RESISTOR—145–215-volt ballast
		R-37	RESISTOR—100,000 ohm, ½-W carbon
		R-38	RESISTOR—470 ohm, ½-W carbon
		S-1	SWITCH—Band change switch
		S2a, 2b	SWITCH—Tone control and power switch
		L-1	COIL—Antenna coil (all bands)
		L-2	COIL—Oscillator coil (all bands)
		L-3	COIL—IF neutralizing coil
		T-1	TRANSFORMER—1st I.F. transformer
		T-2	TRANSFORMER—2nd I.F. transformer
		T-3	TRANSFORMER—Output transformer
		T-4	TRANSFORMER—50/60 cycle power transformer (Model X-226)
		T-5	TRANSFORMER—25-cycle power transformer (Model X-226C)
			SPEAKER—6½" P.M. speaker

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MODEL X-226

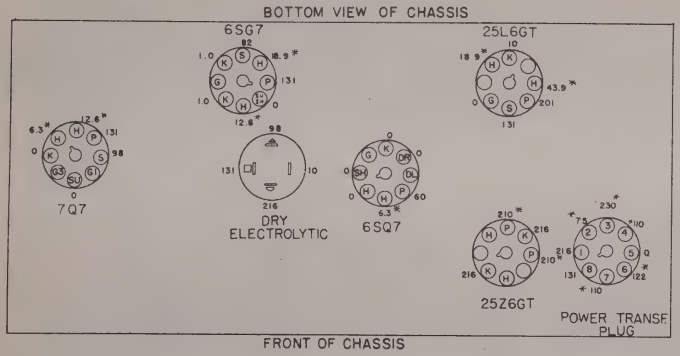
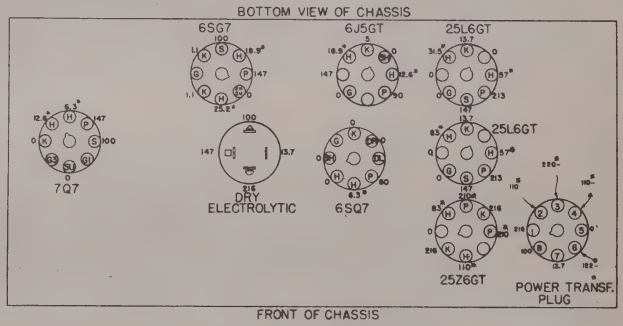


Fig. 3 Socket Voltages

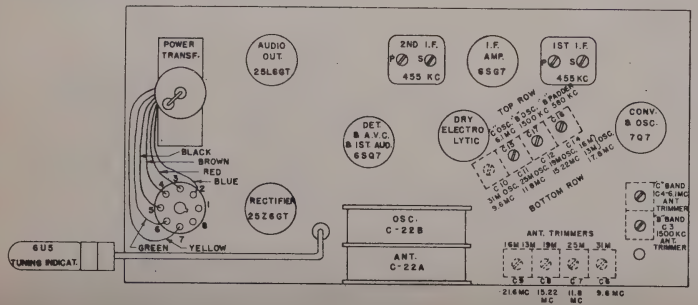
Variations of ±20% permissible. All measurements taken with R-26 shorted across.

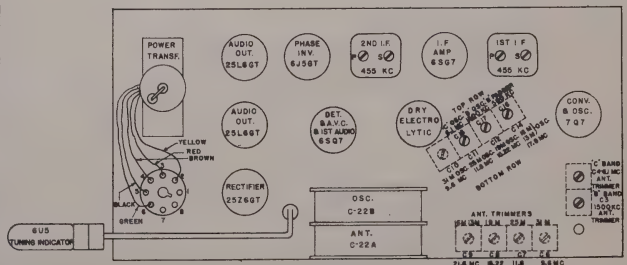
MODEL X-228

Variations of ±20% permissible. All measurements taken with R-26 shorted across.



VOLTAGES INDICATED BY ASTERISK (*) ARE AC VOLTAGES.
VOLTAGES READ WITH 1000 OHMS/VOLT METER
ON 250-VOLT SCALE





Alignment Procedure

The alignment procedure shown in table form is made either with the chassis in or removed from the cabinet.

If the chassis is removed from the cabinet to make the RF alignment, the dial which is fastened to the cabinet cannot be used for calibration reference. Use must be made, therefore, of the paper scale fastened on the rear of the dial reflector plate. With the gang condenser completely closed, one of the edges of the pointer rider should be lined up with the first marking to the right of the scale on the rear of the dial reflector plate. This can be accomplished by sliding the pointer on the cord until it does. The selected edge of the pointer rider may now serve as a pointer for the RF alignment. There are two 17.8 reference points on the paper scale on the rear of the dial reflector plate. The one towards the lower frequency end of the dial is the proper one to use for the 16-meter spread-band alignment; while the other is used for a reference point on the SW2 band.

The SW2 band does not require alignment. This band is taken care of when the 16-meter spread-band is aligned.

Spread-band Alignment

Since accuracy in frequency calibration is very essential for proper alignment of the spread-bands, it is impractical to use the standard test oscillator for this purpose unless a special calibration is first made.

The actual reception of short-wave stations of known frequency in the band to be checked is probably the most satisfactory method of determining the proper setting of the oscillator trimmers in these bands. The oscillator trimmer should be adjusted so that the station appears at the correct position on the dial. RF alignment can be made with the test oscillator.

The calibration of the test oscillator may be checked by zero beating the test oscillator with a short-wave station of known frequency. By taking several of these calibration points, it will afford a calibration of a high degree of accuracy in case you wish to use the test oscillator for alignment in these bands.

ALIGNMENT CHART

Step	Test Osc. Connected to	Test-osc. Setting	Band and Pointer Setting	Tune Trimmer for Max. Output
1	6SG7 I.F. grid in series with .05 mfd. cap.	455 KC	"BC" BAND 550 KC	C26 and C27
2	7Q7 CONV. grid in series with .05 mfd. cap	455 KC	"BC" BAND 550 KC	C24 and C25
3	ANT. POST in series with 200 mmf. and 400 ohms	580 KC	"BC" BAND 580 KC	C16**
4	ANT. POST in series with 200 mmf. and 400 ohms	1500 KC	"BC" BAND 1500 KC	C17 (osc.) C3 (ant.)
5	REPEAT STEP 3			
6	ANT. POST in series with 200 mmf. and 400 ohms	6.1 MC	"SW-1" BAND 6.1 MC	C15 (osc.) C4 (ant.)
7	ANT. POST in series with 200 mmf. and 400 ohms	17.8 MC	16 METER 17.8 MC	C14* (osc.)
8	ANT. POST in series with 200 mmf. and 400 ohms	21.6 MC	16 METER 21.6 MC	C9*** (ant.)
9	ANT. POST in series with 200 mmf. and 400 ohms	15.22 MC	19 METER 15.22 MC	C10* (osc.) C6*** (ant.)
10	ANT. POST in series with 200 mmf. and 400 ohms	11.8 MC	25 METER 11.8 MC	C11* (osc.) C7*** (ant.)
11	ANT. POST in series with 200 mmf. and 400 ohms	9.6 MC	31 METER 9.6 MC	C12* (osc.) C8*** (ant.)

*Use minimum capacity peak if two are obtainable.
**Rock gang condenser for optimum peak.
***Use maximum capacity peak if two are obtainable.

BAND CHANGE SWITCHING

The following charts show the switch points connected for any one position of the wave change switch. The numbers shown in each box indicate the switch points connected together in the section of the switch for each position of the switch. As for example: the numbers 5–9–10 indicate these switch points are all connected together for this particular position of the switch.

BAND SWITCH CONNECTIONS

Band in Use	Section "A" Front Side	Section "A" Back Side	Section "B" Front Side	Section "B" Back Side
BC	4–8–9	5–9–10	5–9–10	1–10 6–8
SW1	4–8–10	5–9–11	5–9–11	1–2–10 7–8
SW2	4–8–11	5–9–12	5–9–12	1–2–3 8–10
31 METER	8–11	9–12–1	9–12–1	1–2–3–4 8–10
25 METER	8–11	9–12–2	9–12–2	1–2–3–4–5 8–10
19 METER	8–11	9–12–3	9–12–3	2–3–4–5–6 8–10
16 and 13 METER	8–11	9–12	9–12	3–4–5–6–7 8–10

SPECIAL SERVICE INFORMATION

The following information will be very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

NOTE—Connection to converter grid must be made directly to tube grid and not to gang condenser on spread bands.

(1) Stage gains

(a) Antenna Post to Converter Grid, through 400 ohms and 200 mmfd. in series, at

Stand.	1000 KC	5.4	31 M	9.6 MC	1.8
SW1	4000 KC	3.7	25 M	11.8 MC	1.6
SW2	18000 KC	1.1	19 M	15.22 MC	1.4
			16–13 M	17.8 MC	1.0

(b) RF on Converter Grid to IF on 6SG7 grid at

Stand.	1000 KC	.61	31 M	9.6 MC	.65
SW1	4000 KC	.63	25 M	11.8 MC	.68
SW2	18000 KC	.71	19 M	15.22 MC	.71
			16–13 M	17.8 MC	.71

(c) IF on Converter Grid to IF on 6SG7 grid at 455 KC—85

(d) IF Grid to diode plate at 455 KC—160

(2) Voltage across the diode load to give ½-watt speaker output at 400 cycles—.046 V.

(3) DC voltage developed across oscillator and resistor (R1) at

Stand.	1000 KC	8.3 V.	31 M	4.4 V.
SW1	4000 KC	7.7 V.	25 M	4.8 V.
SW2	18000 KC	5.0 V.	19 M	4.4 V.
			16–13 M	3.7 V.

Loud-speaker

The voice coil is accurately and permanently centered at the factory and should seldom give trouble. In case a voice coil needs recentering, it will be necessary to replace the entire cone and voice coil assembly. In no case should you attempt to move the magnet in the assembly.

CONVERSION FOR SPECIAL LINE VOLTAGES

The Model X-226 can be converted for operation on the following line voltages. In all cases where the power transformer is replaced with a ballast resistor, the power transformer must be removed from the chassis as the radiant heat from the ballast resistor is likely to injure the transformer insulation. When operated with these special resistors and lower power supplies than 220 volts, the audio power output and socket voltages will be reduced.

220 Volts AC/DC—(Range 200-240 Volts)

Remove transformer from chassis of X-226, insert ballast tube resistor RR-7007, and change rating on label to read 220 volts AC/DC.

180 Volts DC—(Range 160-200 Volts)

Remove transformer from chassis of X-226, insert the ballast tube resistor RR-7008 and change rating on label so that it reads 180 volts DC.

PHONOGRAPH INSTALLATION

1. Remove the link from terminals 1 and 2, and replace it between terminals 2 and 3.
2. Connect the record player to terminals 1 and 3. If the record player does not have a high-impedance pickup a matching transformer may have to be used. It is very important that the high side pick-up lead has a shield to prevent hum interference. This shield should be connected to terminal No. 3 and the high side pick-up lead to terminal No. 1.

If, on operating the record player, external radio signals leak through, turn the tuning control to a position where no radio signals would be received. Complete silencing of the external radio signals can be obtained by grounding the antenna terminal while operating the record player.

If, in operating the record player, there is appreciable hum interference, reverse the record player phonomotor power cord plug in the power supply outlet.

MODEL X-228
CONVERSION FOR SPECIAL LINE VOLTAGES

The Model X-228 can be converted for operation on the following line voltages. In all cases where the power transformer is replaced with a ballast resistor, the power transformer must be removed from the chassis as the radiant heat from the ballast resistor is likely to injure the transformer insulation. When operated with these special resistors and lower power supplies than 220 volts, the audio power output and socket voltages will be reduced.

220 Volts AC/DC—(Range 200-240 Volts)

Remove transformer from chassis of X-228, insert ballast tube resistor RR-7003, and note change on label.

180 Volts DC—(Range 160-200 volts)

Remove transformer from chassis of X-228; insert the ballast tube resistor RR-7004 and change the label on the receiver.

NOTE—The 8200 ohm, 1-watt resistor (R-35) shown in dotted lines for the RR-7004 ballast tube schematic is not a part of the ballast tube. In order to increase the sensitivity and power output of this receiver when operating in this voltage range, this resistor may be installed externally across the terminals 1 and 8 of the ballast tube socket.

117 Volts DC—(Range 105-129 Volts)

Remove transformer from chassis of X-228; insert the ballast tube resistor RR-7005 and change the label on the receiver.

NOTE—The power output on this receiver can be raised if the resistors R-18, R-24 and X-25 are shorted across.

Two other transformers are available for AC operation. The transformer T5 can be substituted in the Model X-228 receiver for operation on 25-cycle circuits. Re-mark the label so that it reads Model X-228C. The special duty transformer T6 can be used in the Model X-228 receiver for operation on 50/60 cycle circuits where a 145-volt tap is required. Re-mark the label on the recever so that it reads Model X-228X.

The cold resistance of all ballast tubes is shown directly on the schematic diagram, Fig. 2.

PHONOGRAPH INSTALLATION

Connect the record player output leads to the terminals marked 1 and 2. The high side of the pickup is connected to terminal No. 1, while the low side or ground is connected to terminal No. 2. With some low-impedance type of pickups, a suitable matching transformer may have to be used. It is very important that the high side phono pickup lead be shielded to prevent hum interference. The shield should be connected to terminal No. 2.

If, in operating the record player, there is appreciable hum interference, reverse the motor power-cord plug in the power-supply outlet.

TONE CONTROL SWITCH CONNECTIONS

Position in Use	Section "C" Back Side	Section "C" Front Side
Radio-Brilliant	Open	3–7
Radio-Bass	1–12	3–7
Radio-Treble	4–6	3–7
Radio-Mellow	1–12 4–6	3–7
Phono-Brilliant	Open	7–11 2–3
Phono-Bass	1–12	7–11 2–3
Phono-Treble	4–6	7–11 2–3
Phono-Mellow	1–12 4–6	7–11 3–4

GENERAL ELECTRIC CO.
MODEL X-226
MODEL X-228
G.E. PAGE 14-43

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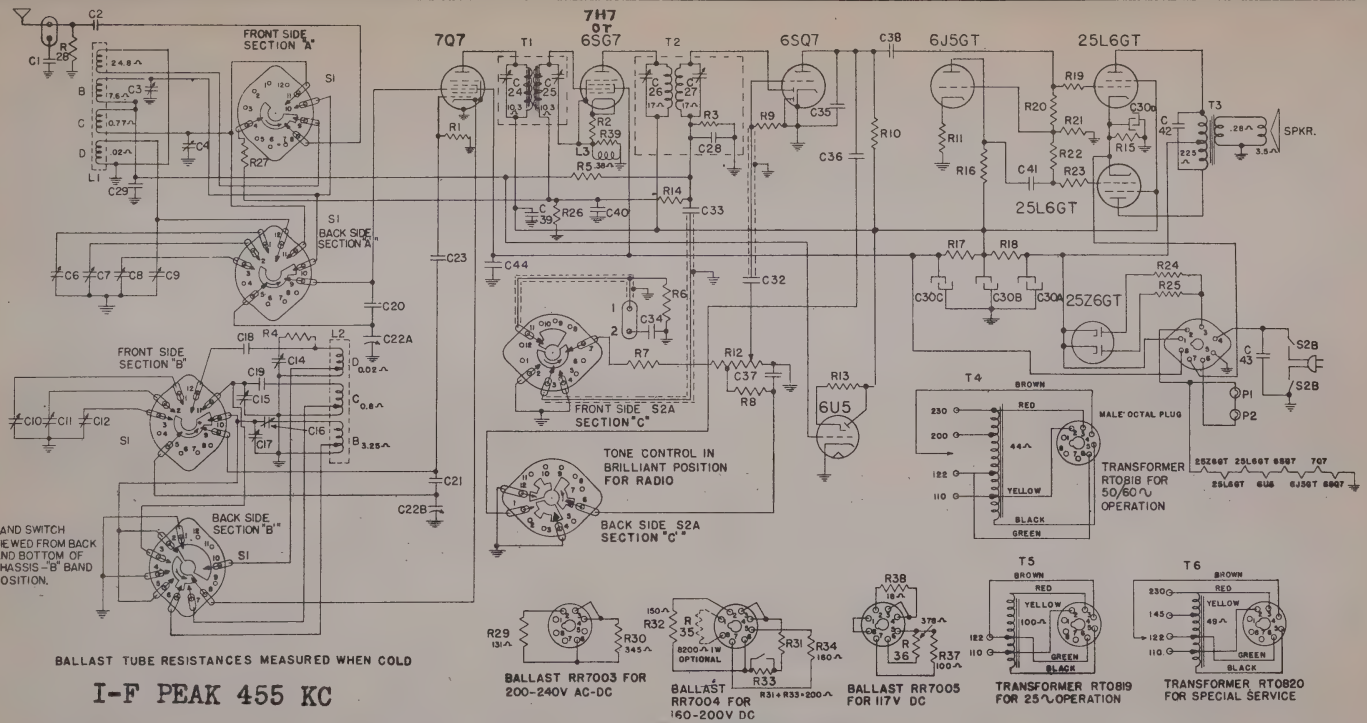


I-F PEAK 455 KC

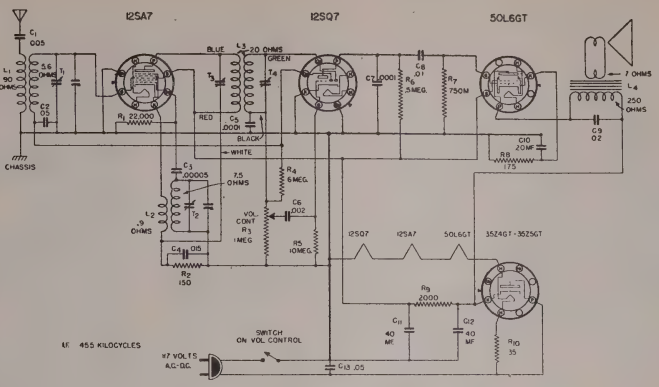
C1	CAPACITOR—.01 mfd., 600 v. paper.	C-33	CAPACITOR—.02 mfd, 600 v, paper.	R-11	RESISTOR—3300 ohm, ½ W., carbon	S-1	SWITCH—Band change switch.
C2	CAPACITOR—.001 mfd., 600 v, paper.	C-34	CAPACITOR—.2 mfd., 400 v, paper.	R-12	VOLUME CONTROL—2 meg. volume control.	S-2A, -2B	SWITCH—Tone control and power switch.
C3, 4	CAPACITOR—"B" and "C" Antenna trimmer.	C-35	CAPACITOR—220 mmf. mica			L-1	COIL—Antenna coil (all bands).
C6, 7, 8, 9	TRIMMER—Antenna trimmer strip	C-36	CAPACITOR—.004 mfd., 600 v, paper.	R-13	RESISTOR—1 megohm, ½ W., carbon	L-2	COIL—Oscillator coil (all bands).
C10, 11, 12, 14, 15, 16, 17	TRIMMER STRIP—Oscillator trimmer strip.	C-37	CAPACITOR—.005 mfd, 600 v, paper.	R-14	RESISTOR—4.7 meg., ½ W., carbon	L-3	COIL—I.F. neutralizing coil.
C-18	CAPACITOR—5600 mmf., mica	C-38	CAPACITOR—.03 mfd., 600 v, paper.	R-15	RESISTOR—220 ohm, 2 W., carbon	T-1	TRANSFORMER—1st IF transformer
C-19	CAPACITOR—1800 mmf., mica	C-39	CAPACITOR—.05 mfd., 600 v, paper.	R-16	RESISTOR—68,000 ohm, ½ W., carbon	T-2	TRANSFORMER—2nd IF transformer
C-20, 21	CAPACITOR—45 mmf., compensating capacitor	C-40	CAPACITOR—.05 mfd., 200 v, paper.	R-17	RESISTOR—3900 ohm, 1 W., carbon.	T-3	TRANSFORMER—Output transformer
C-22a, 22b	CONDENSER—2 gang tuning condenser.	C-41	CAPACITOR—.03 mfd., 600 v, paper.	R-18	RESISTOR—2700 ohm, 3 W., carbon	T-4	TRANSFORMER—50/60 cycle power transformer.
C-23	CAPACITOR—40 mmf., compensating capacitor	C-42	CAPACITOR—.01 mfd., 600 v, paper.	R-19	RESISTOR—1000 ohm, ½ W., carbon	T-5	TRANSFORMER—25-cycle power transformer.
C-29	CAPACITOR—.05 mfd., 200 v., paper.	C-43	CAPACITOR—.02 mfd., 600 v, AC.	R-20	RESISTOR—150,000 ohm, ½ W., carbon.	T-6	TRANSFORMER—50/60 cycle power transformer (special service).
C-30a	CAPACITOR—20 mfd., 250 v, dry electrolytic	C-44	CAPACITOR—.05 mfd., 600 v, paper.	R-21	RESISTOR—56,000 ohm, ½ W., carbon	SPKR	SPEAKER—10-inch PM dynamic.
C-30b	CAPACITOR—40 mfd., 250 v, dry electrolytic	R-1	RESISTOR—33,000 ohm, ½ W., carbon	R-22	RESISTOR—270,000 ohm, ½ W., carbon.		
C-30c	CAPACITOR—20 mfd., 250 v, dry electrolytic	R-2	RESISTOR—100 ohm, ½ W., carbon.	R-23	RESISTOR—1000 ohm, ½ W., carbon.		
C-30d	CAPACITOR—20 mfd., 25 v, dry electrolytic	R-3	RESISTOR—390,000 ohm, ½ W., carbon.	R-24, -25	RESISTOR—180 ohm, 2 W., carbon.		
C-32	CAPACITOR—.01 mfd., 600 v, paper	R-4	RESISTOR—22 ohm, ½ W., carbon.	R-26	RESISTOR—3.9 meg., ½ W., carbon.		
		R-5	RESISTOR—2.2 megohm, ½ W., carbon	R-27	RESISTOR—560,000 ohm, ½ W., carbon.		
		R-6	RESISTOR—470,000 ohm, ½ W., carbon	R-28, -29	RESISTOR—200-240 volt ballast.		
		R-7	RESISTOR—47,000 ohm, ½ W., carbon	R-31, -34	RESISTOR—160-200 volt ballast.		
		R-8	RESISTOR—82,000 ohm, ½ W., carbon	R-35	RESISTOR—8200 ohm, 1 W., carbon.		
		R-9	RESISTOR—10 megohm, ½ W., carbon	R-36, -38	RESISTOR—117 v. DC ballast.		
		R-10	RESISTOR—470,000 ohm, ½ W., carbon	R-39	RESISTOR—100,000 ohm, ½ W., carbon		

DIAL SCALE MECHANISM

CORD—Dial cord assembly (45 inches).
DRUM—Condenser drive drum assembly.
DIAL—Dial scale.
INDICATOR—Band change indicator.

MODEL LCP-401

GENERAL ELECTRIC CO



SERVICE NOTES

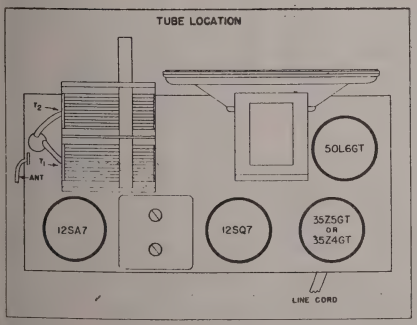
Intermediate Frequency	455 K.C.
Tuning Frequency Range	540-1720 K.C.
Audio, Power Output (Beam Power)	2 Watts
P. M. Speaker	Cone Diameter—3¾ inches
Voice Coil Impedance (400 cycles)	3.5 Ohms

OPERATING VOLTAGES (Approximately)

(Measured with respect to chassis at 117 Volt Line)

TUBES		SCREEN VOLTS*	PLATE VOLTS*
12SA7	Converter Oscillator	90	90
12SQ7	Detector—A.V.C.—1st Audio	—	45
50L6GT	Output	90	112
35Z5GT or 35Z4GT	Rectifier	Voltage at Anode 120	

*300 Volt Range of 1000 Ohm-per-Volt Meter



Alignment Frequencies:

I. F.	455 K.C.
R. F.	1500 K.C.

I. F. Alignment

Connect an output meter across the voice coil. Rotate the volume to maximum. Set test oscillator to 455 K.C. and apply signal through a .05 Mfd. capacitor to lug on stator of gang condenser to which antenna coil is connected. Align the I. F. transformer trimmers, going over twice. Keep test oscillator output as low as a readable meter reading will permit.

R. F. Alignment

Stretch out antenna hank to its full length. Set the dial pointer and generator at 1500 K.C. Run a wire from the output terminal of the generator, having it come near the antenna wire on the receiver. However, no metallic connection is made between the signal generator and the receiver.

Peak the oscillator trimmer for maximum output and then the antenna trimmer.

If the variable condenser plates have become bent or damaged, it may be necessary to adjust them for tracking, at 600 K.C. The oscillator plates are adjusted first, then the antenna plates are adjusted for maximum output at 600 K.C.

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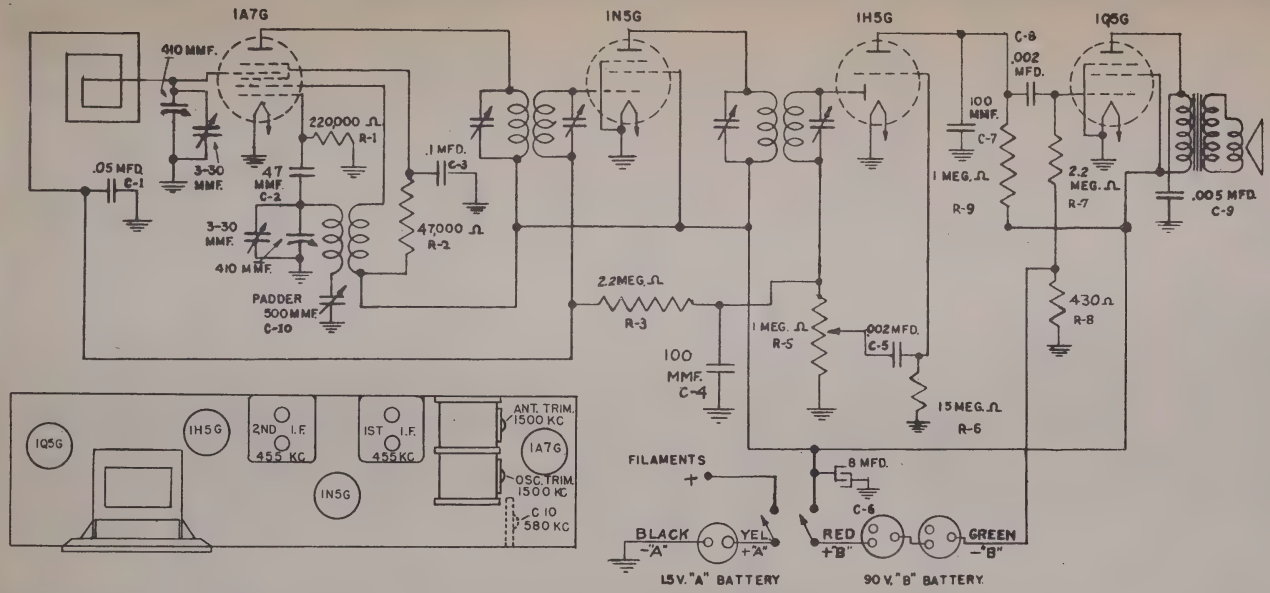


These receivers are designed to operate with new longer life batteries of the following types:

"A" battery - Eveready #745 or equivalent
"B" batteries - two Eveready Layerbilt #482 or equivalent

These batteries fit easily into the compartment provided with the "A" battery on the bottom and the two "B" batteries resting on the "A" battery. Insert the battery plugs firmly into their respective sockets.

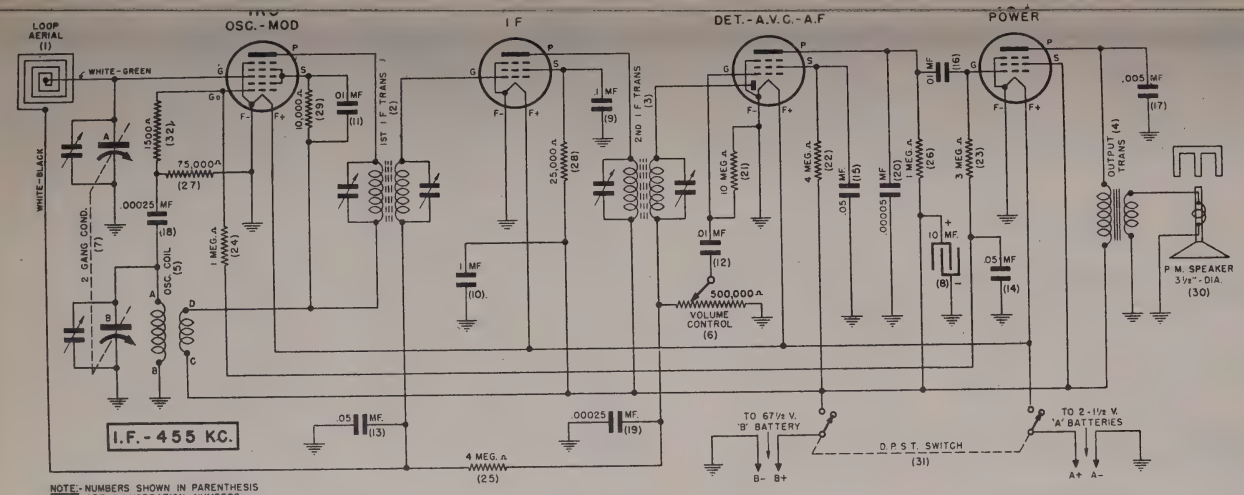
Battery supplies of the following types may be used when the recommended batteries are not available:

"A" supply - one, General 4-F-1 or Eveready #742 or equivalent
"B" supply - two, General V-30-AA or Eveready #738 or equivalent

Place the batteries in the compartment beneath the chassis. If separate battery supplies are used, place the "A" battery on the right side and the two "B" batteries in the remaining space. Insert the battery plugs firmly into their respective sockets.

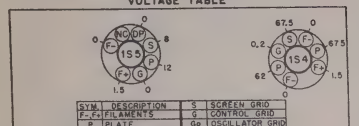
Alignment Frequencies...IF- 455 KC
Broadcast ....1500 KC and 580 KC

NOTE:- The chassis must be removed from the carrying case when aligning. Since the location of the back cover, loop, chassis and battery affect alignment considerably, the position of these components when aligning should duplicate that found in the carrying case. A non-metallic object should be used to hold the back cover-loop assembly in position during alignment.



NOTE:- NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

VOLTAGE TABLE



SYM.	DESCRIPTION	S	SCREEN GRID
F-F+	FILAMENTS	G	CONTROL GRID
P	PLATE	Go	OSCILLATOR GRID
DP	DIODE PLATE	NC	NO CONNECTION

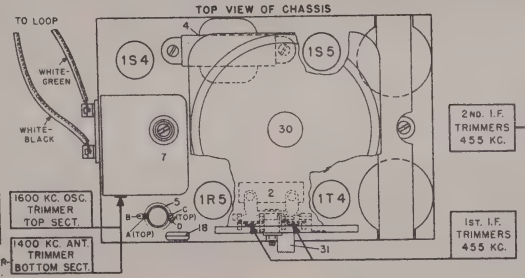
'A' BATTERY DRAIN- 2.5 MA. 'B' BATTERY DRAIN- 9.0 MA.

(BOTTOM VIEW OF CHASSIS)

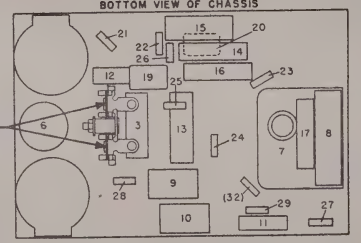
ABOVE VOLTAGES ARE MEASURED FROM SOCKET TERMINALS TO CHASSIS, DIAL AT 1000 KC. & NO SIGNAL.

PART NO.-227

TOP VIEW OF CHASSIS



BOTTOM VIEW OF CHASSIS



ALIGNMENT PROCEDURE

Alignment Frequencies I.F. .....455 K.C.
R.F. .....1600 & 1400 K.C.

I.F. Alignment

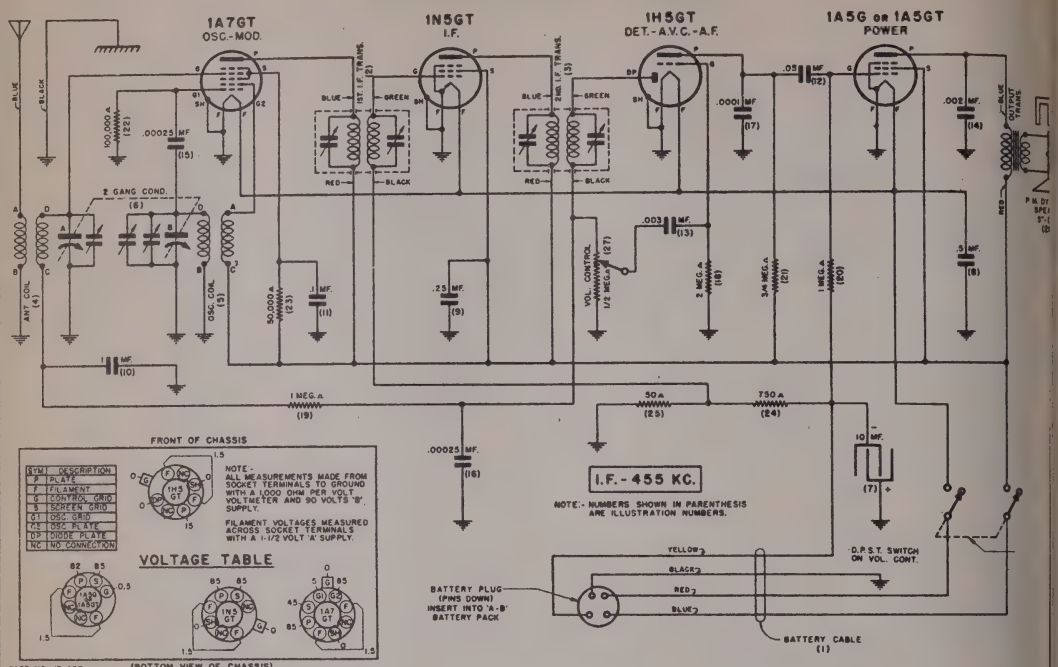
Connect an output meter across the voice coil. Rotate the volume to maximum. Set test oscillator to 455 K.C. and apply **signal to lug on stator** of gang condenser to which loop is connected through a .05 Mfd. capacitor. Align the second I.F. transformer trimmers, next adjust the first I.F. transformer trimmers. Keep test oscillator output as low as a readable meter reading will permit.

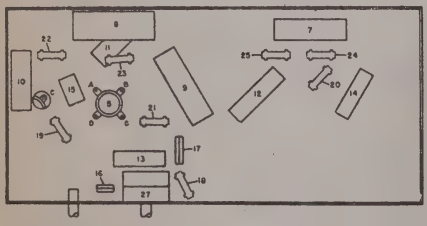
R.F. Alignment

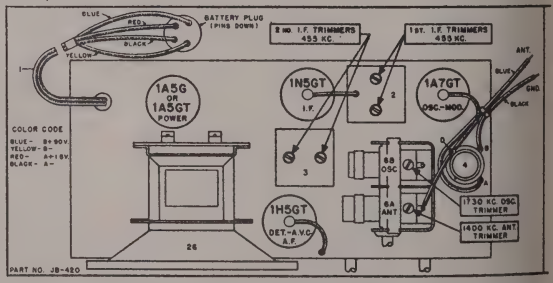
Couple test oscillator output to loop in case cover. Adjust test oscillator and receiver dial to exactly 1600 K.C. Peak 1600 K.C. oscillator trimmer for maximum output. Change test oscillator signal and receiver dial to approximately 1400 K.C. Then while rocking gang condenser trim 1400 K.C. antenna trimmer for maximum output.

MODEL JB-420

GENERAL ELECTRIC CO.


1A7GT
OSC.-MOD.
1N5GT
I.F.
1H5GT
DET.-A.V.C.-A.F.
1A5G or 1A5GT
POWER
2 GANG COND.
ANT. COIL
OSC. COIL
VOL. CONTROL
I.F. - 455 KC.
NOTE:- NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
D.P.S.T. SWITCH ON VOL. CONT.
BATTERY PLUG (PINS DOWN) INSERT INTO 'A-B' BATTERY PACK
BATTERY CABLE
FRONT OF CHASSIS
VOLTAGE TABLE
NOTE:- ALL MEASUREMENTS MADE FROM SOCKET TERMINALS TO GROUND WITH A 1,000 OHM PER VOLT VOLTMETER AND 90 VOLTS 'B' SUPPLY.
FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS WITH A 1-1/2 VOLT 'A' SUPPLY.
PART NO. JB-420
(BOTTOM VIEW OF CHASSIS)





SERVICE NOTES

Tuning Control Drive Ratio.....6:1
Battery Specifications.....Eveready No. 748 or equivalent
Intermediate Frequency.....455 K.C.
Tuning Frequency Range.....540-1730 K.C.
Maximum Power Output.....200 Milliwatts
Loud Speaker.....Cone Diameter—5 Inches
Voice Coil Impedance .....(400 Cycles) 5 Ohms

Tubes: Converter-Oscillator 1A7GT, I.F. 1N5GT, Detector A.V.C. 1H5GT, Power Output 1A5G.

ALIGNMENT PROCEDURE

Alignment Frequencies I.F. .....455 K.C.
R.F. .....1730 & 1400 K.C.

I.F. Alignment

Connect an output meter across the voice coil. Rotate the volume control to maximum. Set test oscillator to 455 kilocycles and apply signal to control grid of 1A7GT tube through a .05 Mfd. capacitor. Align the second I.F. transformer trimmers, next adjust the first I.F. transformer trimmers. Do not remove the grid leads from the tube when applying test oscillator signal—keep the test oscillator output as low as a readable meter reading will permit.

R.F. Alignment

Attach high side of test oscillator output to blue antenna receiver lead through a .00025 Mfd. condenser, and low side to black lead. Adjust test oscillator and receiver dial to exactly 1730 kilocycles. Peak 1730 kilocycle oscillator trimmer for maximum output. Change test oscillator signal and receiver dial to approximately 1400 kilocycles. Then while rocking gang condenser trim 1400 kilocycle antenna trimmer for maximum output.

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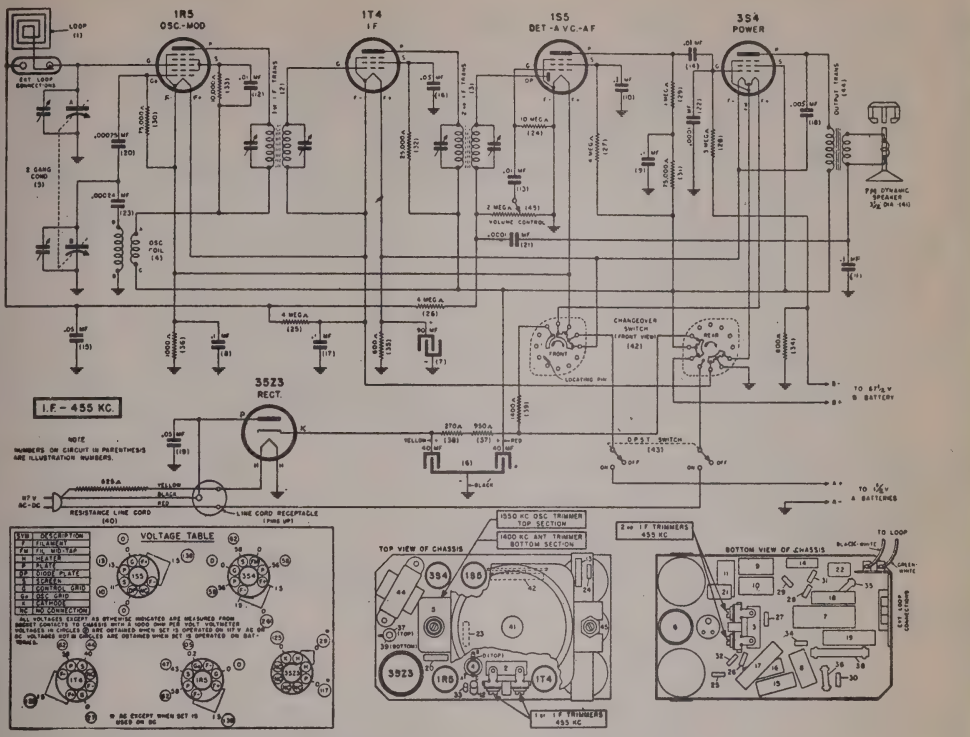
GENERAL ELECTRIC CO.

MODEL LB-502



SERVICE NOTES

Tuning Control Drive Ratio	6:1
Battery Specification	2-1½ Volt "A" Eveready No. 950 or Equivalent 1-67½ Volt "B" Eveready No. 647 or Equivalent
Intermediate Frequency	455 K.C.
Tuning Frequency Range	540-1550 K.C.
Maximum Power Output	Battery—120 Milliwatts AC-DC 150 Milliwatts
Loud Speaker	Cone Diameter—3 Inches
Voice Coil Impedance	(400 Cycles) 3.5 Ohms

ALIGNMENT PROCEDURE

Alignment Frequencies I.F. .....455 K.C.
R.F. .....1550 & 1400 K.C.

I.F. Alignment Connect an output meter across the voice coil. Rotate the volume to maximum. Set test oscillator to 455 K.C. and apply signal to lug on stator of gang condenser to which loop is connected through a .05 Mfd. capacitor. Align the second I.F. transformer trimmers, next adjust the first I.F. transformer trimmers. Keep test oscillator output as low as a readable meter reading will permit.

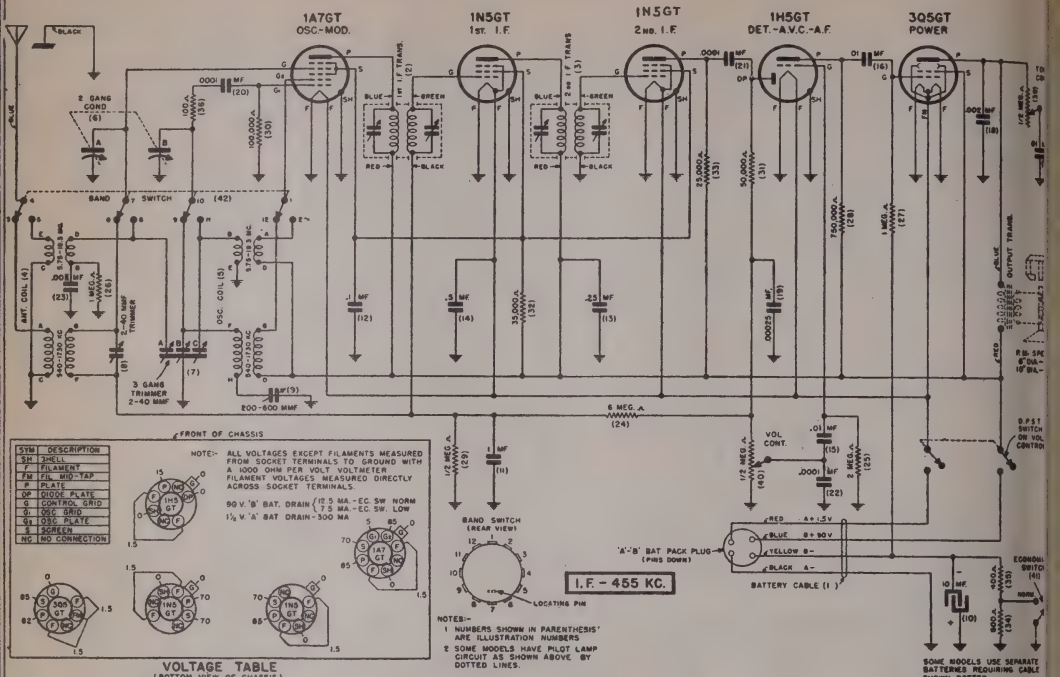
R.F. Alignment Couple test oscillator output to loop in case cover. Adjust test oscillator and receiver dial to exactly 1550 K.C. Peak 1550 K.C. oscillator trimmer for maximum output. Change test oscillator signal and receiver dial to approximately 1400 K.C. Then while rocking gang condenser trim 1400 K.C. antenna trimmer for maximum output.

NOTE:- Oscillator coil RL-2052EX and padder condenser RC-257EX replace part No. RL-2052E Oscillator coil and RC-257E mica .00024 Mfd. padder condenser which were used in first production. It is important to remember that the RL-2052E and RL-2052EX oscillator coils and the RC-257E .00024 Mfd. and RC-257EX .000275 Mfd. condensers cannot be interchanged. When RL-2052EX coil is used the .000275 Mfd. padder condenser RC-257EX must be used. With RL-2052E oscillator coil the .00024 Mfd. condenser RC-257E must be used.

Sets having part RL-2052EX oscillator coil and RC-257EX oscillator padder condenser can be identified by the letter "A" which will be found stamped on the back of the chassis.

MODELS JB-520, JB-525

GENERAL ELECTRIC CO.



SYM	DESCRIPTION
SH	SHELL
F	FILAMENT
FM	FIL. MID-TAP
P	PLATE
DP	DIODE PLATE
G	CONTROL GRID
G1	OSC. GRID
G2	1ST. PLATE
S	SCREEN
NC	NO CONNECTION

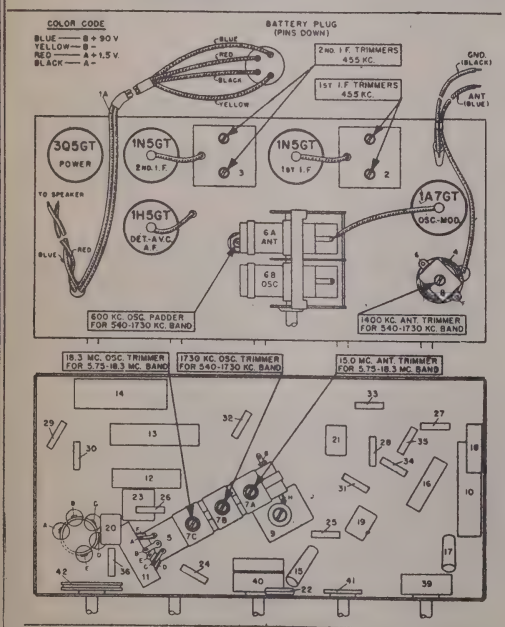
NOTE:- ALL VOLTAGES EXCEPT FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

90 V. 'B' BAT. DRAIN (12.5 MA.-EC. SW NORM, 7.5 MA.-EC. SW. LOW)

1½ V. 'A' BAT. DRAIN-300 MA.

NOTES:-
1 NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS
2 SOME MODELS HAVE PILOT LAMP CIRCUIT AS SHOWN ABOVE BY DOTTED LINES.

VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)


COLOR CODE
BLUE — B + 90 V
YELLOW — B —
RED — A + 1.5 V.
BLACK — A —
BATTERY PLUG (PINS DOWN)
2 NO. I.F. TRIMMERS 455 KC.
1ST I.F. TRIMMERS 455 KC.
GND. (BLACK)
ANT (BLUE)
3Q5GT POWER
1N5GT 2ND. I.F.
1N5GT 1ST I.F.
1A7GT OSC.-MOD.
1H5GT DET.-A.V.C.-A.F.
TO SPEAKER
6A ANT
6B OSC
600 KC. OSC. PADDER FOR 540-1730 KC. BAND
1400 KC. ANT. TRIMMER FOR 540-1730 KC. BAND
18.3 MC. OSC. TRIMMER FOR 5.75-18.3 MC. BAND
1730 KC. OSC. TRIMMER FOR 540-1730 KC. BAND
15.0 MC. ANT. TRIMMER FOR 5.75-18.3 MC. BAND

I.F. Alignment

Connect an output meter across the voice coil. Rotate the volume control to maximum. Set test oscillator to 455 kilocycles and apply signal to control grid of 1A7GT tube through a .05 Mfd. capacitor.

Tuning Control Drive Ratio	6:1
Battery Specifications	Eveready No. 748 or equivalent
Intermediate Frequency	455 K.C.
Tuning Frequency Range	540-1730 K.C. / 5.75-18.3 M.C.
Maximum Power Output	450 Milliwatts
Loud Speaker	Cone Dia. JB520—6 Inches
Loud Speaker	Cone Dia. JB525—10 Inches

ALIGNMENT PROCEDURE

Alignment Frequencies

I. F.	455 K.C.
R. F. 1730-540 K. C. Band	1730 & 1400 & 600 K.C.
R. F. 5.75-18.3 M. C. Band	18.3 & 15 M.C.

1730-540 K.C. Band R.F. Alignment

Attach high side of test oscillator output to blue antenna receiver lead through a .00025 Mfd. condenser and low side to black lead. Adjust test oscillator and receiver dial to exactly 1730 kilocycles. Peak 1730 kilocycle oscillator trimmer for maximum output. Change test oscillator signal and receiver dial to approximately 1400 kilocycles. Then while rocking gang condenser trim 1400 kilocycle antenna trimmer for maximum output.

Change test oscillator signal and receiver dial to 600 K.C. While rocking gang condenser trim 600 K.C. Osc. padder for maximum output.

5.75-18.3 M.C. Band R.F. Alignment

Change .00025 Mfd. condenser dummy load in series with blue antenna lead to 400 ohm carbon resistor.

Adjust test oscillator and receiver dial to exactly 18.3 M.C. Peak 18.3 M.C. oscillator trimmer for maximum output. Be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak —which is the proper one—is tuned in. Then while rocking gang condenser adjust 15 M.C. antenna trimmer for maximum output.

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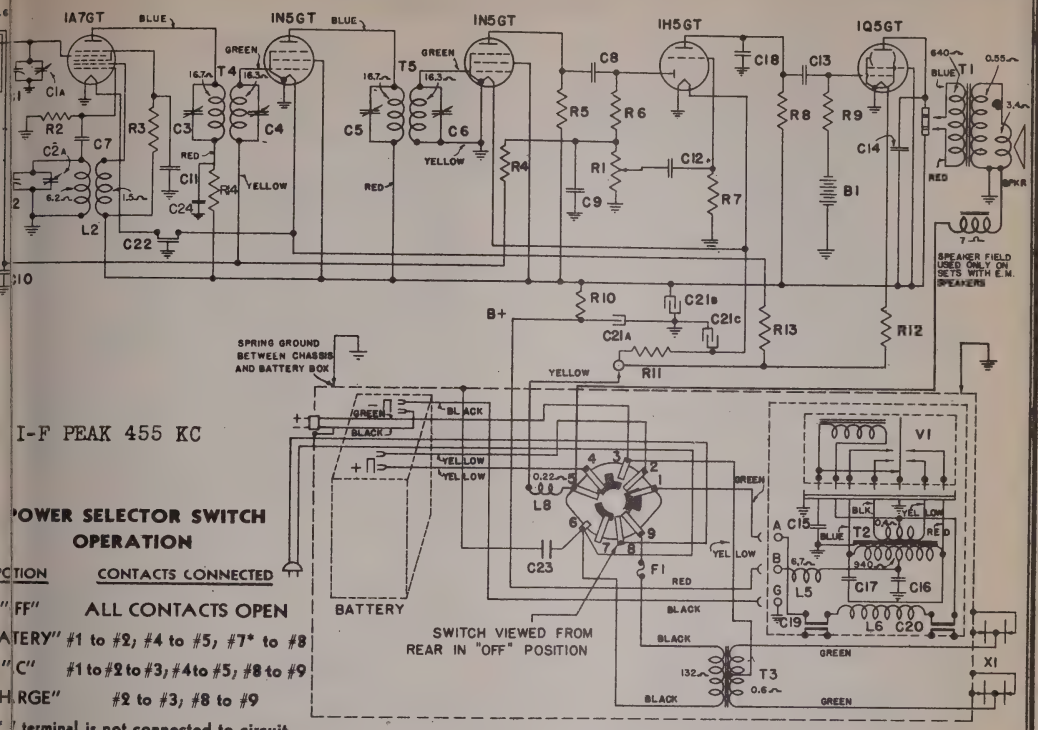
MODEL LB-530X



I-F PEAK 455 KC

POWER SELECTOR SWITCH OPERATION

CTION	CONTACTS CONNECTED
"FF"	ALL CONTACTS OPEN
ATERY"	#1 to #2; #4 to #5; #7* to #8
"C"	#1 to #2 to #3; #4 to #5; #8 to #9
H. RGE"	#2 to #3; #8 to #9

* terminal is not connected to circuit

Fig. 1. Schematic Diagram

REPLACEMENT PARTS LIST—MODEL LB-530X

Stock No.	Symbol	Description
*RC-7054	C-1, 2	CONDENSER—Tuning condenser and trimmers
*RC-216	C-7	CAPACITOR—47 mmf, mica
*RC-235	C-8, 9	CAPACITOR—100 mmf., mica
*RC-072	C-10	CAPACITOR—.05 Mfd., 200 V. paper
*RC-086	C-11	CAPACITOR—0.1 Mfd., 200 V. paper
*RC-023	C-12, 13	CAPACITOR—.005 Mfd., 600 V. paper
*RC-039	C-14	CAPACITOR—.01 Mfd., 600 V. paper
*RC-096	C-15	CAPACITOR—0.1 Mfd., 200 V. paper
*RC-072	C-16	CAPACITOR—.05 Mfd., 200 V. paper
*RC-027	C-17	CAPACITOR—.006 Mfd., 100 V. paper
*RC-235	C-18	CAPACITOR—100 mmf., mica
*RC-156A	C-19, 20	CAPACITOR—0.5 Mfd., 120 V.
*RC-5189	C-21A, 21B	CAPACITOR—15 Mfd., 150 V. dry electrolytic
	C-21C	CAPACITOR—1200 Mfd., 2 V. dry electrolytic
*RC-156A	C-22	CAPACITOR—0.5 Mfd., 120 V. paper
*RC-092	C-23	CAPACITOR—.05 Mfd., 600 V. paper
*RC-092	C-24	CAPACITOR—.05 Mfd., 600 V. paper
*RV-125	R-1	VOLUME CONTROL—0.5 megohm volume control
*RQ-1315	R-2	RESISTOR—220,000 ohm, ½ W. carbon
*RQ-1299	R-3	RESISTOR—47,000 ohm, ½ W. carbon
*RQ-1339	R-4	RESISTOR—2.2 megohm, ½ W. carbon
*RQ-1293	R-5	RESISTOR—27,000 ohm, ½ W. carbon
*RQ-1299	R-6	RESISTOR—47,000 ohm, ½ W. carbon
*RQ-1347	R-7	RESISTOR—4.7 megohm, ½ W. carbon
*RQ-1331	R-8	RESISTOR—1.0 megohm, ½ W. carbon
*RQ-1339	R-9	RESISTOR—2.2 megohm, ½ W. carbon

Stock No.	Symbol	Description
*RQ-1259	R-10	RESISTOR—1,000 ohm, ½ W. carbon
*RQ-1208	R-11, 12, 13	RESISTOR—8.2 ohm, ½ W. carbon
*RQ-1271	R-14	RESISTOR—3,300 ohm, ½ W. carbon
*RC-2056	B-1	CELL—5.0 V. bias cell assembly
*RL-5005	L-1	LOOP—Loop antenna and cover assembly
*RL-2055	L-2	COIL—Oscillator coil
*RL-367	L-5	CHOKE—B choke
*RL-366	L-6	CHOKE—Vibrator choke
*RL-365	L-8	CHOKE—Filament supply choke
*RS-3115	SW1	SWITCH—Power selector switch
*RT-4010	T-1	TRANSFORMER—Output transformer (Used with PM speaker only)
RT-4029	T-1	TRANSFORMER—Output transformer
*RT-0525	T-2	VIBRATOR—Vibrator power transformer
*RT-0528	T-3	TRANSFORMER—50–60 cycle rectifier step-down transformer
*RT-0527	T-3	TRANSFORMER—25 cycle rectifier step-down transformer (Available with PM speaker only)
*RT-393	T-4	TRANSFORMER—1st I.F. transformer
*RT-392	T-5	TRANSFORMER—2nd I.F. transformer
*RV-204	V-1	VIBRATOR—Power supply synchronous vibrator
*RR-802	X-1	RECTIFIER—Copper oxide rectifier disc
RS-1066	Spkr	SPEAKER—PM speaker
RS-1094	Spkr	SPEAKER—EM speaker

(CONT'D)

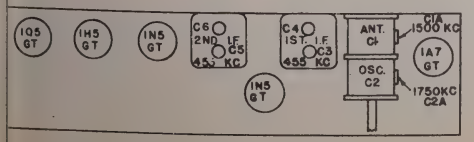
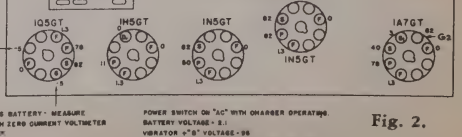


Fig. 3. Trimmer Location


1Q5GT
1H5GT
1N5GT
1N5GT
1A7GT
BIAS BATTERY - MEASURE WITH ZERO CURRENT VOLTMETER
POWER SWITCH ON "AC" WITH CHARGER OPERATING.
BATTERY VOLTAGE - 2.1
VIBRATOR "B" VOLTAGE - 95
DIAL AT 1000 KC., ZERO SIGNAL, ZERO VOLUME.
ALL MEASUREMENTS EXCEPT BIAS BATTERY AND FILAMENT MADE WITH 1000 OHMS PER VOLT VOLTMETER, 150 VOLT SCALE

Socket Voltages

Fig. 2.

MODEL LB-530X
MODELS L-540, L-541, L-542
L-543, L-542M,
L-543M, L-580

GENERAL ELECTRIC CO.

MODEL LB-530X

MISCELLANEOUS PARTS (CONT'D)

*RB-1032	BOARD—External loop terminal board
*RB-1035	BOARD—2-prong male connector for LM-1 charging cable
*RB-1040	BOARD—Terminal board (located on vibrator box)
*RB-1041	BOARD—Filament and speaker lead terminal board (on chassis)
*RC-863	CORD—Power cord
*RC-2016	CLIP—Osc. coil clip
*RC-2057	CLAMP—Bias cell clamp
*RC-8217	CORD—Pointer drive cord
*RC-9039	CONE—PM speaker cone
*RC-9051	CONE—EM speaker cone
*RD-198	DIAL—Dial scale
*RE-222	ESCUTCHEON—Selector switch escutcheon
*RG-016	GRID CAP—Control grid clip
*RG-436	GRILLE—Cabinet speaker grille
*RH-124	COTTER—Hairpin cotter
*RK-1039	KNOB—Selector switch knob
*RK-1040	KNOB—Volume or tuning control knob
*RP-1019	POINTER—Dial scale pointer
*RS-219	SOCKET—Vibrator socket
*RS-238	SOCKET—Octal base tube socket
*RS-463	SPRING—Drive cord tension spring
*RS-9033	SHAFT—Tuning shaft and cotter
*RT-941	TUBE—Vent tube
*RX-101	ASSEMBLY—Fuse container assembly

* Used on previous receivers.

ALIGNMENT PROCEDURE

I.F. Alignment

Connect an output meter across the voice coil. Turn volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to 1A7GT converter grid through .05 Mfd. capacitor and align progressively the trimmers in the 2nd and 1st I.F. transformer cans.

R.F. Alignment

With loop swung upright to its normal operating position, adjust the signal generator to 1750 KC and loosely couple a wire from the output terminal of the signal generator so that the receiver loop will pick up the signal. Set the gang condenser to minimum capacity and adjust the oscillator trimmer (C2A) to receive the signal. After this has been done, set the signal generator to 1500 KC and tune the receiver until this signal is tuned in. Adjust the R.F. trimmer (1A) for maximum output. In case of bent plates in the condenser, set the signal generator and the receiver to 600 KC and bend plates into the position for maximum output.

SPECIFICATIONS

Physical Dimensions

Height ..... 11¾ inches
Width ..... 13¼ inches
Depth ..... 4¾ inches
Weight (with battery) ..... 16 pounds

Electrical Rating

Charging from AC Line—PM Speaker
110–125 Volts AC—50–60 cycles—6 watts
110–125 Volts AC—25–60 cycles—10 watts

Charging from AC Line—EM Speaker
110–125 Volts AC—50–60 cycles—8 watts

Receiver Power Consumption
PM Speaker—2.1 Volts DC, 1.3 amperes—2.7 watts
EM Speaker—2.1 Volts DC, 1.6 amperes—3.4 watts

Receiver battery requirement:
Willard 2.0 volts No. 20-2 or equivalent rechargeable battery.

Charging from Storage Battery (using LM-1 Charging Cable):
6.3 Volts DC ..... 1.4 amperes
Fuse: GE No. 2548—¼-ampere rating.

Tuning Frequency Range ..... 550-1750 KC

Electrical Power Output

Maximum ..... 225 milliwatts

Loud-speaker—PM Dynamic—EM Dynamic

Cone Diameter ..... 5 inches
Voice Coil Impedance (400 cycles) ..... 3.5 ohms

Tubes

Converter-Oscillator	GE-1A7GT
1st I.F. Amplifier	GE-1N5GT
2nd I.F. Amplifier	GE-1N5GT
Detector & 1st Audio	GE-1H5GT
Power Output	GE-1Q5GT

GENERAL INFORMATION

For information regarding the rectifier and battery operation, refer to the Model LB-530 service note.

On receivers using an EM speaker an additional spliced wire runs to the speaker for the field supply. This spliced wire should be well taped at all times.

MODELS L-540, L-541, L-542, L-543, L-542M, L-543M, L-580

SPECIFICATIONS

Physical Dimensions

	Height	Width	Depth
L-540, L-541	7 5/16"	10 1/8"	6 3/16"
L-542, L-543, L-542M, L-543M	7 5/16"	10 3/8"	6 5/8"
L-580	7 5/16"	9 11/16"	6 3/16"

Tuning Control Drive Ratio 7:1

Electrical Specifications

Rating A-6..105-117 volts, 50-60 cycles or 105-117 volts D-C; 30 watts.
Rating C-2..105-117 volts, 25 cycles or 105-117 volts D-C; 30 watts.

Tuning Frequency Range ..... 550-1720 KC

Intermediate Frequency ..... 455 KC

Maximum Power Output ..... 1.5 watts

Loud-speaker—PM Dynamic

Outside cone diameter ..... 4 inches
Voice coil impedance (400 cycles) ..... 3.5 ohms

Tubes

Converter and oscillator	GE-12SA7 or GT
IF Amplifier	GE-12SK7 or GT
Detector, AVC, audio	GE-12SQ7 or GT
Power output	GE-50L6GT
Rectifier	GE-35Z5GT
Dial Lamp	MAZDA No. 47

GENERAL INFORMATION

All models are five-tube AC-DC superheterodyne receivers. The Models L-541, L-543, L-543M and L-580 are Underwriters' approval version of Models L-540, L-542 and L-542M.

Cabinet Description:

L-540	Non UL	Walnut wood
L-541	UL	Walnut wood
L-542	Non UL	Walnut wood
L-543	UL	Walnut wood
L-542M	Non UL	Maple wood
L-543M	UL	Maple wood
L-580	UL	Ivory Catalin with blue grille and handle.

ALIGNMENT PROCEDURE

Alignment Frequencies

IF ..... 455 KC
RF ..... 1500 KC
The location of all trimmers is shown in Fig. 1.

IF Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the converter grid through a .05 mfd. capacitor and align progressively the trimmers in the 2nd and 1st IF transformers.

RF Alignment

Close the gang condenser by rotating the tuning control. Slide the pointer along the cord until it lines up with the first dial marking on the left. Now rotate the tuning control until the pointer is over the 1500 KC dial mark. Apply a 1500 KC signal to the receiver by means of a standard loop antenna. Align the oscillator trimmer (C-7) to bring in the signal and peak the signal by adjusting the antenna trimmer (C-5) (See Fig. 1 for trimmer locations.)

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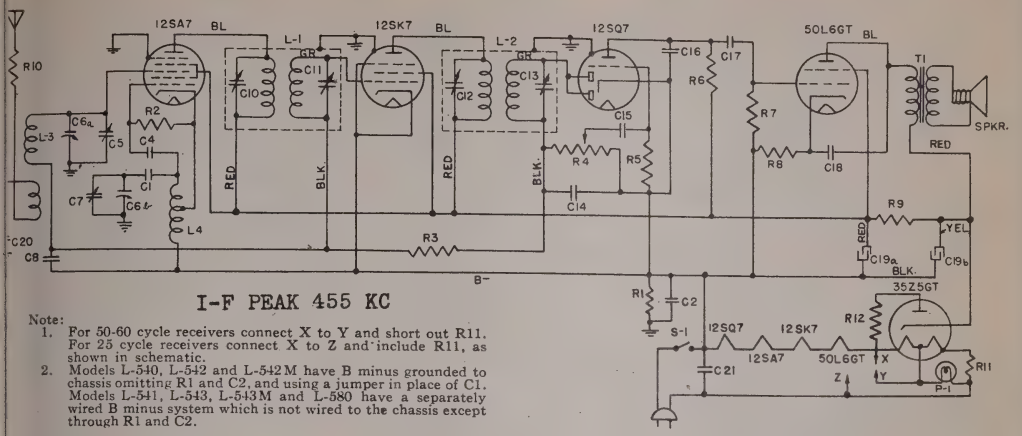
MODELS L-540, L-541, L-542, L-543, L-542M, L-543M, L-580



I-F PEAK 455 KC

Note:

1. For 50-60 cycle receivers connect X to Y and short out R11. For 25 cycle receivers connect X to Z and include R11, as shown in schematic.
2. Models L-540, L-542 and L-542M have B minus grounded to chassis omitting R1 and C2, and using a jumper in place of C1. Models L-541, L-543, L-543M and L-580 have a separately wired B minus system which is not wired to the chassis except through R1 and C2.

REPLACEMENT PARTS LIST

Models L-540, L-541, L-542, L-543, L-542-M, L-543-M, L-580

Stock Number	Symbol	Description
*RC-072	C-1	CAPACITOR—.05 mfd. 200-V paper
*RC-130	C-2	CAPACITOR—0.2 mfd. 400-V paper
*RC-235	C-4	CAPACITOR—100 mmf. mica
*RC-7039	C-6a, b	CONDENSER—Tuning condenser (Includes trimmers C-5, C-7)
*RC-072	C-8	CAPACITOR—.05 mfd. 200-V paper
*RC-274	C-14	CAPACITOR—330 mmf. mica
*RC-023	C-15	CAPACITOR—.005 mfd. 600-V paper
*RC-274	C-16	CAPACITOR—330 mmf. mica
*RC-039	C-17	CAPACITOR—.01 mfd. 600-V paper
*RC-048	C-18	CAPACITOR—.02 mfd. 600-V paper
*RC-5174	C-19a C-19b	CAPACITOR—20 mfd. 150-V dry electrolytic, 30 mfd. 150-V dry electrolytic
*RC-039	C-20	CAPACITOR—.01 mfd. 600-V paper
*RC-092	C-21	CAPACITOR—.05 mfd. 600-V paper
*RQ-1319	R-1	RESISTOR—330,000 ohms, ½-W carbon
*RQ-1291	R-2	RESISTOR—22,000 ohms, ½-W carbon
*RQ-1339	R-3	RESISTOR—2.2 megohms, ½-W carbon
*RV-108	R-4, S-1	VOL. CONTROL—0.5 megohm Volume Control and power switch
*RQ-1347	R-5	RESISTOR—4.7 megohms, ½-W carbon
*RQ-1317	R-6	RESISTOR—270,000 ohms, ½-W carbon
*RQ-1323	R-7	RESISTOR—470,000 ohms, ½-W carbon
*RQ-1239	R-8	RESISTOR—150 ohms, ½-W carbon
RQ-1461	R-9	RESISTOR—1500 ohms, 1-W carbon
*RQ-1255	R-10	RESISTOR—680 ohm, ½-W carbon
*RQ-1214	R-11	RESISTOR—13 ohm, ½-W carbon
*RQ-1365	R-12	RESISTOR—15 ohm, ½-W carbon
*RT-3015	L-1	TRANSFORMER—1st I.F. Transformer
*RT-376	L-2	TRANSFORMER—2nd I.F. Transformer
*RL-584	L-3	BEAM-A-SCOPE—Loop antenna assembly
*RL-2068	L-4	COIL—Oscillator coil
*RS-1059	SPKR	SPEAKER—4 in. PM Speaker with transformer
*RT-4004	T1	TRANSFORMER—Output speaker transformer

Stock Number	Description
	MISCELLANEOUS PARTS
*RB-023	BOARD—4-lug terminal board
*RB-971	BACK COVER—Cabinet back cover (Model L-580)
RB-982	BACK COVER—Cabinet back cover (Models L-540, L-541)
RB-983	BACK COVER—Cabinet back cover (Models L-542, L-543, L-542M, L-543M)
*RB-1128	BRACKET—Dial lamp bracket assembly
*RC-8154	CORD—Power cord
*RC-8196	CABLE—Tuning condenser drive cable (32 inches)
*RC-9015	CONE—4-inch Speaker cone assembly
*RD-770	DIAL—Dial scale
*RF-205	FASTENER—Back cover fastener (Model L-580)
RF-207	FASTENER—Back cover fasteners (Models L-540, L-541, L-542, L-543, L-542M, L-543M)
*RF-206	FASTENER—Window fasteners
*RH-124	HAIRPIN COTTER—Tuning shaft retaining cotter
*RH-806	HANDLE—Blue cabinet handle (Model L-580)
*RK-092	KNOB—Control knob (Models L-540, L-541, L-542, L-543, L-542M, L-543M)
RK-1071	KNOB—Control knob (Model L-580)
*RTN-001	NUT—Control mounting pal nut
*RP-1003	POINTER—Dial scale pointer
*RS-238	SOCKET—Octal tube socket
*RS-295	SOCKET—Dial lamp socket assembly
*RS-444	SPRING—Knob spring
*RS-463	SPRING—Drive cable tension spring
*RS-1821	SHIELD—50L6GT tube shield
*RS-9027	SHAFT—Drive shaft
*RW-053	WINDOW—Dial scale window
*RW-101	WASHER—Felt washer
RZ-294	CABINET—Ivory Catalin cabinet less back (Model L-580)

* Used on previous receivers.

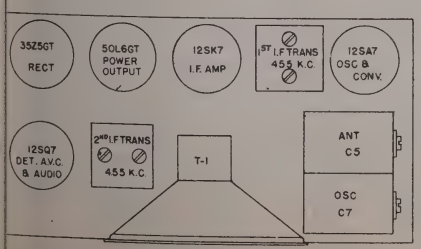


Fig. 1. Tube and Trimmer Location

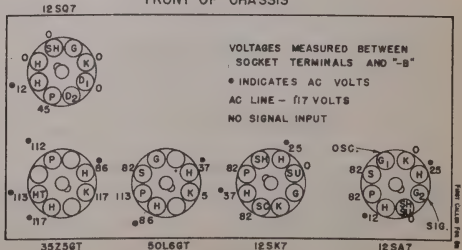
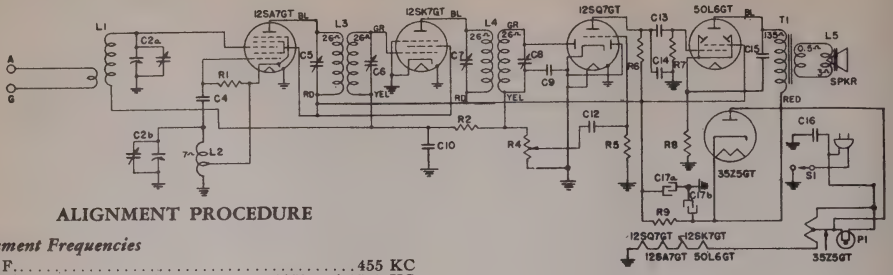


Fig. 2. Socket Voltages

MODEL JCP-562

GENERAL ELECTRIC CO.



ALIGNMENT PROCEDURE

Alignment Frequencies

I.F. ..... 455 KC
R.F. ..... 1650 and 1500 KC

The location of all trimmers is shown in Figure 1.

I.F. Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the converter grid of the 12SA7GT through a 0.05 mfd. capacitor and align progressively the trimmers in the 2nd and 1st I.F. transformer cans. Do not remove the grid lead from the 12SA7GT.

R.F. Alignment

To insert the R.F. signal use either a standard I.R.E. dummy between the signal generator and the receiver antenna post or a loop connected across the generator output which can be magnetically coupled to the receiver Beam-a-Scope. When using an I.R.E. dummy antenna for R.F. alignment, the ground lead from the signal generator to the receiver ground post should be omitted.

With the gang condenser wide open, align oscillator trimmer (C-2b) to 1650 KC. Change generator signal to 1500 KC, tune receiver to the signal and peak antenna trimmer (C-2a) for maximum output.

Precaution

If the signal generator is AC operated use an isolating transformer between the power supply and the radio receiver power input. The use of an isolating capacitor is not recommended as AC current through the capacitor will introduce hum modulation and/or create the possibility of a burned-out signal generator attenuator.

Special Service Information

The following information will be found very useful in servicing receivers if a vacuum tube voltmeter or similar voltage measuring instrument is available.

(1) Stage Gains — Gain

Antenna to 12SA7GT grid. . . 3 to 3.5 at 1000 KC‡
12SA7GT grid to 12SK7GT grid. . . . . 50 at 455 KC‡
12SK7GT grid to 12SQ7GT detector plate. . . . . 50 at 455 KC‡

Gains shown in the first two stages do not contain the conversion gain which amounts to 1.1 at 1000 KC.

(2) 0.15 volt, 400 cycle signal across the volume control will give ½ watt speaker output. (Volume control turned to maximum.)

(3) Average DC voltage developed across oscillator grid leak. . . . . 15 volts

‡ Variations of +10%, −20% permissible.

The glass tubes used in the I.F. amplifier and 2nd detector stages are interchangeable with metal tubes.

Tuning Control Drive Ratio 4.5:1

Tuning Frequency Range . . . . . 540–1600 KC

Intermediate Frequency . . . . . 455 KC

Electrical Power Output (117-line volts)

Undistorted . . . . . 1.3 watts
Maximum . . . . . 1.9 watts

Loud-speaker—"Alnico" Magnetic Dynamic

Outside Cone Diameter . . . . . 5 inches
Voice Coil Impedance (400 cycles) . . . . . 3.5 ohms

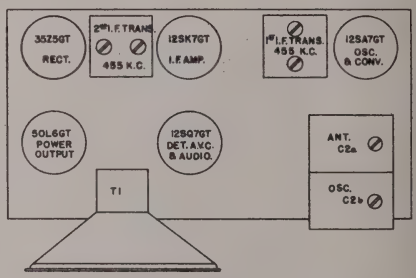


Fig. 1. Trimmer Location

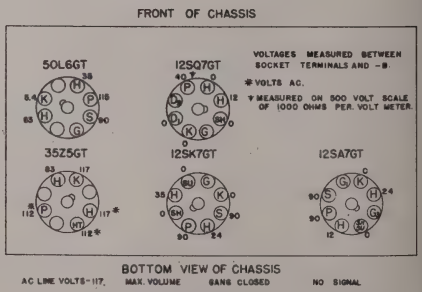


Fig. 3. Socket Voltages

Parts Description List

Sym.	Description	Sym.	Description	Sym.	Description
C-2a	Antenna Section Tuning Condenser	C-13	.005 mfd. paper capacitor	P-1	Dial lamp, MAZDA No. 47
C-2b	Oscillator Section Tuning Condenser	C-14	330 mmf. mica capacitor	R-1	33,000 ohms carbon resistor
C-4	47 mmf. mica capacitor	C-15	.01 mfd. paper capacitor	R-2	2.2 megohms carbon resistor
C-5	25–140 mmf. I.F. trimmer	C-16	.05 mfd. paper capacitor	R-4	0.5 megohm volume control
C-6	25–140 mmf. I.F. trimmer	C-17a	30 mfd. 150 V. dry electrolytic	R-5	4.7 megohms carbon resistor
C-7	25–140 mmf. I.F. trimmer	C-17b	40 mfd. 150 V. dry electrolytic	R-6	470,000 ohms carbon resistor
C-8	25–140 mmf. I.F. trimmer	L-1	Beam-a-Scope	R-7	470,000 ohms carbon resistor
C-9	470 mmf. mica capacitor	L-2	Oscillator coil	R-8	150 ohms carbon resistor
C-10	.05 mfd. paper capacitor	L-3	1st I.F. transformer	R-9	1200 ohms 1 W. carbon resistor
C-12	.03 mfd. paper capacitor	L-4	2nd I.F. transformer		

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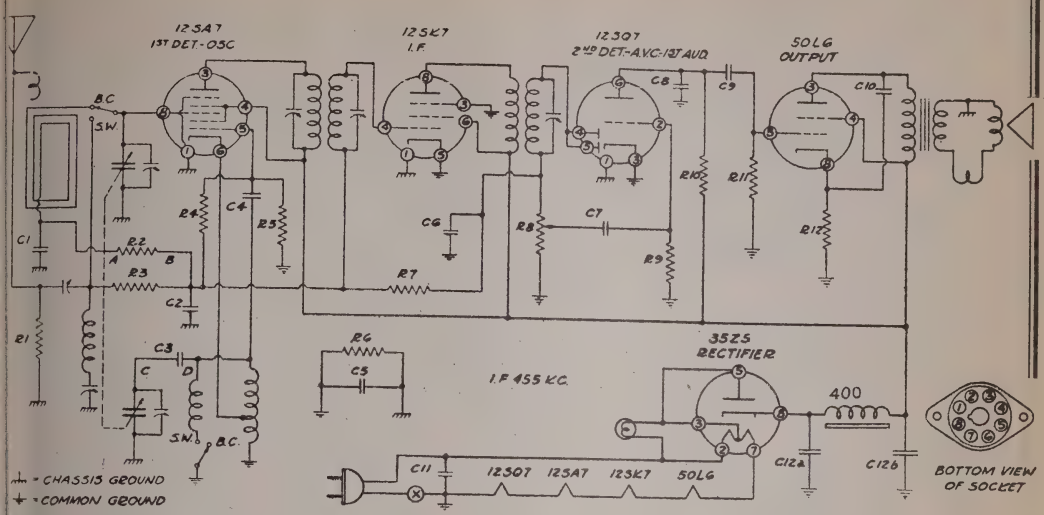
MODEL JCP-596



RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
1	250,000	1/4	R8	500,000	V.C.
3	250,000	1/4	R9	5,000,000	1/4
4	10,000,000	1/4	R10	250,000	1/4
5	25,000	1/4	R11	500,000	1/4
7	2,000,000	1/4	R12	150—10%	1/4

CONDENSERS

No.	Capacity (Mfd.)	Volts
C2	.05	200
C4	.0001	Mica
C6	.00025	Mica
C7	.005	400
C8	.0005	Mica
C9	.01	400
C10	.02	400
C11	.05	400
C12a	30. Elec.	150
C12b	20. Elec.	150

All common grounds become chassis grounds, C1, C3, C5, R2, and R6 are omitted.
Point "A" is connected to point "B" and point "C" to point "D."

SERVICE INFORMATION

ages—Line 117 Volts AC—Power Consumption 30 Watts.
ume Control maximum. Meter 1000 ohms per volt, 0 volt scale.

e (3) of 12SA7 tube to common ground	93 volts
en (4) of 12SA7 tube to common ground	95 volts
e (8) of 12SK7 tube to common ground	93 volts
en (6) of 12SK7 tube to common ground	95 volts
e (3) of 50L6 tube to common ground	90 volts
en (4) of 50L6 tube to common ground	95 volts
ode (8) of 50L6 tube to common ground	5.5 volts
ode (8) of 35Z5 tube to common ground	122 volts

ker—5" Dynamic.

d Resistance	400 ohms
e coil impedance at 400 cycles	4.0 ohms

llator and Short Wave Antenna Coil

king at the five terminal connection end in a clockwise tion starting at the mounting bracket, the connections No. 1, ground; No. 2, grid; No. 3, B.C. osc. tap; No. 4, ; No. 5, open. Looking at the other end in a clockwise tion starting at the mounting bracket, the connections No. 6, pad; No. 7, open; No. 8, switch; No. 9, ant.

1 and No. 2—Resistance	6.9 ohms
1 and No. 3—Resistance	.4 ohm
3 and No. 2—Resistance	6.5 ohms
6 and No. 9—Resistance	.3 ohm
8 and No. 2—Resistance	.3 ohm

I.F. Transformer

ary—Blue, plate; red, B+—Resistance 20.4 ohms.
ndary—White, grid; Black, AVC—Resistance 20.3 ohms.

nd I.F. Transformer

ary—Blue, plate; red B+—Resistance 22.2 ohms.
ndary—White, diode; black, AVC—Resistance 22.1 ohms.

ALIGNMENT PROCEDURE

General Data

The alignment of this receiver requires the use of a signal generator that will cover the frequencies of 455, 600, 1400, 1630, 3000 and 6000 K.C., and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the signal generator output as low as possible, to prevent the AVC from operating and giving false readings.

I.F. Alignment

Adjust the signal generator to 455 K.C. and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. Connect ground of signal generator to chassis ground through a .1 mfd. condenser. Align all I.F. trimmers to peak or maximum reading on the output meter.

Broadcast Band Alignment

Adjust the signal generator to 1630 K.C. and connect the output to the antenna lead, through a .0002 mfd. mica condenser. Set the gang condenser to minimum capacity and adjust the oscillator trimmer to receive this signal. After this has been carefully done, the next step is to set the signal generator to 1400 K.C. and after tuning in the signal adjust the B.C. antenna trimmer to peak. In case of bent plates, set the signal generator and the receiver to 600 K.C. and bend the plates into the position for maximum output.

Short Wave Band Alignment

Set the signal generator to 6000 K.C., tune the signal and adjust the short wave antenna trimmer to give maximum output. Set the signal generator to 3000 K.C., tune the signal and then slowly increase or decrease the short wave antenna padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter.

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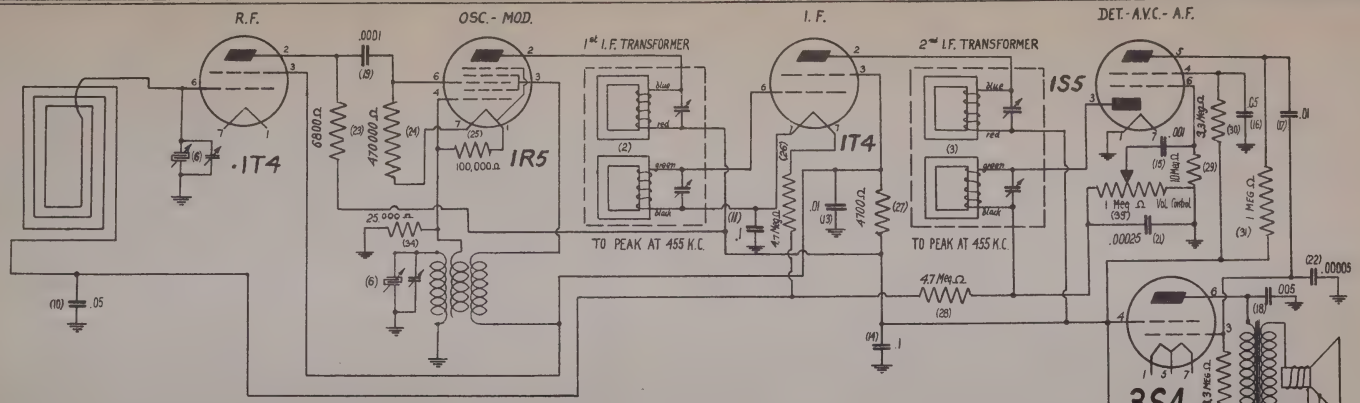


Service Notes

Intermediate Frequency.....455 K.C.
Tuning Frequency Range.....540-1700 K.C.
Maximum Power Output.....150 Milliwatts
Loud Speaker.....Cone Diameter - 3 inches
Voice Coil Impedence.....(400 cycles) 3 ohms
Tubes: R.F. 1T4, Converter - Oscillator 1R5, I.F. 1T4, Detector, A.V.C. 1S5, Power Output 3S4, Rectifier 4523

ALIGNMENT PROCEDURE

Alignment Frequencies	R. F.	1500- 1700 K.C.
	I. F.	455 K.C.

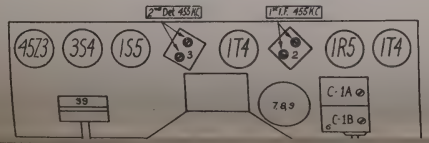
I. F. Alignment

Connect an output meter across the voice coil. Rotate the volume control to maximum. Set test oscillator to 455 kilocycles and apply signal to control grid of 1T4 R.F. tube through a .05 mfd. capacitor. Align the second I.F. transformer trimmers, next adjust the first I.F. trimmers. Keep the test output to a level that will give a good meter reading.

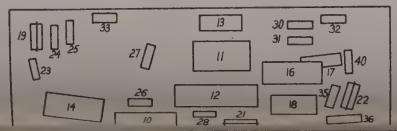
R.F. Alignment

Place a one turn coupling not closer than six inches from the receiver Beam-a-Scope which is located in the front cover. Apply a 1700 kilocycles signal to the coupling loop. Adjust the receiver to 1700 kilocycles by turning the variable condenser until it is in the extreme clockwise position. Align the oscillator trimmer (C-1A). Set the signal generator to 1500 kilocycles. Turn the receiver tuning condenser until the generator signal is picked up. Peak (C-1B) for maximum output.

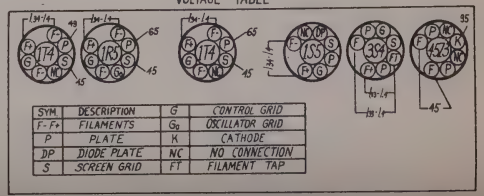
The Beam-a-Scope leads should be dressed the same after the components are mounted in the cabinet as during alignment.



BOTTOM VIEW OF CHASSIS
PARTS 15, 20, 29, 34, 37 LOCATED ON TOP OF CHASSIS



VOLTAGE TABLE



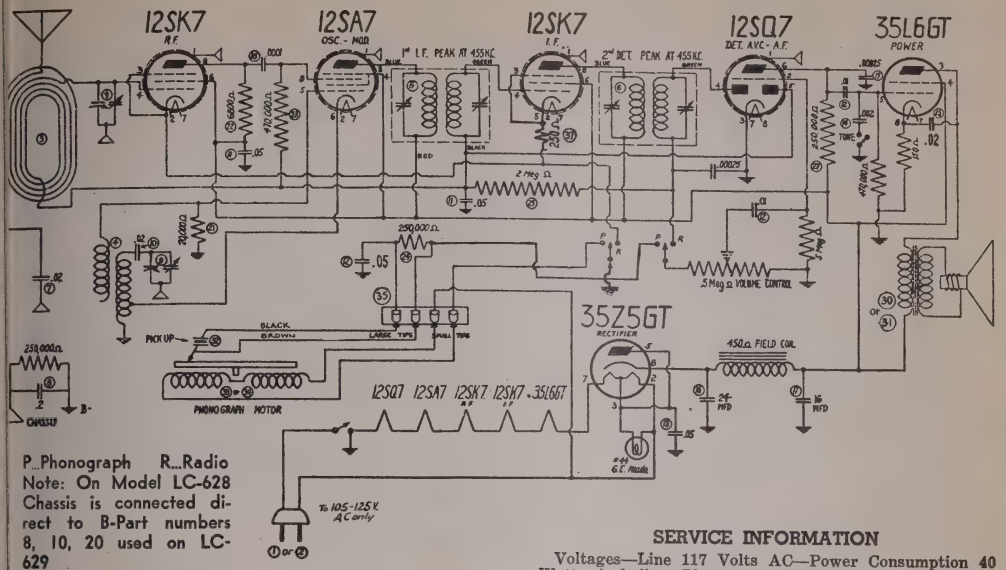
SYM.	DESCRIPTION	G	CONTROL GRID
F-F+	FILAMENTS	G_0	OSCILLATOR GRID
P	PLATE	K	CATHODE
DP	DIODE PLATE	NC	NO CONNECTION
S	SCREEN GRID	FT	FILAMENT TAP

BOTTOM VIEW OF CHASSIS

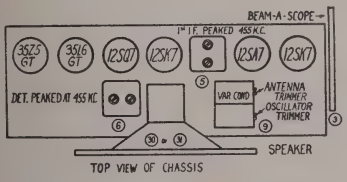
ALL FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS. OTHER VOLTAGES MEASURED FROM SOCKET TERMINAL TO GROUND WITH A 1000Ω PER VOLT VOLTMETER.

GENERAL ELECTRIC CO.

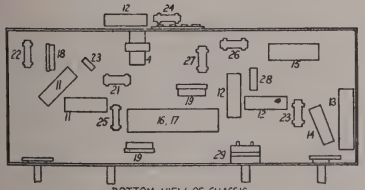
MODELS LC-628, LC-629
LC-638



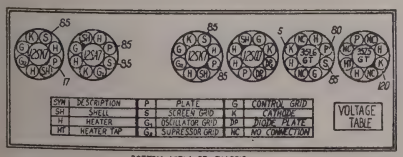
P...Phonograph R...Radio
Note: On Model LC-628 Chassis is connected direct to B-Part numbers 8, 10, 20 used on LC-629



TOP VIEW OF CHASSIS



BOTTOM VIEW OF CHASSIS



BOTTOM VIEW OF CHASSIS
ALL ABOVE VOLTAGES MEASURED FROM SOCKET TERMINAL TO CHASSIS WITH A 1000 Ω. PER VOLT VOLTMETER

SERVICE INFORMATION

Voltages—Line 117 Volts AC—Power Consumption 40 Watts including Phonograph Motor. Volume Control maximum. Meter 1000 ohms per volt, 250 volt scale.

Plate (8) of 12SK7 R. F. tube to common ground	17 volts
Screen (6) of 12SK7 R. F. tube to common ground	85 volts
Plate (3) of 12SA7 tube to common ground	85 volts
Screen (4) of 12SA7 tube to common ground	85 volts
Plate (8) of 12SK7 I. F. tube to common ground	85 volts
Screen (6) of 12SK7 I. F. tube to common ground	85 volts
Plate (3) of 35L6GT tube to common ground	80 volts
Screen (4) 35L6GT tube to common ground	85 volts
Cathode (8) of 35L6GT tube to common ground	5.0 volts
Cathode (8) of 35Z5GT tube to common ground	120 volts
Heater (2) and (7) of 12SA7 tube	12.4 volts AC
Heater (2) and (7) of 12SK7 R. F. tube	12.4 volts AC
Heater (2) and (7) of 12SK7 I. F. tube	12.4 volts AC
Heater (8) and (7) of 12SQ7 tube	12.4 volts AC
Heater (2) and (7) of 35L6GT tube	35.0 volts AC
Heater (2) and (7) of 35Z5GT tube	35.0 volts AC

SERVICE NOTES

Tuning Control Drive Radio	12:1
Power Consumption (with phono)	40 watts
Intermediate Frequency	455 K.C.
Tuning Frequency Range	540-1700 K.C.
Maximum Power Output	0.9 watts
Loud Speaker	Cone Diameter—5 inches
Voice Coil Impedance	(at 400 cycles) 3 ohms

Tubes: R. F. amplifier 12SK7 Converter—Oscillator 12SA7, I. F. 12SK7, Detector, A. V. C. 12SQ7, Power Output 35L6GT, Rectifier 35Z5GT.

ALIGNMENT PROCEDURE

Alignment Frequencies I. F. .....455 K. C.
R. F. .....1700 & 1400 K. C.

I. F. Alignment

Connect an output meter across the voice coil. Rotate the volume control to maximum. Set test oscillator to 455 kilocycles and apply signal to control grid of 12SK7 R. F. through a .05 mfd. capacitor. Align the second I. F. transformer trimmers, next adjust the first I. F. transformer trimmers. Keep the test oscillator output to a level that will give a good meter reading.

R. F. Alignment

Attach high side of test oscillator to flexible lead extending from rear of chassis through a .00025 mfd. condenser. Connect the low side to the receiver chassis. Adjust the test oscillator and receiver to 1700 kilocycles. Peak 1700 kilocycles oscillator trimmer for maximum output. Change test oscillator signal and receiver dial to approximately 1400 kilocycles. Then while rocking gang condenser, trim 1400 kilocycles antenna trimmer for maximum output.

MODELS L-631, L-642, L-674

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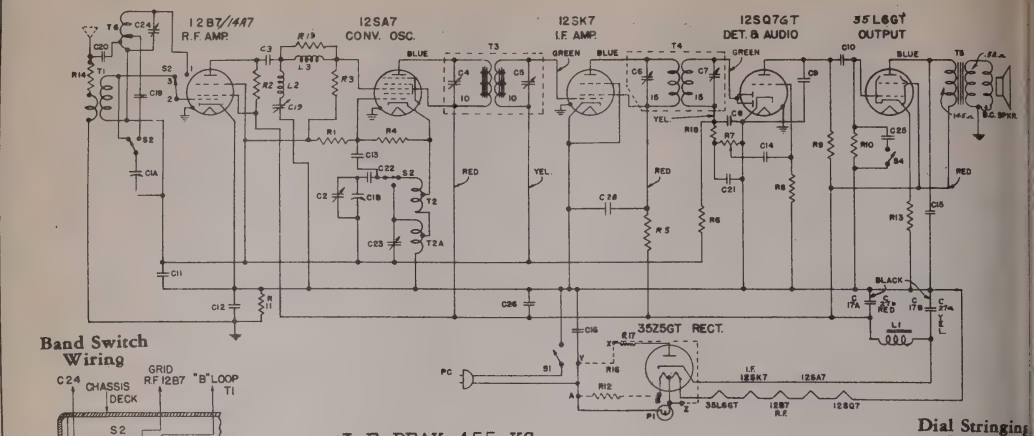
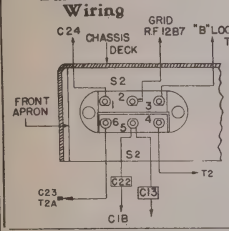
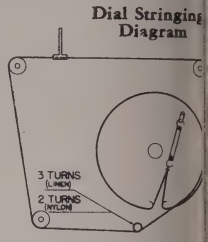




I-F PEAK 455 KC

NOTE:
On 40–60 cycle receivers, omit R12 and connect A to B and X to Z.
On 25-cycle receivers, add R12 and connect X to Y.

Fig. 3. Schematic Diagram



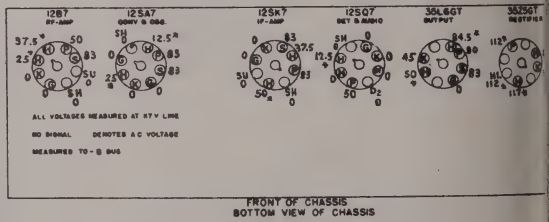


Fig. 2. Socket Voltages

Stock No.	Symbol	Description
RC-7067	C1a, 1b	CONDENSER—Tuning condenser
RT-892	C2, 24	TRIMMER—"B" band oscillator and "D" band ant. trimmers
*RC-235	C3	CAPACITOR—100 mmf., mica
*RC-274	C8	CAPACITOR—330 mmf., mica
*RC-242	C9	CAPACITOR—150 mmf., mica
*RC-039	C10, 15, 26, C28	CAPACITOR—.01 mfd., 600-V paper
*RC-092	C11, 16	CAPACITOR—.05 mfd., 600-V paper
*RC-104	C12	CAPACITOR—.1 mfd., 600-V paper
*RC-216	C13	CAPACITOR—47 mmf., mica
*RC-023	C14	CAPACITOR—.005 mfd., 600-V paper
RC-5206	C17a, C17b	CAPACITOR—30 mfd., 30 mfd. 150-V electrolytic
*RC-259	C18	CAPACITOR—250 mmf., mica
RC-6569	C19	CAPACITOR—Wave trap trimmer
*RC-209	C20	CAPACITOR—39 mmf., mica
*RC-235	C21	CAPACITOR—100 mmf., mica
*RC-048	C22	CAPACITOR—.02 mfd., 600-V paper
RC-6560	C23	CAPACITOR—"D" Band oscillator trimmer
*RC-053	C25	CAPACITOR—.0032 mfd., 600-V paper
*RC-5183	C27a, C27b	CAPACITOR—60 mfd., 50 mfd., 150-V Electrolytic (25-cycle only)
*RQ-1365	R1	RESISTOR—15 megohm, ½-W carbon
*RQ-1275	R2	RESISTOR—4700 ohm, ½-W carbon
*RQ-1299	R3, 18	RESISTOR—47,000 ohm, ½-W carbon
*RQ-1295	R4	RESISTOR—33,000 ohm, ½-W carbon
*RQ-1251	R5	RESISTOR—470 ohm, ½-W carbon
*RQ-1339	R6	RESISTOR—2.2 megohm, ½-W carbon
*RV-120	R7, S1	VOL. CONTROL—0.5 megohm with power switch (Model L-674)
*RV-131	R7, S1	VOL. CONTROL—0.5 megohm with power switch (Models L-631, L-642)
*RQ-1349	R8	RESISTOR—5.6 megohm, ½-W carbon
*RQ-1315	R9	RESISTOR—220,000 ohm, ½-W carbon
*RQ-1323	R10, 11	RESISTOR—470,000 ohm, ½-W carbon
*RQ-1213	R12	RESISTOR—12 ohm, ½-W carbon
*RQ-1237	R13	RESISTOR—120 ohm, ½-W carbon
*RQ-1255	R14	RESISTOR—680 ohm, ½-W carbon
*RQ-1215	R17	RESISTOR—15 ohm, ½-W carbon
*RQ-1307	R19	RESISTOR—100,000 ohm, ½-W carbon
* RL-608	L2	COIL—Wave trap coil
RL-177	L3	COIL—Choke coil
RL-5000	T1	LOOP—"B" band loop and cabinet back assembly
RL-2077	T2	COIL—"B" band oscillator coil
RL-2078	T2A	COIL—"D" band oscillator coil
*RT-385	T3	TRANSFORMER—1st IF transformer
RT-3022	T4	TRANSFORMER—2nd IF transformer
RT-4026	T5	TRANSFORMER—Output transformer
RL-5002	T6	LOOP—"SW" band loop antenna (Model L-674)
RL-5003	T6	LOOP—"SW" band loop antenna (Models L-631, 642)
RS-1090	SPKR	SPEAKER—Electro-dynamic speaker (450 ohm field)
RS-3151	S2	SWITCH—Band change switch
*RS-3108	S4	SWITCH—Tone control switch

* Used on previous receivers.

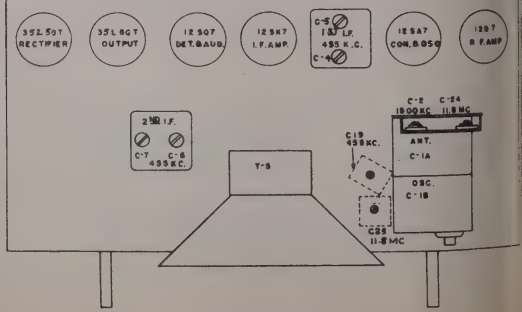


Fig. 1. Trimmer Location

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Models L-631, L-642 and L-674

Intermediate Frequency ..... 455 KC

Electrical Power Output
Undistorted ..... 0.6 watts
Maximum ..... 1.3 watts

Loud-speaker Electro-dynamic
Outside cone diameter ..... 5 inches
Voice coil impedance ..... 3.5 ohms
Field coil resistance ..... 450 ohms

Tubes
RF Amplifier G.E.–12B7/14A7
Converter, Oscillator G.E.–12SA7
IF Amplifier G.E.–12SK7
Demodulator, Audio, and AVC G.E.–12SQ7GT
Audio output G.E.–35L6GT
Rectifier G.E.–35Z5GT
Pilot Lamp ..... MAZDA 51

GENERAL INFORMATION

Models L-631, L-642 and L-674 are six-tube AC-DC superheterodyne receivers which have full Underwriters' approval.

ALIGNMENT CHART

Step	Test-Osc. Connection	Test-Osc. Setting	Pointer Setting	Adjust Trimmers
1	12SK7 IP Grid in series with .05 mfd.	486 KC	"BC" Band 550 KC	C6 and C7 for maximum
2	6SA7 Converter Grid in series with .05	455 KC	"BC" Band 580 KC	C4 and C5 for maximum
3	12B7 RF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C19 for minimum
4	Capacity Coupled	580 KC	"BC" Band 580 KC	C22 ** for maximum
5	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C2 **(Osc.) for maximum
6	Capacity Coupled	580 KC	"BC" Band 580 KC	C22 ** for maximum
7	Capacity Coupled	11.8 MC	"SW" Band 11.8 MC	C23 * (Osc.) to signal
8	Capacity Coupled	11.8 MC	"SW" Band 11.8 MC	C24 ** (Ant.) for maximum

* Correct peak is at low capacity.
** Rock gang condenser when making alignment.
Caution: Always use an isolating transformer in the power supply line.

ALIGNMENT PROCEDURE

The location of trimmers is shown in Fig. 1. All RF Trimmers are accessible through holes in the back cover or bottom of the cabinet. The alignment procedure is given in table form. All IF adjustments may be made with the chassis removed from the cabinet. However, the RF Adjustments should be made with the chassis and loop antennas securely bolted in the cabinet, as the relative position of the loop antennas with respect to the chassis materially effects alignment. The RF signal should be capacity-coupled by placing a two-foot wire for an antenna on the test oscillator output post (high side). Keeping the antenna two-feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed on top of the receiver cabinet.

The following data will be very useful to servicemen who have available, vacuum-tube voltmeters or similar voltage-measuring instruments:

(1) Stage Gains
Antenna Post to RF Grid—5 at 1000 KC; 2.5 at 10 MC
RF Grid to Converter Grid—8 at 1000 KC, 1.8 at 10 MC
Converter Grid to IF Grid—45 at 455 KC
IF Grid to Diode Plates—75 at 455 KC

(2) Audio Gains
.16 volts, 400 cycles, signal across volume control with control set to maximum will give approximately ½-watt output to speaker.

(3) DC voltage developed across oscillator grid resistor R4, averages 9 volts at 1000 KC or 8 volts at 10,000 KC.

Variations of 20% permissible. All readings obtained with enough signal input to give ½-watt output to speaker.

SPECIFICATIONS

MODEL L-641

Intermediate Frequency ..... 455 KC

Electrical Power Output
Undistorted ..... 3 watts
Maximum ..... 5 watts

Loud-speaker—Electro-dynamic
Outside Cone Diameter ..... 5½ inches
Voice Coil Impedance (40 cycles) ..... 3.5 ohms

Tubes
RF Amplifier GE-6SG7
Converter, Oscillator GE-6SA7
IF Amplifier GE-6SK7
Detector, 1st Audio and AVC GE-6SQ7
Power Output GE-6V6GT
Rectifier GE-5Y3G
Dial Lamps ..... (2) MAZDA No. 44

GENERAL INFORMATION

Model L-641 is a six-tube superheterodyne receiver bearing Underwriters' Approval. In late production receivers some tubes may be supplied in glass with a metal shield instead of all metal. When it is found necessary to replace metal tubes with glass a check on alignment will be advisable. Very little change in gain will be apparent with either type provided the set is properly aligned.

ALIGNMENT PROCEDURE

The location of trimmers is shown in Fig. 1. All oscillator and RF trimmers are accessible through a slot in the back cover of the cabinet.

The alignment procedure is given in table form. All IF alignments may be made with the chassis removed from the cabinet. However, the RF alignments are made with the chassis and loop antennas securely fastened in the cabinet, as the relative position of the loop antenna with respect to the chassis materially affects it. The RF signal should be capacity coupled by placing a two-foot wire for an antenna on the test-oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed on top of the receiver cabinet.

Special Service Information

The following data are taken with a vacuum-tube voltmeter or similar voltage-measuring device.

(1) Stage Gains

Antenna Post to RF Grid	5 at 1000 KC
RF Grid to Converter Grid	9 at 1000 KC
Converter Grid to IF Grid	40 at 1000 KC
Converter Grid to IF Grid	60 at 455 KC
IF Grid to diode plates	90 at 455 KC

(2) Audio Gains
.14 volts, 4000 cycles signal across volume control with control set to maximum will give approximately ½ watt speaker output.

(3) DC voltage developed across oscillator grid resistor R4 averages 10 volts at 1000 KC or 8 volts at 10,000 KC.

Variations of ±20% permissible. All readings taken with AVC shorted out.

ALIGNMENT CHART

Step	Test-Osc. Connection	Test-Osc. Setting	Pointer Setting	Adjust Trimmers
1	6SK7 IF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C6 & C7 for maximum
2	6SA7 Conv. Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C4 & C5 for maximum
3	6SG7 RF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C16 Wave trap for minimum
4	Capacity Coupled	580 KC	"BC" Band 580 KC	C22** (Osc.) for maximum
5	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C2** for maximum
6	Capacity Coupled	580 KC	"BC" Band 580 KC	C22** (Osc.) for maximum
7	Capacity Coupled	18 MC	"SW" Band 18 MC	C23* (Osc.) to signal
8	Capacity Coupled	18 MC	"SW" Band 18 MC	C24** (Ant.) for maximum

* Use minimum capacity peak.
** Rock gang condenser when making alignment.

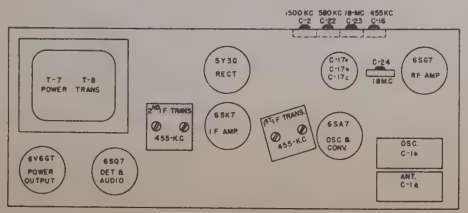


Fig. 1. Trimmer Location

← MODEL L-641 →

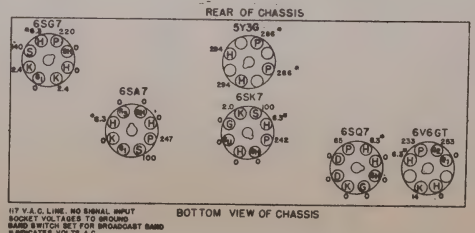
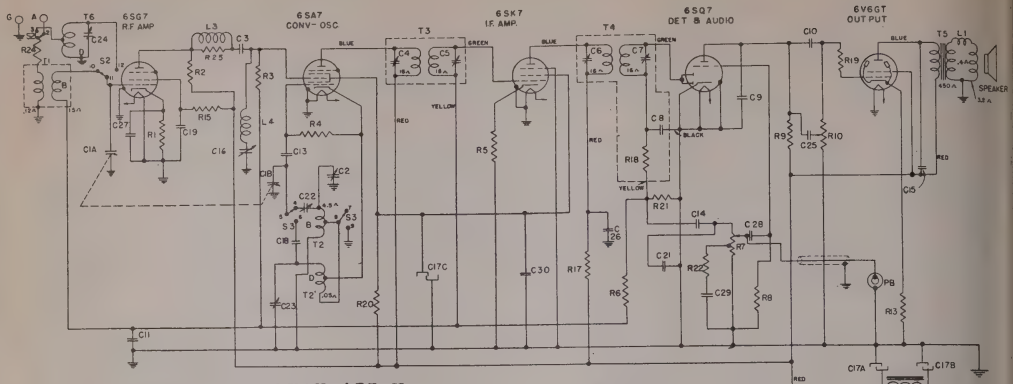


Fig. 2. Socket Voltages

MODEL L-641

GENERAL ELECTRIC CO.



I-F PEAK 455 Kc

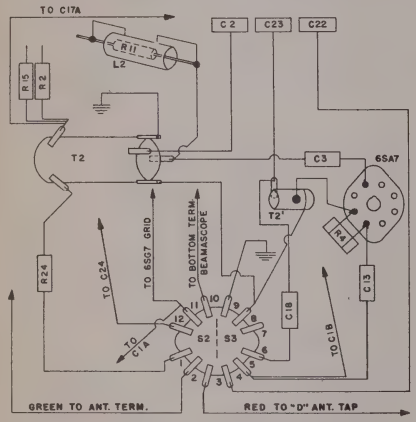


Fig. 4. Switch Wiring Diagram

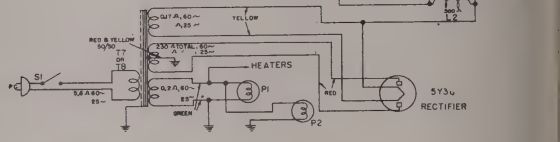


Fig. 3. Schematic

Stock No.	Symbol	Description
RC-7065	C1A, 1B	CONDENSER—Tuning condenser
*RC-6570	C2, 16, 22, 23	CAPACITOR—"B" Oscillator trimmer, Wave trap trimmer, "B"padder, and "D" oscillator trimmer
*RC-235	C3	CAPACITOR—100 mmf., mica
*RC-252	C8	CAPACITOR—200 mmf., mica
*RC-242	C9	CAPACITOR—150 mmf., mica
*RC-048	C10	CAPACITOR—.02 mfd., 600 V, paper
*RC-072	C11	CAPACITOR—.05 mfd., 200 V, paper
*RC-216	C13	CAPACITOR—47 mmf., mica
*RC-023	C14	CAPACITOR—.005 mfd., 600 V, paper
*RC-055	C15	CAPACITOR—.003 mfd., 600 V, paper
RC-5205	C17a,17b 17c	CAPACITOR—10 mfd., 350 V, 15 mfd., 350V.—10 mfd., 250 V, dry electrolytic
*RC-390	C18	CAPACITOR—3900 mmf., mica
*RC-039	C19	CAPACITOR—.01 mfd., 600 V, paper
*RC-235	C21	CAPACITOR—100 mmf., mica
*RC-6553	C24	CAPACITOR—"D" antenna trimmer
*RC-023	C25	CAPACITOR—.005 mfd., 600 V, paper
*RC-047	C26, 27, 28	CAPACITOR—.01 mfd., 400 V, paper
*RC-017	C29	CAPACITOR—.0042 mfd., 600 V, paper
*RC-039	C30	CAPACITOR—.01 mfd., 600 V, paper
*RQ-1245	R1	RESISTOR—270 ohm, ½-W, Carbon
*RQ-1275	R2	RESISTOR—4700 ohm, ½-W, Carbon
*RQ-1299	R3	RESISTOR—47,000 ohm, ½-W, Carbon
*RQ-1291	R4	RESISTOR—22,000 ohm, ½-W, Carbon
*RQ-1239	R5	RESISTOR—150 ohm, ½-W, carbon
*RQ-1339	R6	RESISTOR—2.2 megohm, ½-W carbon
RV-141	R7	VOL. CONTROL—2 meg. volume control
*RQ-1355	R8	RESISTOR—10 megohm, ½-W, Carbon
*RQ-1323	R9	RESISTOR—470,000 ohm, ½-W Carbon

* Used on previous receivers.

Stock No.	Symbol	Description
RT-726	R10, S1	TONE CONTROL—0.5 meg. control and pow switch
*RQ-1247	R13	RESISTOR—330 ohm, ½-W, Carbon
*RQ-1299	R15	RESISTOR—47,000 ohm, ½-W, Carbon
*RQ-1259	R17	RESISTOR—1000 ohm, ½-W, Carbon
*RQ-1299	R18	RESISTOR—47,000 ohm, ½-W, Carbon
*RQ-1259	R19	RESISTOR—1000 ohm, ½-W, Carbon
*RQ-687	R20	RESISTOR—15,000 ohm, 2-W, Carbon
*RQ-1315	R21	RESISTOR—220,000 ohm, ½-W, Carbon
*RQ-1308	R22	RESISTOR—100,000 ohm, ½-W, Carbon
*RQ-1251	R24	RESISTOR—470 ohm, ½-W, Carbon
*RQ-1283	R25	RESISTOR—10,000 ohm, ½-W, Carbon
RL-176	L3	COIL—Peaking coil
RL-608	L4	COIL—Wave trap
RL-577	T1	BEAM-A-SCOPE—"B" band loop and cabi back assembly
*RL-2062	T2	COIL—Osc. coil band "B"
RL-2075	T2	COIL—Osc. coil "D" band
*RT-3005	T3	TRANSFORMER—1st I.F. Transformer
*RT-3006	T4	TRANSFORMER—2nd I.F. Transformer
RT-4024	T5	TRANSFORMER—Output transformer
RL-598	T6	BEAM-A-SCOPE—"D" band loop
RT-0626	T7	TRANSFORMER—60 cycle power transform
RT-0627	T8	TRANSFORMER—25 cycle power transform
RS-3148	S2, S3	SWITCH—Band change switch
RS-1088	SPKR	SPEAKER—5 in. dynamic speaker

MISCELLANEOUS PARTS

*RB-009		BOARD—Single lug terminal board
*RB-013		BOARD—Two lug terminal board
*RB-026		BOARD—Antenna or terminal board
*RB-093		BOARD—Six lug terminal board
*RB-209		BRACKET—Pilot lamp bracket
*RB-1030		BOARD—Phono jack board
*RC-865		CORD—Power cord
*RC-1989		CUSHION—Tuning condenser mtg. cushion
RC-8236		CORD—50-foot drive cord spool
RC-8238		CABLE—Speaker cable and plug
RC-9046		CONE—Speaker cone and voice coil assem
*RD-426		DRUM—Condenser drive drum
RD-780		DIAL—Dial scale
*RF-207		FASTENER—Back cover fastener
RG-456		GRILLE—Cabinet grille cloth
*RK-091		KNOB—Volume or tuning knob
*RK-092		KNOB—Tone or band change knob
*RL-784		LAMP—Mazda No. 44 pilot lamp
*RP-1027		POINTER—Dial pointer assembly
RS-2023		SOCKET—Octal tube socket
*RS-257		SOCKET—Electrolytic mtg. socket
*RS-444		SPRING—Volume or tuning knob spring
*RS-463		SPRING—Drive cord tension spring
*RS-511		SPACER—Tuning condenser mtg. spacer
*RS-265		SOCKET—Pilot lamp socket
*RS-4012		SPRING—Tone or band knob spring
RS-9047		SHAFT—Tuning shaft and clip
*RT-952		TERMINAL—SW loop tap terminal
*RW-101		WASHER—Felt washer for knobs

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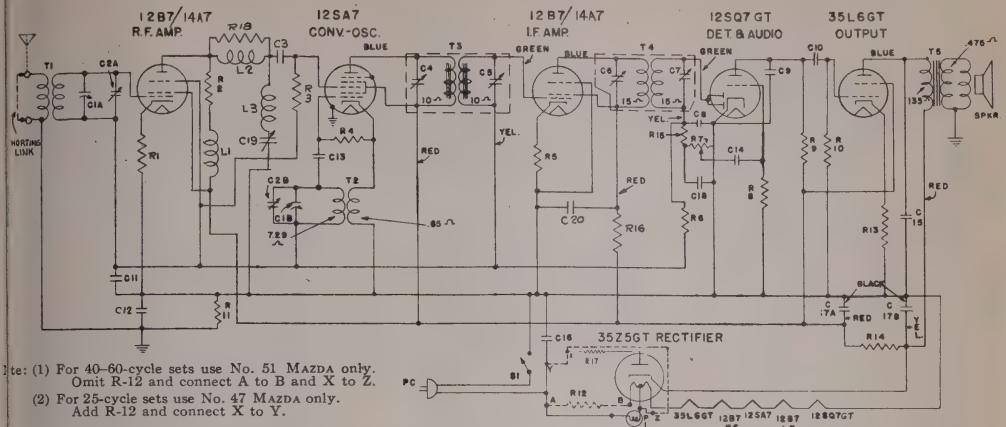
GENERAL ELECTRIC CO.

MODELS L-643, L-653, L-663, L-673



Note: (1) For 40–60-cycle sets use No. 51 MAZDA only. Omit R-12 and connect A to B and X to Z.
(2) For 25-cycle sets use No. 47 MAZDA only. Add R-12 and connect X to Y.

I-F PEAK 455 KC

Stock No.	Symbol	Description
*E-7039	C1a, C1b, C2a, C2b	CONDENSER—Tuning condenser
*E-226	C3	CAPACITOR—100 mmf., mica
*E-242	C8	CAPACITOR—330 mmf., mica
*E-274	C9	CAPACITOR—150 mmf., mica
*E-039	C10, C20	CAPACITOR—.01 mfd., 600 V. paper
*E-072	C11	CAPACITOR—.05 mfd., 200 V. paper
*E-104	C12	CAPACITOR—0.1 mfd., 600 V., paper
*E-216	C13	CAPACITOR—47 mmf., mica
*E-023	C14	CAPACITOR—.005 mfd., 600 V. paper
*E-048	C15	CAPACITOR—.02 mfd., 600 V. paper
*E-092	C16	CAPACITOR—.05 mfd., 600 V. paper
*E-5183	C17a, C17b	CAPACITOR—50 mfd., 60 mfd., 150 V. dry electrolytic
*E-235	C18	CAPACITOR—100 mmf., mica
E-6573	C19	CAPACITOR—Wave trap trimmer
*E-1215	R1	RESISTOR—47 ohm, ½ Watt carbon
*E-1275	R2	RESISTOR—4,700 ohm, ½ Watt carbon
*E-1299	R3	RESISTOR—47,000 ohm, ½ Watt carbon
*E-1295	R4	RESISTOR—33,000 ohm, ½ Watt carbon
*E-1235	R5	RESISTOR—100 ohm, ½ Watt carbon
*E-1339	R6	RESISTOR—2.2 megohm, ½ Watt carbon
*E-120	R7, S1	VOLUME CONTROL—0.5 megohm, combined with power switch
*E-1349	R8	RESISTOR—5.6 megohm, ½ Watt carbon
*E-1323	R9, R10, R11	RESISTOR—470,000 ohm, ½ Watt carbon
*E-1213	R12	RESISTOR—12 ohms, ½ Watt carbon
*E-1239	R13, R17	RESISTOR—150 ohms, ½ Watt carbon
*E-651	R14	RESISTOR—1000 ohms, 2 Watt carbon
*E-1299	R15	RESISTOR—47,000 ohms, ½ Watt carbon
*E-1251	R16	RESISTOR—470 ohms, ½ Watt carbon
	R18	RESISTOR—270,000 ohm, ½ Watt carbon
RQ-1317	L1	COIL—Plate choke coil
RL-178	L2	COIL—Series choke coil
RL-179	L3	COIL—Wave trap coil
RL-609	T1	LOOP ANTENNA—"BC" loop and cabinet back assembly
RL-597	T2	COIL—Oscillator coil
*RL-2048	T3	TRANSFORMER—1st I.F. transformer
*RT-385	T4	TRANSFORMER—2nd I.F. transformer
*RT-386	T5	TRANSFORMER—Output transformer
*RT-4005	SPKR	SPEAKER—5-in. PM dynamic speaker
RS-1087		

MISCELLANEOUS PARTS

*RB-008	BOARD—2-lug terminal
*RB-013	BOARD—2-lug terminal
RB-984	BACK—Cabinet back
*RC-8081	CORD—Power cord
*RC-8224	CORD—Drive cord assembly (39-in.)
RC-9057	CONE—5-in. cone assembly
*RD-761	SCALE—Dial scale
*RF-207	FASTENER—Cabinet back fastener
*RK-091	KNOB—Control knob and spring
*RP-334	PULLEY—Dial cord pulley on speaker frame
*RP-1026	POINTER—Dial pointer
*RS-238	SOCKET—Octal base tube socket
*RS-258	SOCKET—Pilot lamp socket
*RS-2015	SOCKET—12B7 tube socket
*RS-463	SPRING—Drive cord tension spring
*RS-444	SPRING—Knob springs
*RS-9029	SHAFT—Tuning shaft and cotter
*RW-101	WASHER—Felt washer for knobs

*Used in previous receivers.

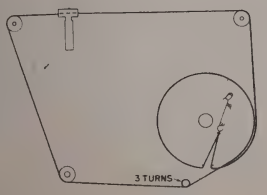


Fig. 1. Dial Stringing Diagram

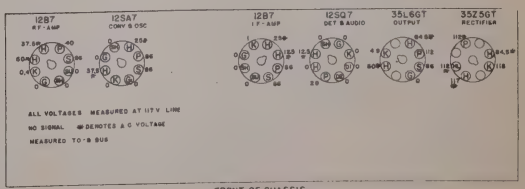


Fig. 3. Socket Voltages

MODELS L-643, L-653,
L-663, L-673
MODEL L-651

GENERAL ELECTRIC CO.

Models L-643, L-653, L-663, L-673

SPECIFICATIONS

Over-all Dimensions

	L-643 or L-663	L-653 or L-673
Model		
Height	7¼ inches	8¼ inches
Width	13 inches	13⅛ inches
Depth	7½ inches	7 inches

Electrical Rating

Rating "A"—105–125 volts AC/DC, 40–60 cycles AC, 35 watts.
Rating "C"—105–125 volts AC/DC, 25 cycles AC, 35 watts

Tuning Frequency Range.....540–1720 KC.

Intermediate Frequency.....455 KC.

Electrical Power Output (117 volt line)

Undistorted.....1.0 watt
Maximum.....1.5 watts

Loudspeaker—PM Dynamic

Outside cone diameter.....5 inches
Voice coil impedance (400 cycles)..3.5 ohms

Tubes

RF Amplifier.....GE-12B7/14A7
Converter-Oscillator.....GE-12SA7
IF Amplifier.....GE-12B7/14A7
Demodulator, Audio, and AVC....GE-12SQ7GT
Power Output.....GE-35L6GT
Rectifier.....GE-35Z5GT
Dial Lamp (See paragraph below)..MAZDA #47 or 51

GENERAL INFORMATION

Models L-643, L-653, L-663 and L-673 are six-tube, table model superheterodyne receivers, which are designed to operate from either an AC or DC power supply as specified on the label.

Models L-663 and L-673 are fully approved by Underwriters' Laboratories.

Use MAZDA No. 47 lamp only on 25-cycle receiver. Use MAZDA No. 51 in the 40–60-cycle receivers.

ALIGNMENT PROCEDURE

Alignment Frequencies

RF.....1500 KC
IF.....455 KC

The chassis must be removed from the cabinet to make the following alignment. The location of all trimmers is shown in Fig. 2.

IF Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the 12SA7 converter grid through a .05 mfd. capacitor and align progressively the trimmers in the 2nd and 1st IF transformers.

Wave-trap Alignment

Apply the 455 KC signal to the grid of the 12B7/14A7 RF amplifier through a .05 mfd. capacitor. Adjust the Wave-trap trimmer C-19 for minimum output.

RF Alignment

When making the following alignment the loop antenna must be bolted to the chassis by the screw and spacer mounting. The RF signal should be capacity coupled to the receiver loop by placing a two-foot piece of wire for an antenna on the test oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed in close proximity to the loop when making this alignment.

With the gang condenser plates completely closed, the pointer should line up with the first mark on the left of the scale. Set the signal generator to 1500 KC. Align (C-1b) to the signal while the pointer is on the 1500 KC mark. Peak (C-1a) for maximum output.

Special Service Information

The following information will be very useful to servicemen equipped with vacuum tube voltmeters or similar voltage measuring instruments.

(1) Stage Gains
Antenna post to RF grid—5 at 1000 KC
RF grid to converter grid—15 at 1000 KC
Converter grid to IF grid—46 at 455 KC
IF grid to 12SQ7 diode plate—75 at 455 KC

(2) Audio Gain
.14 volts, 400 cycles signal across volume control with control set at maximum, will give approximately ½-watt speaker output.

(3) DC voltage developed across oscillator grid resistor (R4) averages 10.0 volts at 1000 KC.
Variations of ±20% permissible. All readings obtained with enough signal input to give ½-watt speaker output.

MODEL L-651

SPECIFICATIONS

Over-all Dimensions

Height.....8¾ inches
Width.....13⅜ inches
Depth.....7¼ inches

Electrical Rating

105–125 volts AC/DC, 50–60 cycles AC, 30 watts.

Tuning Frequency Range.....550–1720 KC

Intermediate Frequency.....455 KC

Electrical Power Output (117 volts)

Undistorted.....1.1 watts
Maximum.....1.6 watts

Loudspeaker—ELECTRODYNAMIC

Outside cone diameter.....5 inches
Voice coil impedance (400 cycles).....3.5 ohms
Field coil resistance.....450 ohms

Tubes

RF Amplifier.....GE-12SK7
Converter-Oscillator.....GE-12SA7
IF Amplifier.....GE-12SK7
Detector, Audio, AVC.....GE-12SQ7
Power Output.....GE-35L6GT
Rectifier.....GE-35Z5GT
Dial Lamp 110–125 volt, C-7 bulb, candelabra screw base

GENERAL INFORMATION

Station Key Adjustments

The station key adjustments are located on the bottom of the cabinet through the slots designated as "Osc." and "RF." The extreme left trimmer in rows "Osc." and "RF" are corresponding adjustments for the first or extreme left station key. The second set of adjustment trimmers is for the No. 2 or second key from left; correspondingly the remaining sets of trimmers are for the station keys No. 3 and No. 4. All receivers to run for 15 minutes before making the following adjustments.

1. List desired station on key, then manually tune in station desired for this key.
2. Push in station key to be set-up, to its depressed position.
3. Adjust its corresponding "Osc." adjustment for the station signal which you tuned manually above and which is listed for the key. Peak adjustment for clearest reception.
4. Adjust corresponding "RF" adjustment for maximum signal strength.
5. Proceed in like manner for adjustment of remaining keys.

NOTE.—Clockwise rotation of adjustment screws lowers the frequency.

ALIGNMENT PROCEDURE

Alignment Frequencies

RF.....1500 KC
IF.....455 KC

The chassis must be removed from the cabinet as described above to make the following alignments. The locations of all trimmers are shown in Fig. 1.

IF Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the 12SA7 converter grid through a .05 mfd. capacitor and align progressively the trimmers in the 2nd and 1st IF transformers.

Wave Trap

Apply 455 KC signal to the grid of the 12SK7 RF Amplifier through a .05 mfd. capacitor. Adjust trimmer C29 for minimum output.

RF Alignment

When making the following alignment the loop antenna must be bolted to the chassis by the two mounting screws. Since the glass dial scale is fastened to the cabinet, it cannot be used for reference during the alignment of the chassis outside the cabinet. Use must be made, therefore, of the four calibration marks at the bottom flange of the dial scale reflector plate (immediately below end of dial scale pointer). These marks referring from left to right are as follows: Reference point, 580 KC, 1000 KC and 1500 KC.

The RF signal should be capacity coupled to the receiver loop by placing a two-foot piece of wire for an antenna on the test oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed in close proximity to the loop when making the alignment.

With the gang condenser plates completely closed, the end of the pointer should line up with the first mark to the left of the dial reflector plate. If it doesn't the pointer can be moved on the dial cord until it does. Set the signal generator to 1500 KC. Set pointer to the 1500 KC mark (extreme right flange mark) and align (C2B) to the signal. Peak (C2A) for maximum output.

Special Service Information

The following information will be useful to servicemen equipped with vacuum-tube voltmeters or similar voltage measuring instruments. When making the Stage Gain measurements in (1), the AVC bus should be shorted to B –

(1) Stage Gains
Antenna post to converter grid.....26 at 1000 KC
RF grid to converter grid.....5.6 at 1000 KC
Converter grid to IF grid.....25 at 455 KC
IF grid to 12SQ7 diode plate.....53 at 455 KC

(2) Audio Gain
0.14 volts, 400 cycle signal across volume control with control set at maximum, will give approximately ½-watt speaker output.

(3) DC voltage developed across oscillator grid resistor (R4) averages 5.0 volts at 1000 KC.
Variations of 20 per cent permissible. All readings obtained with enough signal input to give ½-watt speaker output.

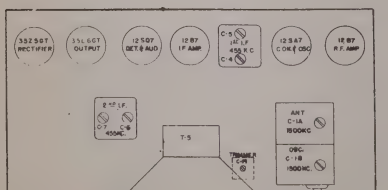


Fig. 2. Trimmer Location

MODELS L-643, L-653, L-663, L-673

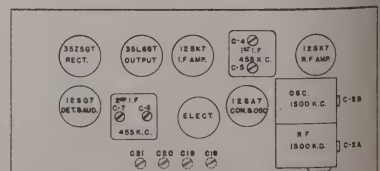


Fig. 1. Trimmer Location

MODEL L-651

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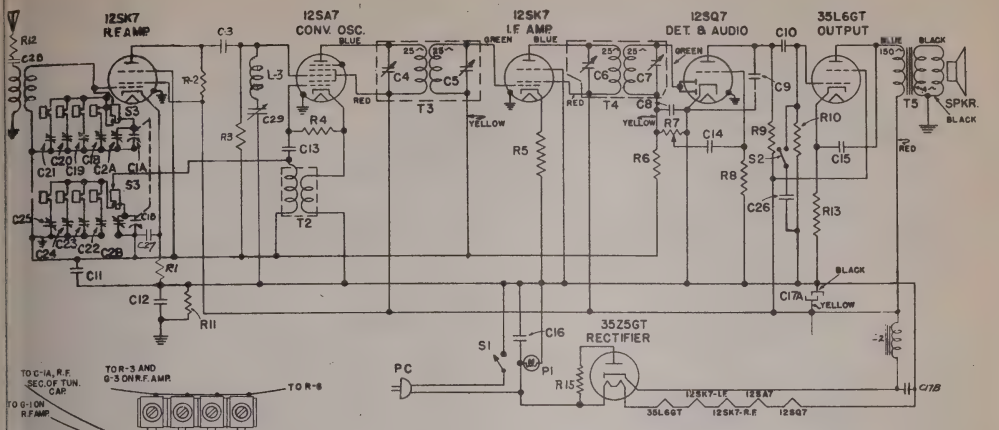
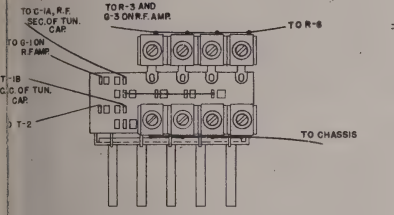
GENERAL ELECTRIC CO.

MODEL L-651



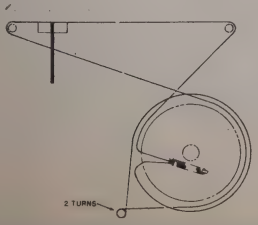


Selector Switch Wiring

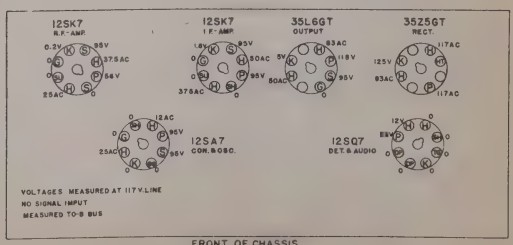
I-F PEAK 455 KC

Stock Number	Symbol	Description
*R-7059	C1a, 1b	CONDENSER—Tuning condenser (with trimmer 2a, 2b mounted)
*R-235	C3	CAPACITOR—100 mmf. mica
*R-274	C8, C9	CAPACITOR—330 mmf. mica
*R-039	C10	CAPACITOR—.01 mfd. 600-V paper
*R-072	C11	CAPACITOR—.05 mfd. 200-V paper
*R-104	C12	CAPACITOR—.1 mfd. 400-V paper
*R-216	C13	CAPACITOR—47 mmf. mica
*R-039	C14	CAPACITOR—.01 mfd. 600-V paper
*R-048	C15	CAPACITOR—.02 mfd. 600-V paper
*R-092	C16	CAPACITOR—.05 mfd. 600-V paper
*R-5194	C17a, C17b	CAPACITOR—60 mfd., 50 mfd. 150-V dry electrolytic
*R-881	C18, C19, C20, C21	TRIMMER STRIP—Station key adjustments (RF section)
*R-882	C22, C23, C24, C25	TRIMMER STRIP—Station key adjustments (Osc. section)
*R-016	C26	CAPACITOR—.002 mfd. 600-V paper
*R-048	C27	CAPACITOR—.02 mfd. 600-V paper
*R-039	C28	CAPACITOR—.01 mfd. 600-V pap r
R-6572	C29	CAPACITOR—Wave trap trimmer
*R-1231	R1	RESISTOR—68 ohm, ½-W carbon
*R-1279	R2	RESISTOR—6800 ohm, ½-W carbon
*R-1299	R3	RESISTOR—47,000 ohm, ½-W carbon
*R-1295	R4	RESISTOR—33,000 ohm, ½-W carbon
*R-1227	R5	RESISTOR—47 ohm, ½-W carbon
*R-1339	R6	RESISTOR—2.2 meg. ½-W carbon
*R-123	R7, S1	VOL. CONTROL—0.5 meg. control and power switch
*R-1349	R8	RESISTOR—5.6 meg. ½-W Carbon
*R-1323	R9, 10, 11	RESISTOR—470,000 ohm, ½-W carbon
*R-1259	R12	RESISTOR—1,000 ohm, ½-W carbon
*R-1239	R13	RESISTOR—150 ohm, ½-W carbon
R-1414	R15	RESISTOR—15 ohm, 1-watt carbon
*R-3108	S2	SWITCH—Tone control switch
*R-3114	S3	SWITCH—Automatic tuning switch (less trimmers)
R-596	L1	BEAM-A-SCOPE—Cabinet back and loop assembly

Used on previous receivers.

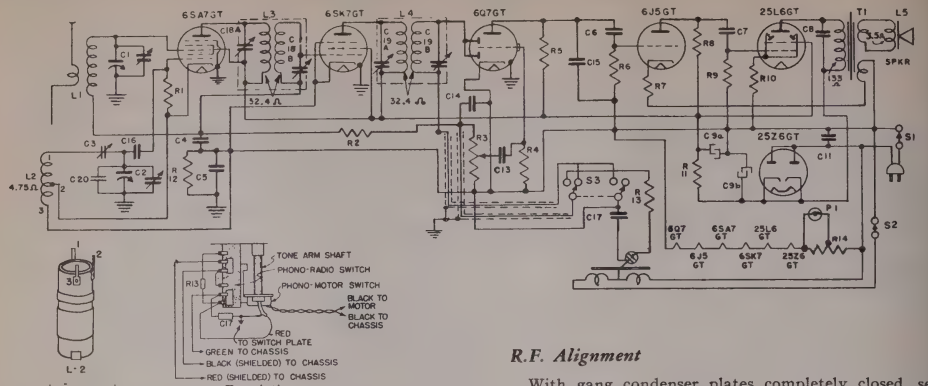


Stock Number	Symbol	Description
RL-608	L3	COIL—Wave trap coil
*RL-2053	T2	COIL—Oscillator coil and clip
*RT-3002	T3	TRANSFORMER—1st IF transformer
*RT-3003	T4	TRANSFORMER—2nd IF transformer
*RT-4008	T5	TRANSFORMER—Output transformer
RS-1086	SPKR	SPEAKER—5" Electrodynamic speaker (450 ohm field)
		MISCELLANEOUS PARTS
*RC-2047		CAM—Tone switch control cam and links
*RC-2054		CLAMP—Electrolytic capacitor mounting clamp
*RC-8081		CORD—Power cord
*RC-8215		CORD—Drive cord assembly
*RC-8531		CARDS—Station call letter cards (set)
RC-9061		CONE—Speaker cone assembly
RD-779		DIAL—Dial scale
*RF-207		FASTENER—Back cover snap fastener
RG-455		GRILLE CLOTH—Cabinet grille cloth
*RH-123		HAIRPIN COTTER—Tuning shaft retaining cotter
*RK-228		KEY—Automatic station selector key
*RK-1050		KNOB—Tone control wafer knob
*RK-091		KNOB—Volume or tuning control knob
*RM-516		MASK—Dial scale reflector flocked mask
*RP-012		PLUG—Female speaker plug
*RP-189		POINTER—Dial pointer
*RP-2016		PLATE—Dial reflector plate assembly
*RS-238		SOCKET—Octal base tube socket
*RS-444		SPRING—Control knob spring
*RS-463		SPRING—Drive cord tension spring
*RS-1821		SHIELD—Tube shield
RS-1824		SHIELD—Pilot lamp shield
*RS-2008		SOCKET—Pilot lamp socket
*RS-4012		SPRING—Station selector
*RS-9040		SHAFT—Tuning shaft and cotter
*RW-101		WASHER—Felt knob washer
*RX-099		ASSEMBLY—Chassis mounting assembly
RZ-286		CABINET—L651 cabinet (less back)



MODEL LC-679

GENERAL ELECTRIC CO.



Stock No.	Symbol	Description
*RC-7017	C-1, -2	CONDENSER—Tuning condenser
*RC-6515	C-3	CAPACITOR—Oscillator padder
*RC-072	C-4	CAPACITOR—.05 Mfd., 200 V. paper
*RC-130	C-5	CAPACITOR—0.2 Mfd., 400 V. paper
*RC-023	C-6, -7	CAPACITOR—.005 Mfd., 600 V. paper
*RC-039	C-8	CAPACITOR—.01 Mfd., 600 V. paper
*RC-5145	C-9a	CAPACITOR—30 Mfd., 150 V.
*RC-5145	C-9b	CAPACITOR—50 Mfd., 150 V.
*RC-092	C-11	CAPACITOR—.05 Mfd., 600 V. paper
*RC-060	C-13	CAPACITOR—.03 Mfd., 600 V. paper
*RC-293	C-14	CAPACITOR—470 Mmf., mica
*RC-250	C-15	CAPACITOR—220 Mmf., mica
*RC-216	C-16	CAPACITOR—47 Mmf., mica
*RC-104	C-17	CAPACITOR—0.1 Mfd., 400 V. paper
*RC-226	C-20	CAPACITOR—10 Mmf., mica
*RQ-1295	R-1	CAPACITOR—33,000 ohms, ½ W. carbon
*RQ-1339	R-2	RESISTOR—2.2 megohm, ½ W. carbon
RV-119	R-3, S-1	VOLUME CONTROL—0.5 megohm potentiometer
*RQ-1365	R-4	RESISTOR—15 megohm, ½ W. carbon
*RQ 1323	R-5	RESISTOR—470,000 ohms, ½ W. carbon
*RQ-1331	R-6	RESISTOR—1.0 megohm, ½ W. carbon
*RQ-1271	R-7	RESISTOR—3,300 ohms, ½ W. carbon
*RQ-1297	R-8	RESISTOR—39,000 ohms, ½ W. carbon
*RQ-1323	R-9	RESISTOR—470,000 ohms, ½ W. carbon
*RQ-1239	R-10	RESISTOR—150 ohms, ½ W. carbon
*RQ-1459	R-11	RESISTOR—1,000 ohms, 1 W. carbon
*RQ-1323	R-12	RESISTOR—470,000 ohms, ½ W. carbon
*RQ-1307	R-13	RESISTOR—100,000 ohms, ½ W. carbon
*RR-773	R-14	RESISTOR—BL42B ballast resistor
*RL-528	L-1	LOOP—Built-in antenna and back cover assembly
*RL-2016	L-2	COIL—Oscillator coil
*RT-341	L-3	TRANSFORMER—1st I.F. transformer
*RT-342	L-4	TRANSFORMER—2nd I.F. transformer
*RT-475	T-1	TRANSFORMER—Output transformer

Electrical Rating

A-6 Rating.....115 volts, 60 cycles AC, 75 watts
A-5 Rating.....115 volts, 50 cycles AC, 75 watts

Tuning Frequency Range.....550–1600 KC

Intermediate Frequency.....455 KC

Electrical Power Output

Undistorted.....2.0 watts
Maximum.....2.5 watts

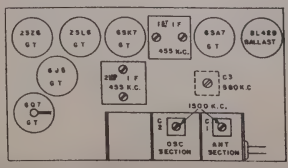
Loud-speaker—PM Dynamic

Outside cone diameter.....6.5 inches
Voice coil impedance (400 cycles).....3.5 ohms

I.F. Alignment

Connect an output meter across the voice coil. Turn the volume control to maximum. Set test oscillator to 455 KC and keep the oscillator output as low as a readable meter reading will permit.

Apply signal to the grid of the 6SK7GT through a .05-mfd capacitor and align the 2nd I.F. transformer. Repeat the procedure, applying the 455-KC signal to the control grid of the 6SA7GT and aligning the 1st I.F. transformer. Finish by over-all adjustments.



R.F. Alignment

With gang condenser plates completely closed, set dial pointer to the first mark at the left end of the scale. Apply a 1500-KC signal either through a standard I.R.E. dummy to the antenna terminal or through an additional loop connected to the generator output which can be magnetically coupled to the receiver Beam-a-Scope. Align (C-2) at 1500 KC and peak (C-1) for maximum output. Peak (C-3) on 580 KC while rocking the gang condenser. Retrim at 1500 KC.

Precaution

If the signal generator is A-C operated, use an isolating transformer between the power supply and the radio receiver power input. The use of an isolating capacitor is not recommended, as A-C current through the capacitor will introduce hum modulation and/or create the possibility of a burned out signal generator attenuator.

Special Service Information

The following data will be very useful to servicemen equipped with vacuum-tube voltmeters or similar voltage measuring instruments.

(1) Stage gains*
Antenna post to 6SA7GT grid.....4 at 1000 KC
6SA7GT grid to 6SK7GT grid.....30 at 455 KC
6SK7GT grid to 6Q7GT det. plate....100 at 455 KC

(2) Audio Gains
.06 volts, 400 cycles signal across volume control with control set to maximum will give approximately ½ watt speaker output.

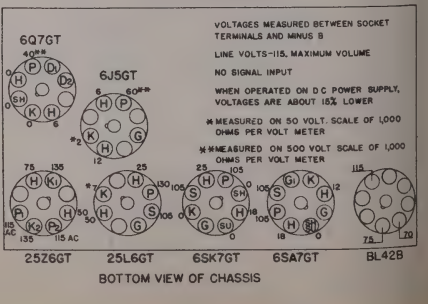
(3) D-C voltage developed across oscillator grid resistor (R-1) averages 12 volts.

* Variations of ±20% permissible.

Loud-speaker

The voice coil is accurately and permanently centered at the factory and should seldom give trouble. In case a voice coil needs recentering it will be necessary to replace the entire cone and voice-coil assembly.

NOTE.—In no case should the magnet be removed from the assembled position without remagnetizing after replacing it.


FRONT OF CHASSIS
6Q7GT
6J5GT
VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND MINUS B
LINE VOLTS-115, MAXIMUM VOLUME
NO SIGNAL INPUT
WHEN OPERATED ON D C POWER SUPPLY, VOLTAGES ARE ABOUT 15% LOWER
* MEASURED ON 50 VOLT SCALE OF 1,000 OHMS PER VOLT METER
** MEASURED ON 500 VOLT SCALE OF 1,000 OHMS PER VOLT METER
25Z6GT
25L6GT
6SK7GT
6SA7GT
BL42B
BOTTOM VIEW OF CHASSIS

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MODEL L-740
(REVISED)

GENERAL ELECTRIC CO.

SPECIFICATIONS

Over-all Dimensions

Height ..... 11⅝ inches
Width ..... 17 inches
Depth ..... 11 inches

Electrical Rating

"A" rating, 110–125 volts, 50–60 cycles, 70 watts.
"C" rating, 110–125 volts, 25 cycles, 70 watts.

Tuning Frequency Range

"BC" Band ..... 550–1720 KC
"SW1" Band ..... 1.7–5.2 MC
"SW2" Band ..... 5.2–18.1 MC

Intermediate Frequency ..... 455 KC

Electrical Power Output

Undistorted ..... 3.5 watts
Maximum ..... 5.5 watts

Loud-speaker—PM Dynamic

Outside Cone Diameter ..... 6½ inches
Voice Coil Impedance (400 cycles) ..... 3.5 ohms

Tubes

RF Amplifier GE-6SG7
Converter, Oscillator GE-6SA7
IF Amplifier, Detector, AVC GE-6SF7
Audio Amplifier, Phase Inverter GE-6SC7
Power Output ..... (2) GE-6K6GT
Rectifier GE-5W4GT
Dial Lamps ..... (2) MAZDA No. 44

GENERAL INFORMATION

These service notes contain data on both early (†) and late (‡) productions of this receiver, replacing and correcting any preceding data. The main difference is that the late production contains a wave trap and peaking coil between the RF and converter stages. For early production receivers eliminate step 3 in alignment chart and use Fig. 1. For alignment of late production receivers, use Fig. 2. In all cases the symbol designations remain the same but the physical locations of trimmers are changed.

ALIGNMENT PROCEDURE

The location of trimmers is shown below. All oscillator and RF trimmers are accessible through a slot through the back cover of the cabinet.

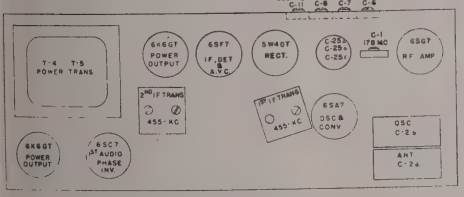


Fig. 1 Trimmer Location (†)

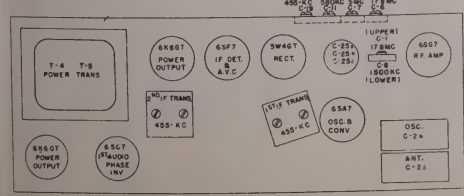


Fig. 2 Trimmer Location (‡)

The alignment procedure is given in table form. All IF alignments may be made with the chassis removed from the cabinet. However, the RF alignments are made with the chassis and loop antennas securely fastened in the cabinet, as the relative position of the loop antenna with respect to the chassis materially affects it. The RF signal should be capacity coupled by placing a two-foot wire for an antenna on the test-oscillator output post (high side). Keeping this antenna two feet or more from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed on top of the receiver cabinet.

ALIGNMENT CHART

Step	Test-Osc. Connection	Test-Osc. Setting	Pointer Setting	Adjust Trimmers
1	6SK7 IF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C17 and C16 for maximum
2	6SA7 Conv. Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C14 and C13 for maximum
‡ 3	6SG7 RF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C19 Wave trap for minimum
4	Capacity coupled	580 KC	"BC" Band 580 KC	C11 ** for maximum
5	Capacity coupled	1500 KC	"BC" Band 1500 KC	C8 ** (Osc.) for maximum
6	Capacity coupled	580 KC	"BC" Band 580 KC	C11 ** for maximum
7	Capacity coupled	5 MC	"SW1" Band 5MC	C7 ** (Osc.) for maximum
8	Capacity coupled	18 MC	"SW2" Band 18 MC	C6 * (Osc.) to signal
9	Capacity coupled	18 MC	"SW2" Band 18 MC	C1 ** (Ant.) for maximum

*Use minimum capacity peak.
**Rock gang condenser when making alignment.

Special Service Information

The following data are taken with a vacuum-tube voltmeter or similar voltage-measuring device.

(1) Stage Gains

Antenna Post to RF Grid	6.5 at 1000 KC
RF Grid to Converter Grid	10 at 1000 KC
Converter Grid to IF Grid	45 at 1000 KC
Converter Grid to IF Grid	60 at 455 KC
IF Grid to 6SF7 diode plates	110 at 455 KC

(2) Audio Gains
.16 volts, 400 cycles signal across volume control with control set to maximum will give approximately ½-watt speaker output.

(3) DC voltage developed across oscillator grid resistor R4 averages 10 volts at 1000 KC or 8.0 volts at 10,000 KC.

Variations of ±20% permissible. All readings taken with −1½-volt fixed bias on AVC bus.

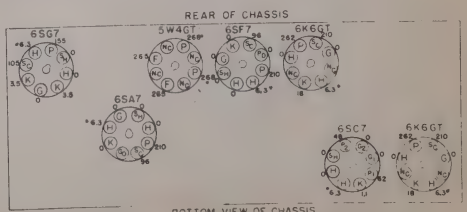
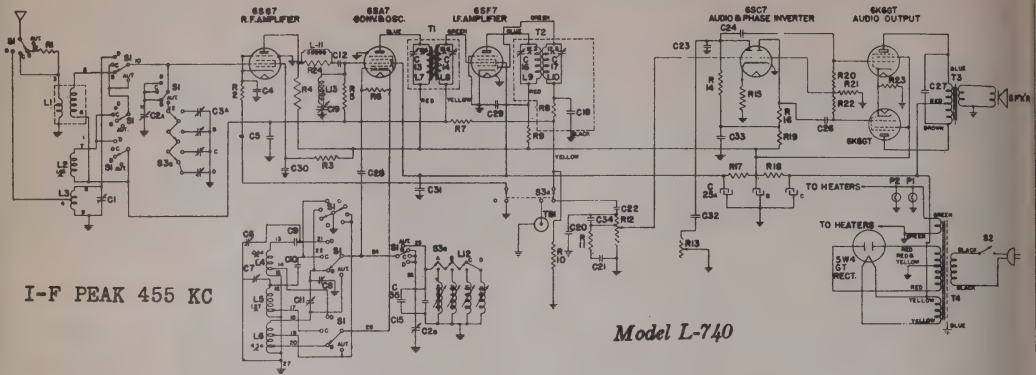


Fig. 3 Socket Voltages († and ‡)

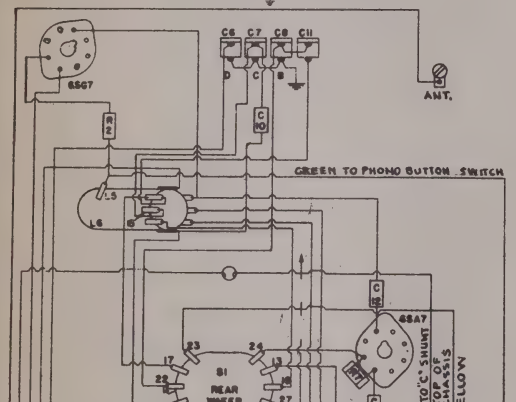
MODEL L-740
(REVISED)

GENERAL ELECTRIC CO.



I-F PEAK 455 KC

Model L-740



Model L-740

Models LC-759, LC-759B and LC-768

MODEL L-740

Stock No.	Symbol	Description
†RC-6553	C-1	CAPACITOR—"D" Band Ant. Trimmer
‡RC-6565	C-1, 8	CAPACITOR—"D" Ant. and "B" Osc. trimmers
RC-7061	C-2a, C-2b	CONDENSER—2 gang condenser
RT-885	C-3a, b, c and d	TRIMMER STRIP—Push button trimmer strip
*RC-039	C-4	CAPACITOR—.01 mfd. 600 volt paper
*RC-072	C-5	CAPACITOR—.05 mfd. 200 volt paper
†RC-6555	C-6, 7, 8, 11	CAPACITOR—"B" "C" and "D" osc. trimmer and "B" padder
‡RC-6566	C-6, 7, 11, 19	CAPACITOR—"D" and "C" Osc. trimmer, "B" padder and wave trap trimmer

* Used on previous receivers.
† Early production only.
‡ Late production only.

Stock No.	Symbol	Description
*RC-393	C-9	CAPACITOR—4700 mmf., mica
*RC-349	C-10	CAPACITOR—2000 mmf., mica
*RC-235	C-12	CAPACITOR—100 mmf., mica
RC-305	C-15	CAPACITOR—600 mmf., silvered mica
*RC-252	C-18	CAPACITOR—200 mmf., mica
*RC-235	C-20	CAPACITOR—100 mmf., mica
*RC-049	C-21	CAPACITOR—.004 mfd., 600 V, paper
*RC-023	C-22	CAPACITOR—.005 mfd., 600 V, paper
*RC-249	C-23	CAPACITOR—220 mmf., mica, 500 V
*RC-048	C-24	CAPACITOR—.02 mfd., 600 V, paper
RC-5198	C-25a	CAPACITOR—10 mfd., 250 V, dry electrolytic
	C-25b	CAPACITOR—15 mfd., 300 V, dry electrolytic
	C-25c	CAPACITOR—30 mfd., 350 V, dry electrolytic
*RC-048	C-26	CAPACITOR—.02 mfd., 600 V, paper
*RC-011	C-27	CAPACITOR—.002 mfd., 600 V, paper
*RC-216	C-28	CAPACITOR—47 mmf., mica
*RC-039	C-29, 30, 31	CAPACITOR—.01 mfd., 600 V, paper
*RC-023	C-32	CAPACITOR—.005 mfd., 600 V, paper
*RC-104	C-33	CAPACITOR—0.1 mfd., 600 V, paper
*RC-216	C-34	CAPACITOR—47 mmf., mica
*RC-329	C-35	CAPACITOR—150 mmf., compensating cap
*RQ-1251	R-1	RESISTOR—470 ohm, ½-W. carbon
*RQ-1243	R-2	RESISTOR—220 ohm, ½-W. carbon
*RQ-1293	R-3	RESISTOR—27,000 ohm, ½-W. carbon
*RQ-1275	R-4, 8	RESISTOR—4,700 ohm, ½-W. carbon
*RQ-1299	R-5, 10	RESISTOR—47,000 ohm, ½-W. carbon
*RQ-1291	R-6	RESISTOR—22,000 ohm, ½-W. carbon
*RQ-1339	R-7	RESISTOR—2.2 megohm, ½-W. carbon
*RQ-1269	R-9	RESISTOR—2,700 ohm, ½-W. carbon
*RQ-1308	R-11, 19, 21	RESISTOR—100,000 ohm, ½-W. carbon
*RV-135	R-12	VOL. CONTROL—2 megohm
RT-723	R-13, S-2	TONE CONTROL—2 megohm with power switch
*RQ-1323	R-14	RESISTOR—470,000 ohm, ½-W. carbon
*RQ-1273	R-15	RESISTOR—3900 ohm, ½-W. carbon
*RQ-1331	R-16	RESISTOR—1 megohm, ½-W. carbon
*RQ-683	R-17	RESISTOR—10,000 ohm 2-W. carbon
*RR-357	R-18	RESISTOR—1,200 ohm, 7.4 watt, W.W.
*RQ-1319	R-20, 22	RESISTOR—330,000 ohm, ½-W. carbon
*RQ-1451	R-23	RESISTOR—470 ohm, 1-W. carbon
‡*RQ-1283	R-24	RESISTOR—10,000 ohm, ½-W. carbon
RL-580	L-1	BEAM-A-SCOPE—"B" band loop and cabinet back assembly
*RL-167	L-2	COIL—"C" band R.F. coil
RL-581	L-3	BEAM-A-SCOPE—"D" band loop assembly
*RL-2065	L-4	COIL—"D" band oscillator coil
*RL-2066	L-5, -6	COIL—"B" and "C" band osc. coil
‡*RL-176	L-11	COIL—Peaking coil
*RL-9530	L-12a, b, c, and d	COIL—Push button coil assembly
‡*RL-608	L-13	COIL—Wave trap
*RS-3129	S-1	SWITCH—Band change switch
*RS-3130	S-3a, b	SWITCH—Push button switch
RT-3011	T-1	TRANSFORMER—1st I.F. transformer
RT-3012	T-2	TRANSFORMER—2nd I.F. transformer
RT-4015	T-3	TRANSFORMER—Speaker output transformer
RT-0724	T-4	TRANSFORMER—50/60 cycle power transformer
RT-0725	T-5	TRANSFORMER—25-cycle power transformer
*RS-1012	SPKR	SPEAKER—6½ in. P.M. speaker

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GENERAL ELECTRIC CO. MODELS LC-759, LC-759B LC-768

Cabinet Specifications

Model	Cabinet	Height	Width	Depth
LC-759	Mahogany Veneer	36″	34 7/8″	16 3/8″
LC-759B	Blonde Mahogany	36″	34 7/8″	16 3/8″
LC-768	Walnut Veneer	38″	28″	14 13/16″

Electrical Rating

Rating "A6" 110–125 volts, 60 cycles, 130 watts.
Rating "A5" 110–125 volts, 50 cycles, 130 watts.

Tuning Frequency Range

"BC" Band.....550–1720 KC
"SW1" Band.....1.7–5.2 MC
"SW2" Band.....5.2–18.1 MC

Intermediate Frequency.....455 KC

Electrical Power Output

Undistorted.....7.5 watts
Maximum.....12 watts

Loud-speaker—Electrodynamic

Outside cone diameter.....11½ inches
Voice coil impedance (400 cycles)..5 ohms
Field resistance.....400 ohms

Phonograph Mechanism

Type changer.....Model LRP-170
Type pick-up.....Crystal
Turntable speed.....78 RPM

Tubes

RF Amplifier.....GE-6SG7
Converter-Oscillator.....GE-6SA7
IF Amplifier, Demodulator, AVC..GE-6SF7
Audio Amplifier, Phase Inverter..GE-6SC7
Audio Output.....(2) GE-6V6GT
Rectifier.....GE-5Y3G
Dial Lamps.....MAZDA No. 44

GENERAL INFORMATION

These models are seven-tube three-band superheterodyne receivers of conventional design using in combination an Automatic Record Changer. The service data on the Record Changer is contained in service notes LRPS-170.

Phonograph Tone Compensation

The schematic diagram as shown in Fig. 1, is as used in Model LC-768, with the tone compensation built into the changer. Models LC-759 and LC-759B have no compensation on the changer but it is built into the chassis as indicated in Fig. 3, otherwise the schematic is identical for all three receivers.

ALIGNMENT PROCEDURE

The location of trimmers is shown in Fig. 5. All oscillator and RF trimmers are accessible from the rear of the cabinet.

The alignment procedure is given in table form. All IF adjustments may be made with the chassis removed from the cabinet. However, the RF adjustments should be made with the chassis and loop antennas securely fastened in the cabinet, as the relative position of the loop antenna with respect to the chassis materially affects alignment. The RF signal should be capacity-coupled to the receiver loop by connecting a two-foot wire for an antenna on the test-oscillator output post (high side). Keeping this antenna two feet or more away from the receiver loop will generally insure freedom from too much coupling. Metal objects such as meters, tools, etc., should not be placed on top of the receiver cabinet.

Special Service Information

The following data is taken with a vacuum-tube voltmeter or similar measuring device.

(1) Stage Gains
Antenna post to RF Grid.....6.5 at 1000 KC
RF Grid to Converter Grid...10 at 1000 KC
Converter Grid to IF Grid....45 at 1000 KC
Converter Grid to IF Grid....60 at 455 KC
IF Grid to 6SF7 diode plate..110 at 455 KC

(2) Audio Gains
.09 volts, 400-cycle signal across volume control with control set to maximum will give approximately ½-watt output to speaker.

(3) D-C voltage developed across oscillator grid resistor R6 averages 7 volts at 1000 KC, 9 volts at 4000 KC, or 6 volts at 10,000 KC.

Variations of ±20% permissible. All readings taken with minus 1½-volt fixed bias on AVC bus.

ALIGNMENT CHART

Step	Test Osc. Connection	Test Osc. Setting	Pointer Setting	Adjust Trimmers
1	6SF7 IF Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C17 and C16 for Maximum
2	6SA7 Conv. Grid in series with .05 mfd.	455 KC	"BC" Band 550 KC	C14 and C13 for Maximum
3	Capacity Coupled	580 KC	"BC" Band 580 KC	C11** for Maximum
4	Capacity Coupled	1500 KC	"BC" Band 1500 KC	C8** (Osc.) for Maximum
5	Capacity Coupled	580 KC	"BC" Band 580 KC	C11** for Maximum
6	Capacity Coupled	5 MC	"SW1" Band 5 MC	C7** (Osc.) for Maximum
7	Capacity Coupled	17.8 MC	"SW2" Band 17.8 MC	C6* (Osc.) to signal
8	Capacity Coupled	17.8 MC	"SW2" Band 17.8 MC	C1** (Ant.) for Maximum

* Correct peak is at low capacity.
** Rock gang condenser when making alignment.

FOR DATA ON AUTOMATIC RECORD CHANGER MODEL LRP-170, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".

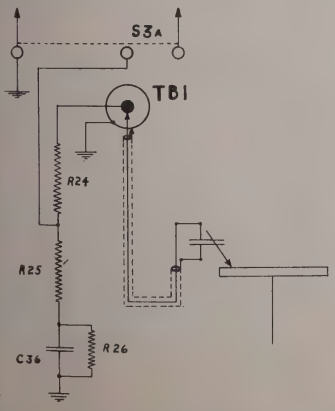

Fig. 3 Phonograph Tone Compensation (LC-759 and LC-759B)

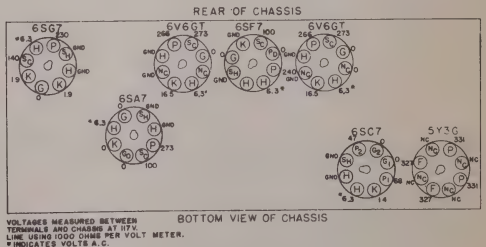

Fig. 4 Socket Voltages

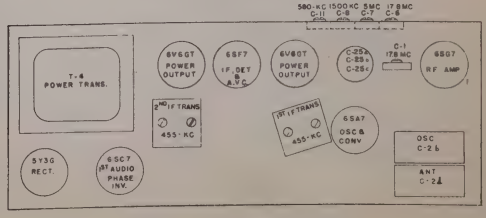

Fig. 5 Trimmer Location

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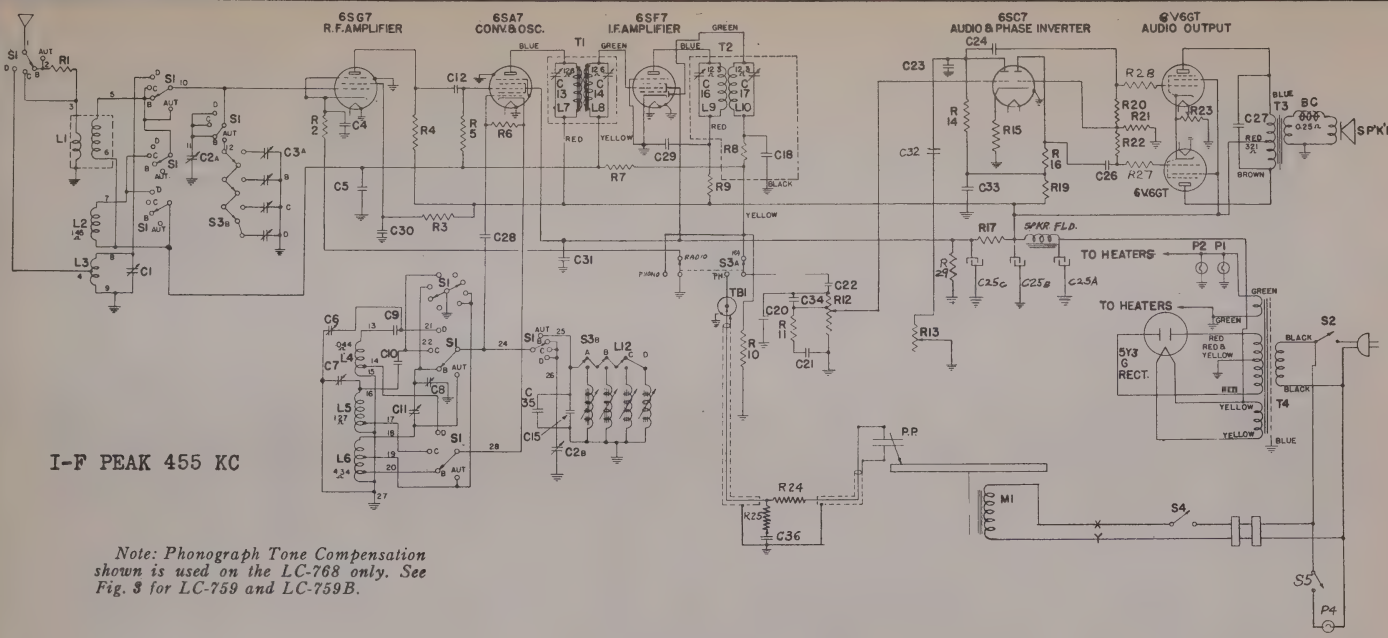

Note: Phonograph Tone Compensation shown is used on the LC-768 only. See Fig. 3 for LC-759 and LC-759B.

PARTS DESCRIPTION LIST

Symbol	Description	Symbol	Description	Symbol	Description	Symbol	Description
C1	"D" Band trimmer	C24	.02 mfd. 600-V paper	L6	"B" Band osc. coil	R19	100,000 ohms, ½-watt carbon
C2a }	Tuning condenser	C25a }	15 mfd. 450 V	L12a }	Push button coil assembly	R20	330,000 ohms, ½-watt carbon
C2b }		C25b }	15 mfd. 400 V	L12b }		R21	100,000 ohms, ½-watt carbon
C3a }		C25c }	10 mfd. 350 V	L12c }		R22	330,000 ohms, ½-watt carbon
C3b }	Push-button trimmer strip	C26	.02 mfd. 600-V paper	L12d }		R23	220 ohms, 2-watt carbon
C3c }		C27	.002 mfd. 1000-V paper	R1	1000 ohms, ½-watt carbon	R24	47,000 ohms, ½-watt, carbon (Fig. 3)
C3d }		C28	47 mmf. Mica	R2	220 ohms, ½-watt carbon	R25	100,000 ohms, ½-watt carbon (Fig. 3)
C4	.01 mfd. 600-V paper	C29	.01 mfd. 600-V paper	R3	47,000 ohms, ½-watt carbon	R26	470,000 ohms, ½-watt, carbon (Fig. 3)
C5	.05 mfd. 600-V paper	C30	.01 mfd. 600-V paper	R4	4700 ohms, ½-watt carbon	R27	1000 ohms, ½-watt carbon
C6	"B" Band osc. trimmer	C31	.01 mfd. 600-V paper	R5	47,000 ohms, ½-watt carbon	R28	1000 ohms, ½-watt, carbon
C7	"C" Band osc. trimmer	C32	.005 mfd. 600-V paper	R6	22,000 ohms, ½-watt carbon	R29	47,000 ohms, 1-watt, carbon
C8	"D" Band osc. trimmer	C33	.1 mfd. 600-V paper	R7	2.2 meg. ½-watt carbon	S1	Band-change switch
C9	4700 mmf. ±5% mica	C34	100 mmf. Mica	R8	47,000 ohms, ½-watt carbon	S2	Power switch (on tone control)
C10	2000 mmf. ±5% mica	C35	150 mmf. Temp. Compensating	R9	2700 ohms, ½-watt carbon	S3a }	Push-button switch assembly
C11	"B" padder	C36	.002 mfd. 600-V paper	R10	470,000 ohms, ½-watt carbon	S3b }	
C12	100 mmf. Mica	L1	"B" Band loop	R11	68,000 ohms, ½-watt carbon	S5	Phono.-comp. switch
C15	600 mmf. Silvered Mica	L2	"C" RF Coil	R12	2 meg. tap at 1 meg. (volume control)	T1	1st IF Transformer
C18	200 mmf. Mica	L3	"D" Band loop (LC-759 and LC-759B)	R13	2 meg. tone control	T2	2nd IF Transformer
C20	100 mmf. Mica			R14	470,000 ohms, ½-watt carbon	T3	Output transformer
C21	.0042 mfd. 600-V paper	L3	"D" Band loop (LC-768 only)	R15	3900 ohms, ½-watt carbon	T4	50–60-cycle power transformer
C22	.005 mfd. 600-V paper	L4	"D" Band osc. coil	R16	1 meg. ½-watt carbon	TB1	Phono jack
C23	220 mmf. Mica	L5	"C" Band osc. coil	R17	12,000 ohms, ½-watt carbon	SPKR	14" Electro-dynamic 400 ohm field

GENERAL ELECTRIC CO.

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TECHNICAL AND SERVICE INFORMATION

Since the Model JFM-165 consists of the Model J-718 radio chassis used in conjunction with the Model JFM-90 Frequency Modulation Translator, reference should be made to the service notes (RJS-718 and RJFMS-90) on these receivers for all technical and service information. When ordering replacement parts, for the standard radio chassis, refer to the parts list on the J-718 receiver and make the removals as shown under the J-718 parts list below. When ordering parts for the FM chassis refer to the parts list on the JFM-90 receiver and make additions and removals as in the JFM-90 parts list below. The additional parts listed are only common to the Model JFM-165 receiver.

Electrical Rating

Rating	Power Supply (Volts)	Frequency (Cycles on AC)	Power Consumption AM and FM Receiver
A-6	105–125	60	145
A-5	105–125	50	145
C-2	105–125	25	155

Tuning Frequency Range

Broadcast Band..... 540–1600 KC
Short-wave Band No. 1.....2300–6900 KC
Short-wave Band No. 2.....6900–22000 KC
Frequency Modulation Band..... 42.0–50.0 MC

Intermediate Frequency

Broadcast and Short-wave Receiver.....455 KC
Frequency Modulation Receiver.....4.3 MC

Electrical Power Output

Undistorted..... 4 watts
Maximum.....5.5 watts

Loud-speaker—"Alnico" Magnet Dynamic

Outside Speaker Diameter.....14 inches
Voice Coil Impedance .....3.5 ohms

Tubes

Frequency Modulation Chassis
1st Converter.....GE-6AB7
2nd Converter.....GE-6AB7
Oscillator.....GE-7A4
I.F. Amplifier.....(2) GE-6SK7
1st Limiter.....GE-6SJ7
2nd Limiter.....GE-6SJ7
Discriminator.....GE-6H6
Rectifier.....GE-5Y3G
Broadcast and Short-wave Chassis
R.F. Amplifier.....GE-6SK7
Converter and Oscillator.....GE-6SA7
I.F. Amplifier GE-6SK7
Det. Audio and AVC.....GE-6SQ7
Audio Driver.....GE-6J5G or GT
Audio Output GE-6Y6G
Rectifier.....GE-5Y3G
Pilot Lamps.....(5) MAZDA No. 44

REPLACEMENT PARTS LIST

(For complete list of replacements refer to J-718 and JFM-90 service notes)
SEE VOLUMES XII AND XIII FOR ORIGINAL DATA OF J-718 & JFM 90
Additions and substitutions

MODEL JFM-165

Stock No.	Description	List Price
	J-718 Parts List	
	Remove resistors R-2, R-27, and R-28	
RQ-1307	RESISTOR—100,000 ohm, ½ W. carbon (R-2) (Pkg. 5)	$0.70
RQ-1317	RESISTOR—270,000 ohm, ½ W. carbon (R-28) (Pkg. 5)	.70
RQ-1327	RESISTOR—680,000 ohm, ½ W. carbon (R-27) (Pkg. 5)	.70
	Remove Capacitor C-27	
RC-039	CAPACITOR—.01 mfd., 600 V. paper (C-27)	.25
	JFM-90 Parts List	
	Remove C-1	
RC-7041	CONDENSER—Tuning condenser and station selector assembly (C-1a, 1b, 1c)	5.00
	Substitute C-1	
RC-7044	CONDENSER—Tuning condenser assembly (C-1a, 1b, 1c)	5.00
	Remove R-22	
*RQ-1307	RESISTOR—100,000 ohm, ½ W. carbon (R-22) (Pkg. 5)	$0.70
	Substitute R-22	
*RQ-1299	RESISTOR—47,000 ohm, ½ W. carbon (R-22) (Pkg. 5)	.70
	Additional Parts JFM-165	
RB-206	BOARD—FM chassis mounting boards	1.00
RB-1037	BOARD—FM antenna terminal board	.10
RG-423	GRILLE CLOTH—Cabinet grille cloth	1.10
RC-8204	CABLE—FM output connector cable and plug assembly	.35
RC-8527	CARD—FM key tab card	.05
RD-173	DIAL—Dial scale and escutcheon assembly—FM	.70
RL-550	BEAM-A-SCOPE—Cylindrical Beam-a-Scope assembly	2.10
RS-629	SUPPORT—Cylindrical Beam-a-Scope bottom support	1.00

*Used on previous production receivers.

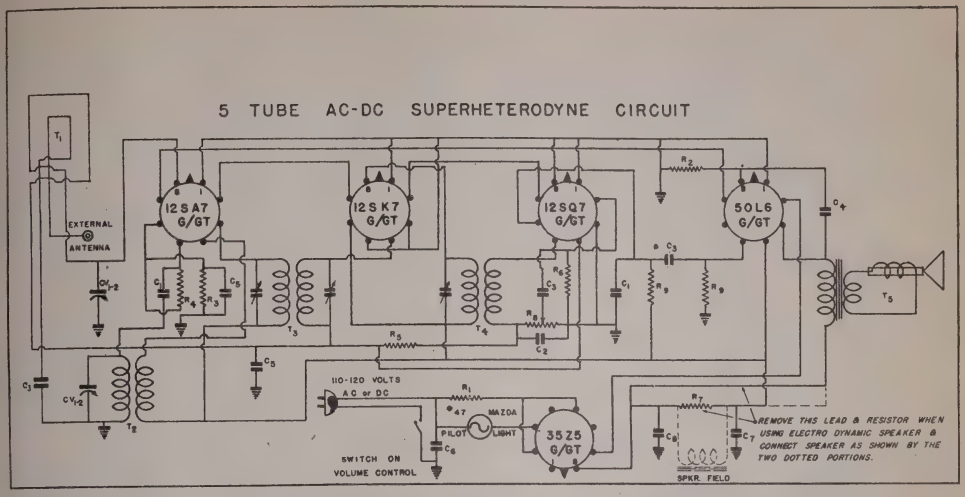
(Prices subject to change without notice)

John F. Rider

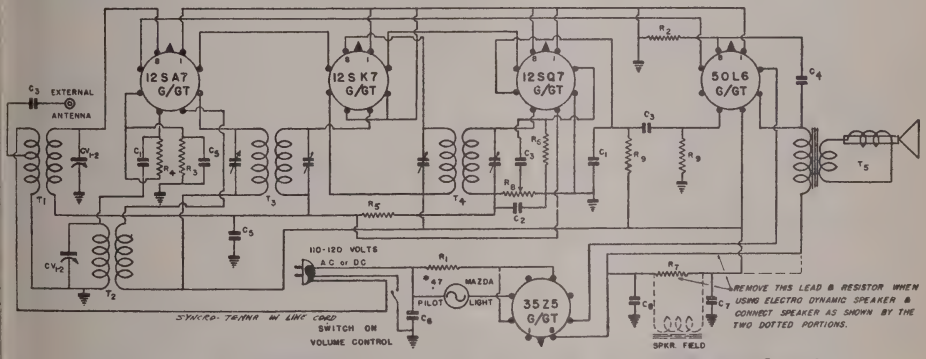
Single End Tubes

GENERAL TELEVISION & RADIO CO.

MODELS 19, 51, 57
MODELS 26, 34, 47, 49, 57, 88, 91.

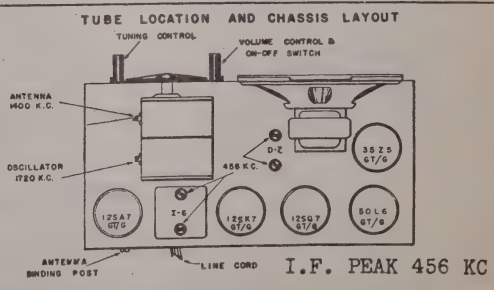


MODELS 19, 51 and 57



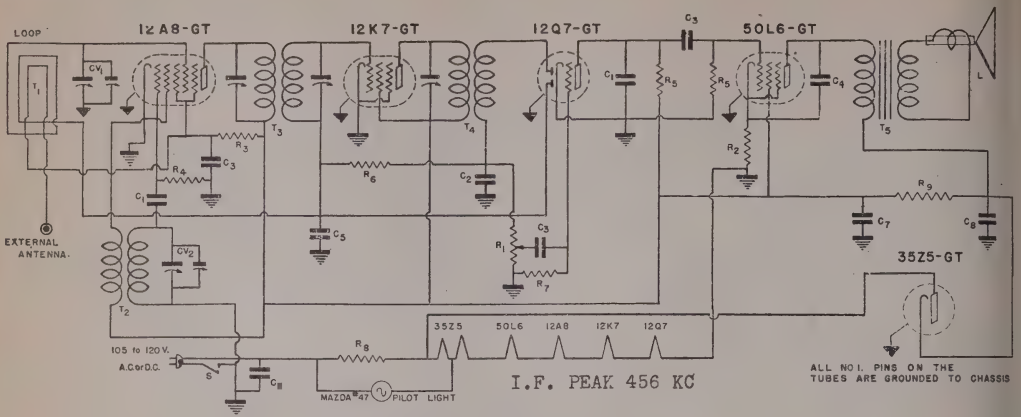
MODELS 26, 34, 47, 49, 57, 88 and 91

C_1	—	.00025 MFD. 600 V. PAPER	CONDENSER
C_2	—	.0005 MFD. 600 V.	" "
C_3	—	.01 MFD. 400 V.	" "
C_4	—	.02 MFD. 400 V.	" "
C_5	—	.05 MFD. 200 V.	" "
C_6	—	.1 MFD. 400 V.	" "
C_7	346	20 MFD. 150 W.V.	ELECTROLYTIC CONDENSER
C_8	348	40 MFD. 150 W.V.	" "
CV_{1-2}	6468B	TWO GANG VARIABLE	CONDENSER
R_1	—	10 OHM 1/4 WATT	CARBON RESISTOR
R_2	—	150 OHM 1/4 "	" "
R_3	—	800 OHM 1/4 "	" " ± 10%
R_4	—	50000 OHM 1/4 "	" "
R_5	—	2 MEGOHM 1/4 "	" "
R_6	—	6 MEGOHM 1/4 "	" "
R_7	—	2500 OHM 1/2 "	" "
R_8	2009K	1/2 MEGOHM	VOLUME CONTROL
R_9	—	1/2 MEGOHM 1/4 WATT	CARBON RESISTOR
T_1	A-8	ANTENNA COIL	
T_2	O-6	OSCILLATOR COIL	
T_3	1-6	1st. I.F. TRANSFORMER	
T_4	D-2	DIODE I.F. TRANSFORMER	
T_5	836W	8" P.M. SPEAKER	



MODELS 19, 26, 34, 47, 49, 51, 57, 88 AND 91

MODELS 19, 51
Double End Tubes GENERAL TELEVISION & RADIO CO.
MODEL 530

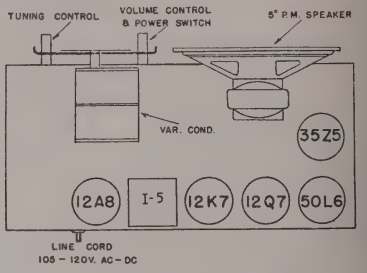


MODELS 19 and 51

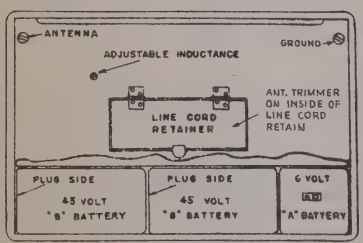
DIA. NO.	PART NO.	DESCRIPTION
C_1	—	.00025 MFD. 600 V. TUBULAR CONDENSER
C_2	—	.0005 MFD. 200 V. TUBULAR CONDENSER
C_3	—	.01 MFD. 400 V. TUBULAR CONDENSER
C_4	—	.02 MFD. 400 V. TUBULAR CONDENSER
C_5	—	.05 MFD. 200 V. TUBULAR CONDENSER
C_6	—	.1 MFD. 400 V. TUBULAR CONDENSER
C_7	IN 346	20 MFD. 150 W.V. ELECTROLYTIC COND.
C_8	IN 346	40 MFD. 150 W.V. ELECTROLYTIC COND.
CV_{1-2}	648	2 GANG VARIABLE CONDENSER
R_9	—	2500 OHM $\frac{1}{2}$ W. CARBON RESISTOR
L	838	P. M. SPEAKER
S	—	LINE SWITCH ON VOLUME CONTROL

DIA. NO.	PART NO.	DESCRIPTION
R_1	2009F	500,000 OHM VOLUME CONTROL
R_2	—	150 OHM $\frac{1}{4}$ WATT CARBON RESISTOR-10%
R_3	—	50000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	—	50000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	—	500,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	—	2 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	—	6 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_8	—	10 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
T_1	3553	LOOP
T_2	O-S	OSCILLATOR COIL
T_3	I-S	INPUT I.F. TRANSFORMER
T_4	O-S	OUTPUT I.F. TRANSFORMER
T_5	IN 838	SPEAKER TRANSFORMER

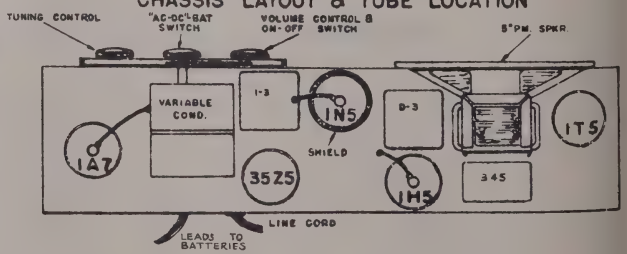
TUBE LOCATION & CHASSIS LAYOUT



BACK VIEW OF CABINET



CHASSIS LAYOUT & TUBE LOCATION



MODEL 530

BATTERY REPLACEMENT

If, when these batteries are to be replaced, longer service (200 hours or more) is desired, you may replace this pack with one (1) 4F4 "A" battery and two (2) V30B "B" batteries made by the same company, or their equivalent in another make.

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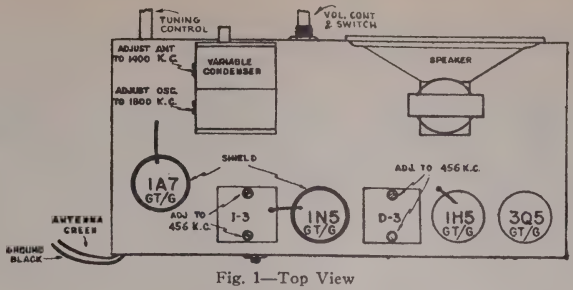


Fig. 1—Top View

SERVICE NOTES

Voltages taken from the different points of the circuit to chassis are measured with volume control in maximum position, all tubes in their sockets and with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the voltage chart.

In order to prevent the signal from acting upon the AVC and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages should be measured with a new battery or one that gives 94½ volts under load. Resistance and actual connections of coils and transformers and speaker data are given under Service Information.

To check for open by pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good.

ALIGNING INSTRUCTIONS

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver, a signal generator as well as an output meter, must be used.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide as accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—1 mf., 200 mmf.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I.F.	456 KC.	.1 MFD.	Grid of 1N5G tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See I3 Fig. 1)	Output I.F.	Adjust to Maximum output
	456 KC.	.1 MFD.	Grid of 1A7G tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See D3 Fig. 1)	Input I.F.	Adjust to Maximum output
BROAD-CAST	1600 KC.	200 mmf.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer— (See Fig. 1)		Adjust to Maximum output
	1400 KC.	200 mmf.	Antenna lead	Set dial at 1400 KC.	Trimmer— (See Fig. 1)		Adjust to Maximum output

This is all that is necessary for the alignment unless the plates of the gang have been bent out of shape. In case of bent plates, set the signal generator and receiver to 600KC and bend the plates into the position for maximum output.

Attenuate the signal from the signal generator to prevent the leveling off-action of the AVC. After each band is completed, repeat the procedure as a final check.

Frequency Range

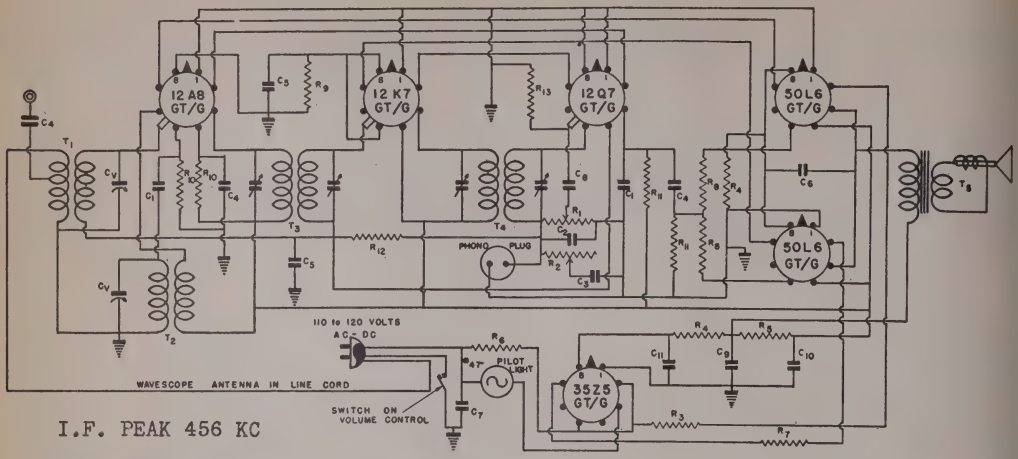
535 to 1730 K.C.

Power output .27 watt undistorted—.35 watt maximum

Intermediate Frequency 456 K.C.

MODELS 54, 616
MODEL F56W

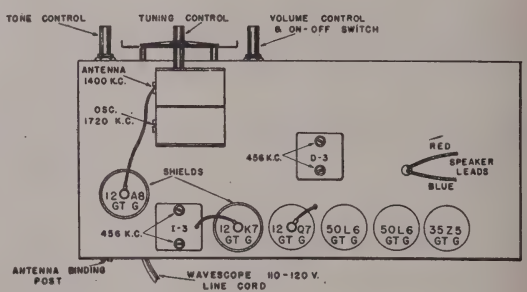
GENERAL TELEVISION & RADIO CO.

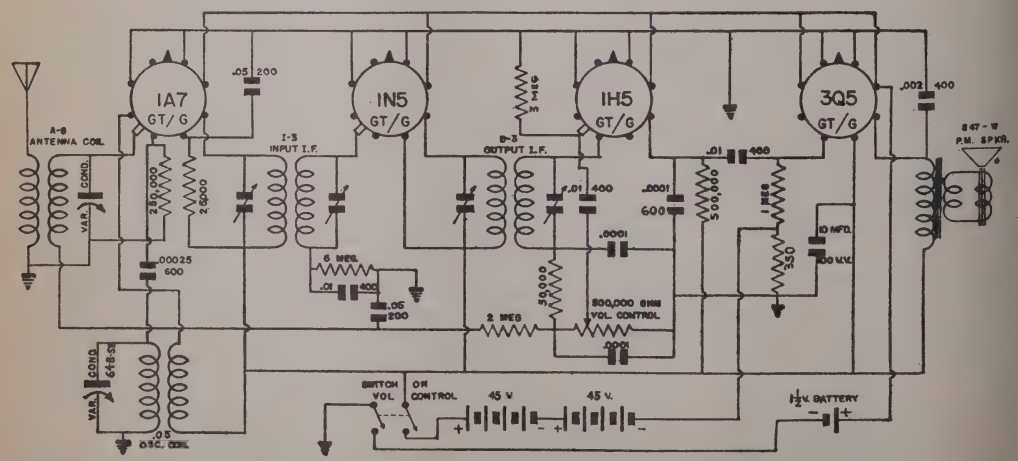


I.F. PEAK 456 KC

MODELS 616 and 54

C_1	———	.00025	MFD. 600 V. PAPER	CONDENSER
C_2	———	.0005	MFD. 600 V. "	"
C_3	———	.005	MFD. 400 V. "	"
C_4	———	.01	MFD. 400 V. "	"
C_5	———	.05	MFD. 200 V. "	"
C_6	———	.05	MFD. 600 V. "	"
C_7	———	.1	MFD. 400 V. "	"
C_8	———	.02	MFD. 400 V. "	"
C_9	348	15	MFD. 150 W.V. ELECTROLYTIC	CONDENSER
C_{10}	348	20	MFD. 150 W.V. "	"
C_{11}	348	40	MFD. 150 W.V. "	"
C_V	648-SB	TWO GANG VARIABLE	CONDENSER	
R_1	2009X	1/2 MEGOHM VOLUME	CONTROL	
R_2	2056X	250,000 OHM TONE	CONTROL	
R_3	157	360 OHM 8 WATT	WIRE WOUND RESISTOR	
R_4	———	80 OHM 1/2 WATT	CARBON RESISTOR	
R_5	———	2500 OHM 1/2	" "	"
R_6	———	5 OHM 1/2	" "	"
R_7	———	46 OHM 1	" "	"
R_8	———	1000 OHM 1/4	" "	"
R_9	———	1500 OHM 1/4	" "	"
R_{10}	———	50000 OHM 1/4	" "	"
R_{11}	———	1/2 MEGOHM 1/4	" "	"
R_{12}	———	2 MEGOHM 1/4	" "	"
R_{13}	———	6 MEGOHM 1/4	" "	"
T_1	A-8	ANTENNA COIL		
T_2	O-5	OSCILLATOR COIL		
T_3	I-3	Ist. I.F. TRANSFORMER		
T_4	D-3	DIODE I.F. TRANSFORMER		
T_5	843	6 1/2" P.M. SPEAKER		





I.F. PEAK 456 KC

MODEL F56W

1½ VOLT FARM BATTERY SET

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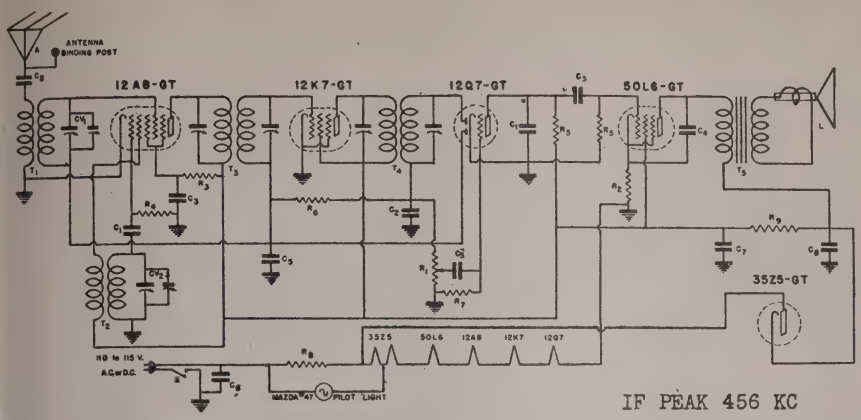
GENERAL TELEVISION & RADIO CO.

MODEL 520
MODELS 411, 421



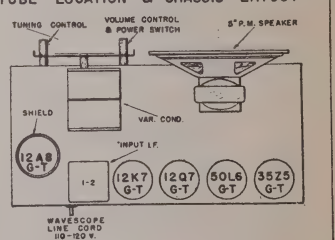
MODEL 520

IF PEAK 456 KC

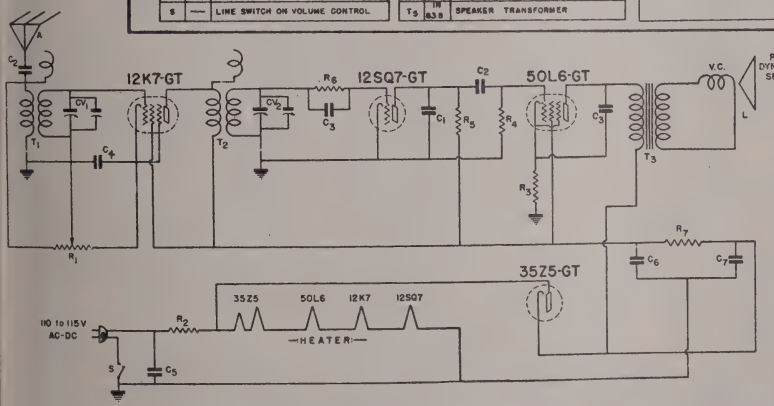
DIA. SYM.	PART NO.	DESCRIPTION
C_1	—	.00025 MFD. 600 V. TUBULAR CONDENSER
C_2	—	.0005 MFD. 200V. TUBULAR CONDENSER
C_3	—	.01 MFD. 400 V. TUBULAR CONDENSER
C_4	—	.02 MFD. 400 V. TUBULAR CONDENSER
C_5	—	.05 MFD. 200 V. TUBULAR CONDENSER
C_6	—	.1 MFD. 400 V. TUBULAR CONDENSER
C_7	IN 348	20 MFD. 150 W.V. ELECTROLYTIC COND.
C_8	IN 346	40 MFD. 150 W.V. ELECTROLYTIC COND.
CV_{1-2}	648	2 GANG VARIABLE CONDENSER
R_9	—	2500 OHM $\frac{1}{2}$ W. CARBON RESISTOR
A	—	WAVESCOPE AERIAL
L	838	P.M. SPEAKER
S	—	LINE SWITCH ON VOLUME CONTROL

DIA. NO.	PART NO.	DESCRIPTION
R_1	2009	500,000 OHM VOLUME CONTROL
R_2	—	150 OHM $\frac{1}{4}$ WATT CARBON RESISTOR-10%
R_3	—	50000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	—	50000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	—	500,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	—	2 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	—	6 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_8	—	10 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
T_1	A-5-A	ANTENNA COIL
T_2	O-5	OSCILLATOR COIL
T_3	I-2	INPUT I.F. TRANSFORMER
T_4	O-2	OUTPUT I.F. TRANSFORMER
T_5	IN 635	SPEAKER TRANSFORMER

TUBE LOCATION & CHASSIS LAYOUT



W.F.S.

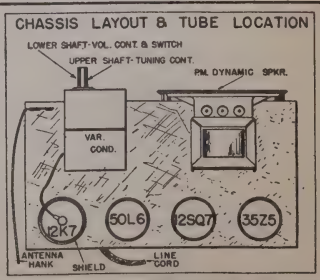


MODELS 411 AND 421

DIA. NO.	PART NO.	DESCRIPTION
C_1	—	.00025 MFD. 600 V. TUB. COND.
C_2	—	.01 MFD. 400 V. TUBULAR COND.
C_3	—	.02 MFD. 400 V. TUBULAR COND.
C_4	—	.05 MFD. 200 V. TUBULAR COND.
C_5	—	.05 MFD. 400 V. TUBULAR COND.
C_6	IN 343	10 MFD. 150 V. TUBULAR COND
C_7	IN 343	30 MFD. 150 V. TUBULAR COND.
CV_{1-2}	656	2 GANG VARIABLE COND.
T_1	A-10	ANTENNA COIL
T_2	R-10	R.F. COIL
T_3	844	SPEAKER TRANSFORMER

DIA NO.	PART NO.	DESCRIPTION
R_1	2042	10,000 OHM VOLUME CONTROL
R_2	—	40 OHM 1 WATT CARBON RESIST.
R_3	—	150 OHM $\frac{1}{4}$ WATT CARBON RESIST.
R_4	—	$\frac{1}{2}$ MEGOHM $\frac{1}{4}$ WATT CAR. RESIST.
R_5	—	1 MEGOHM $\frac{1}{4}$ WATT CARBON RESIST.
R_6	—	3 MEGOHM $\frac{1}{4}$ WATT CAR. RESIST.
R_7	—	5,000 OHM $\frac{1}{4}$ WATT CAR RESIST.
S	—	LINE SWITCH ON VOLUME CONT.
A	—	ANTENNA WIRE
L	844	DYNAMIC SPEAKER P.M.

CHASSIS LAYOUT & TUBE LOCATION



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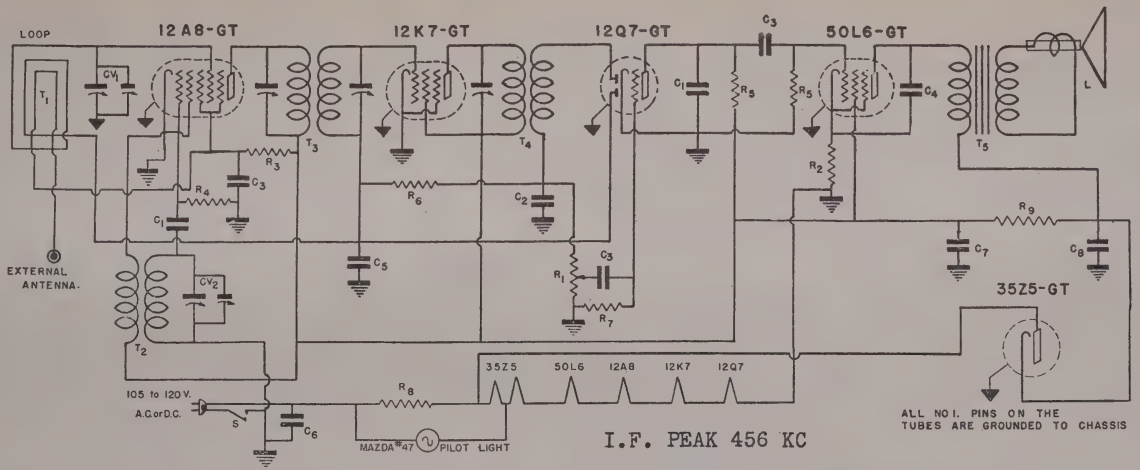
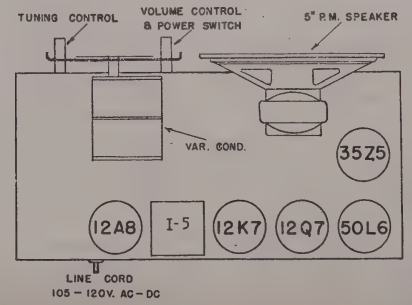
5 TUBE SUPERHETERODYNE RECEIVER *AC-DC TYPE*



DIA. NO.	PART NO.	DESCRIPTION
C_1	—	.00025 MFD. 600 V. TUBULAR CONDENSER
C_2	—	.0005 MFD. 200 V. TUBULAR CONDENSER
C_3	—	.01 MFD. 400 V. TUBULAR CONDENSER
C_4	—	.02 MFD. 400 V. TUBULAR CONDENSER
C_5	—	.05 MFD. 200 V. TUBULAR CONDENSER
C_6	—	.1 MFD. 400 V. TUBULAR CONDENSER
C_7	IN 346	20 MFD. 150 W.V. ELECTROLYTIC COND.
C_8	IN 346	40 MFD. 150 W.V. ELECTROLYTIC COND.
CV_{1-2}	648	2 GANG VARIABLE CONDENSER
R_9	—	2500 OHM $\frac{1}{2}$ W. CARBON RESISTOR
L	836	P. M. SPEAKER
S	—	LINE SWITCH ON VOLUME CONTROL

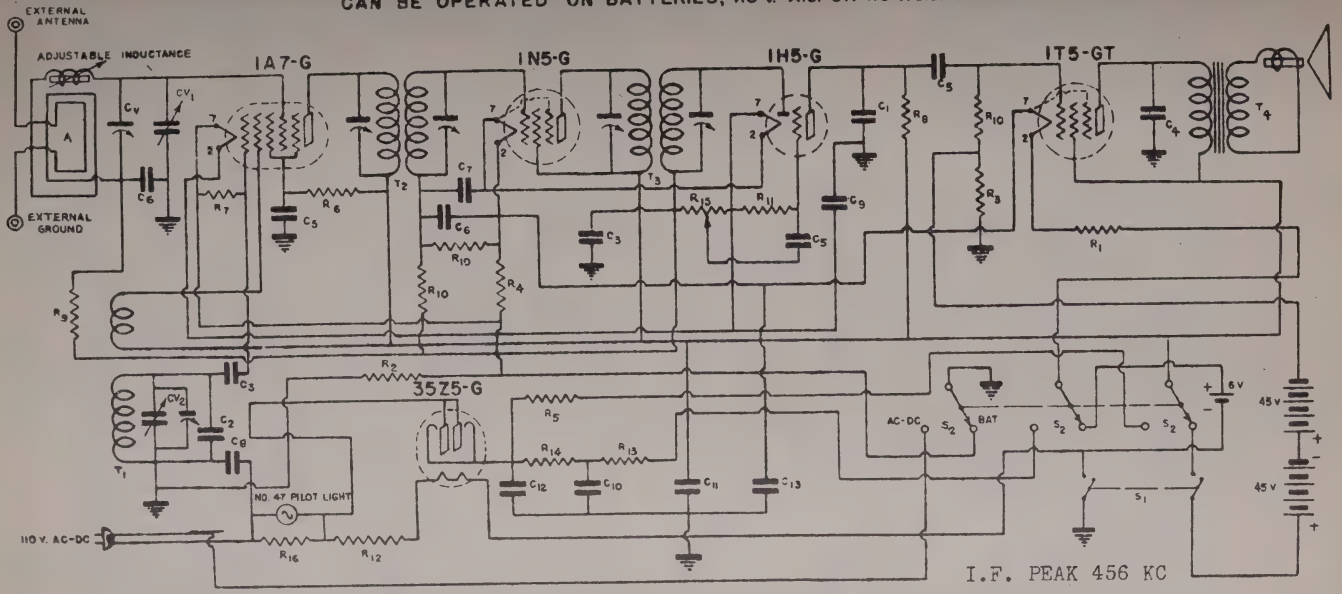
DIA. NO.	PART NO.	DESCRIPTION
R_1	2009F	500,000 OHM VOLUME CONTROL
R_2	—	150 OHM $\frac{1}{4}$ WATT CARBON RESISTOR-10%
R_3	—	50000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_4	—	50000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_5	—	500,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_6	—	2 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_7	—	6 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR
R_8	—	10 OHM $\frac{1}{4}$ WATT CARBON RESISTOR
T_1	3553	LOOP
T_2	O-5	OSCILLATOR COIL
T_3	I-5	INPUT I.F. TRANSFORMER
T_4	O-5	OUTPUT I.F. TRANSFORMER
T_5	IN 838	SPEAKER TRANSFORMER

TUBE LOCATION & CHASSIS LAYOUT



5 TUBE SUPERHETERODYNE RECEIVER

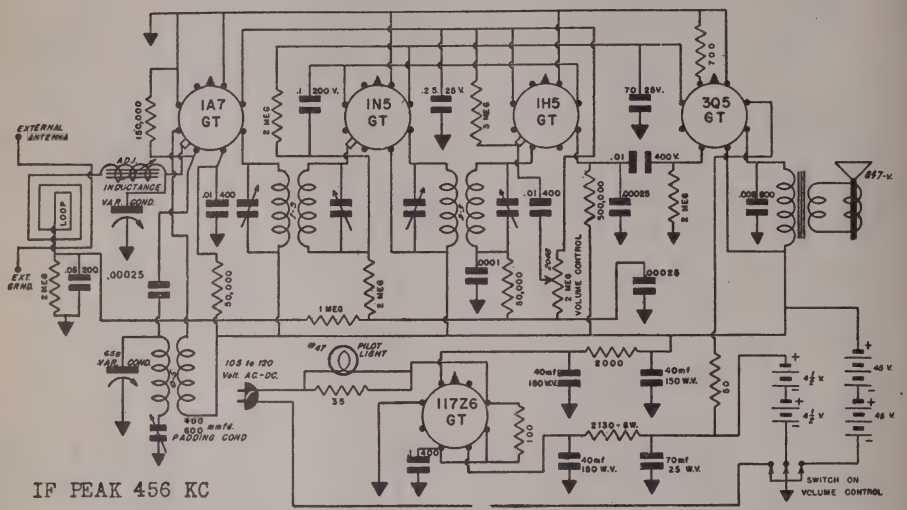
CAN BE OPERATED ON BATTERIES, 110 V.-A.C. OR 110 V.-D.C. CURRENT



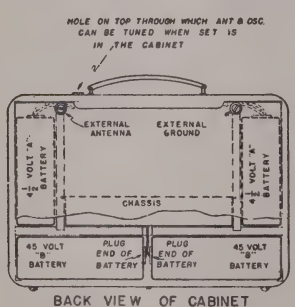
DIAG. NO.	DESCRIPTION
C1	.0001 MICA CONDENSER
C2	.00002 MICA CONDENSER 10%
C3	.00025 MFD. 600 V. TUBULAR COND.
C4	.002 MFD. 600 VOLT TUBULAR COND.
C5	.01 MFD. 400 V. TUBULAR COND.
C6	.05 MFD. 200 V. TUBULAR COND.
C7	.1 MFD. 200 V. TUBULAR COND.
C8	.1 MFD. 400 V. TUBULAR COND.
C9	.25 MFD. 25 V. TUBULAR COND.
C10	10 MFD. 35 V. ELECTROLYTIC COND.
C11	20 MFD. 150 V. " "
C12	40 MFD. 150 V. " "
C13	70 MFD. 6 V. " "
Cv	2 TO 40 MMFD. TRIMMER COND.
Cv1-2	2 GANG VARIABLE CONDENSER
A	LOOP ANTENNA
T1	OSCILLATOR COIL
T2	INPUT I.F. TRANSFORMER
T3	OUTPUT I.F. TRANSFORMER
T4	P.M. SPEAKER
R1	10 OHM 1/4 W. CARBON RESIST. 10%
R2	30 OHM 1/4 W. " "
R3	100 OHM 1/4 W. " "
R4	700 OHM 1/4 W. " "
S1	SWITCH ON VOLUME CONTROL
S2	3-POLE TWO POSITION SWITCH
R5	3000 OHM 1/4 W. CARBON RESISTOR
R6	50,000 OHM 1/4 W. CARBON RESISTOR
R7	150,000 OHM 1/4 W. " "
R8	1/2 MEGOHM 1/4 W. " "
R9	1 MEGOHM 1/4 W. " "
R10	2 MEGOHM 1/4 W. " "
R11	3 MEGOHM 1/4 W. " "
R12	520 OHM 12 WATT WIRE WOUND " "
R13	400 OHM 1 WATT " " "
R14	2200 OHM 5 WATT " " "
R15	VOLUME CONTROL
R16	30 OHM 1.2 WATT " " "

MODEL 536

GENERAL TELEVISION & RADIO CO.

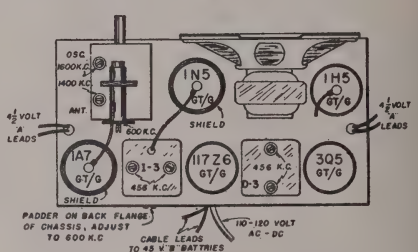


IF PEAK 456 KC


HOLE ON TOP THROUGH WHICH ANT & OSC. CAN BE TUNED WHEN SET IS IN THE CABINET
EXTERNAL ANTENNA
EXTERNAL GROUND
4½ VOLT "A" BATTERY
CHASSIS
45 VOLT "B" BATTERY
PLUG END OF BATTERY

BACK VIEW OF CABINET

CHASSIS LAYOUT & TUBE LOCATION



BATTERIES

When the 45 volt B-batteries are tested and measure 30 volts or less, they should be replaced. The 4 1/2 volt A-batteries should be replaced when the reading is 3 volts or less.

The following kits of batteries can be used for replacement:

2 RAY-O-VAC 45 volt "B" No. 7830.
2 RAY-O-VAC 4 1/2 volt "A" No. P83A.

2 USALITE 45 volt "B" No. 640
2 USALITE 4 1/2 volt "A" No. 683.

2 BURGESS 45 volt "B" No. M30.
2 BURGESS 4 1/2 volt "A" No. G3.

2 EVEREADY MINIMAX No. 482
2 EVEREADY MINIMAX 4 1/2 volt "A" No. 746.

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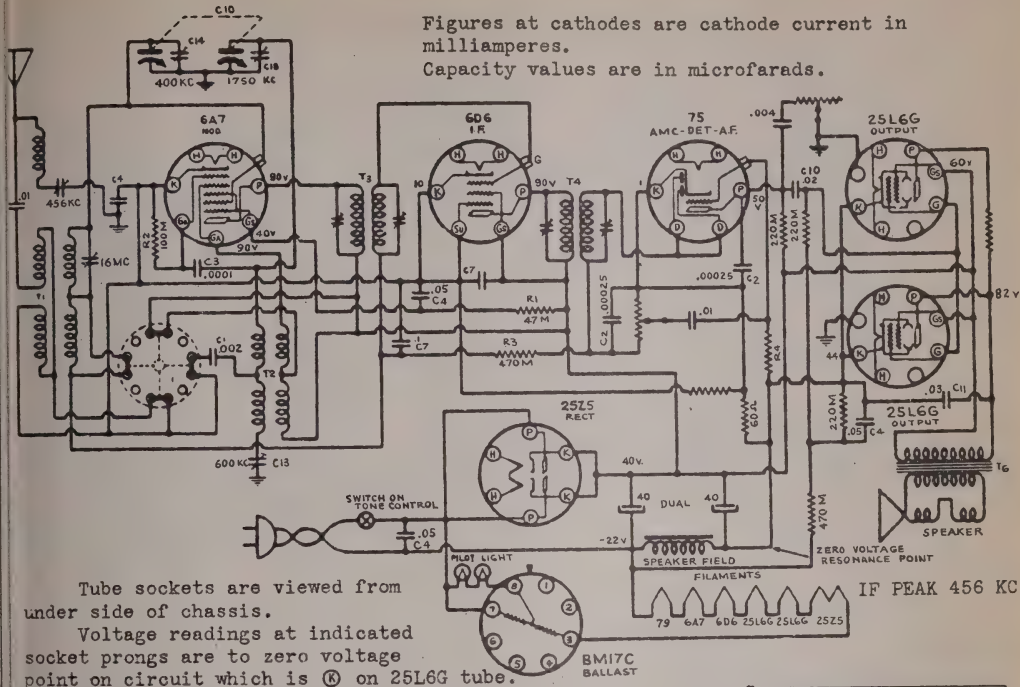
GOODYEAR TIRE & RUBBER CO., INC.

MODEL 015070
Chassis 543



Tube sockets are viewed from under side of chassis.

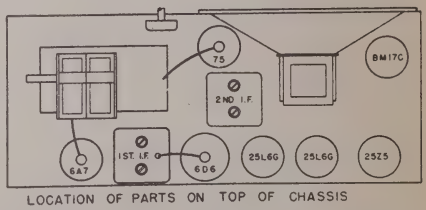
Voltage readings at indicated socket prongs are to zero voltage point on circuit which is Ⓚ on 25L6G tube.

Voltages must be measured with no signal.

Alignment is to be made at the frequencies shown at the trimmer condensers.

Wave trap adjustment at 456 KC input is made to provide maximum reduction of signal.

Where no voltage reading is shown at socket prong, it indicates zero voltage or a very low reading.



LOCATION OF PARTS ON TOP OF CHASSIS

FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL.VIII

SETTING PUSH-BUTTONS

1. By means of the Station Selector Knob, tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the lowest frequency—that is, your selected station which is tuned in nearest the right-hand side of the dial.

2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of lowest frequency and the Call Letter Tab for this station should be at the extreme right of the Call Letter Holder.

Follow through with this same procedure, setting up the other 5 stations in the order of their frequency—that is, the second station set up will be second lowest in frequency and the third station set up will be third lowest in frequency.

Carefully check each Push-Button for the accuracy of its setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your radio automatically or manually. To receive any one of your six selected stations for automatic operation, merely push in ALL THE WAY the Button set up for that station.

To receive all other stations in the regular manner, push in the Station Selector Knob and turn it to the frequency of the station desired.

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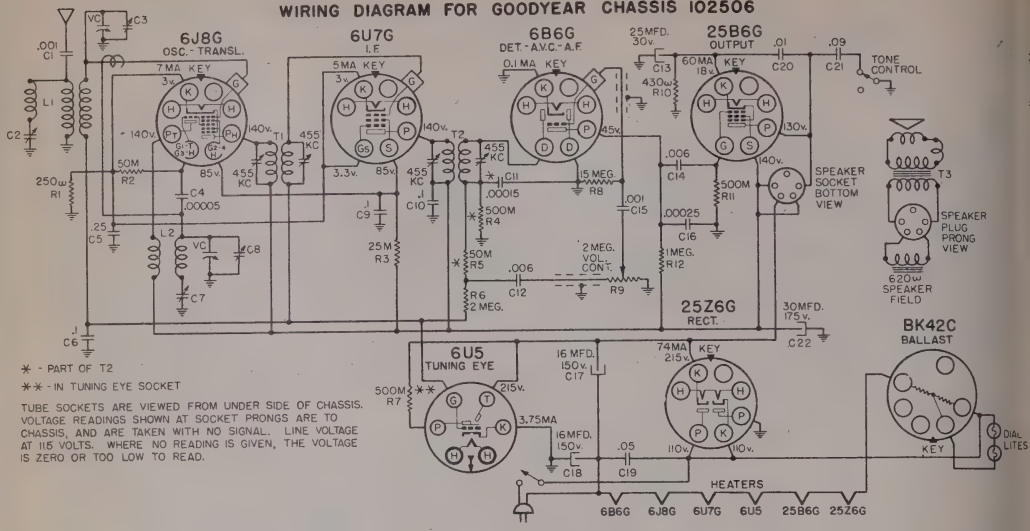
MODEL 102506

GOODYEAR TIRE & RUBBER CO., INC.

WIRING DIAGRAM FOR GOODYEAR CHASSIS 102506



* - PART OF T2

** - IN TUNING EYE SOCKET

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across loud speaker voice coil

Output meter reading to indicate 500 milliwatts . . . . . 1.18 volts

Dummy antenna value to be in series with generator output . . . . . See chart below

Connection of generator output lead . . . . . See chart below

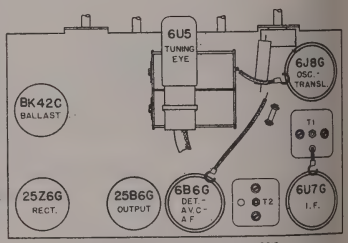
Generator modulation . . . . . 30%, 400 cycles

Position of Volume Control . . . . . Fully clockwise

Position of Tone Control . . . . . HI

Position of Dial Pointer with variable fully closed . . . . . To fall on dot below 550 kc calibration mark.

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION
Closed	455 kc	.1 mfd.	6J8G Grid	T2, T1	IF Output IF Input
1400 kc	1400 kc	.0002 mfd.	Ant. Clip	C3	Translator
600 kc (rock)	600 kc	.0002 mfd.	Ant. Clip	C7	Padder



LOCATION OF PARTS ON TOP OF CHASSIS

IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

PUSH BUTTON TUNING

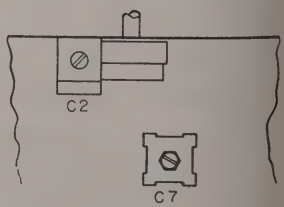
SETTING UP:

Unscrew (turn counter-clockwise) the push button two or three turns. (Use a token or screwdriver in the button slot to unscrew it, if necessary.) Push the button all the way in. Hold it in firmly and at the same time tune in your desired station. With your station tuned in, look the adjustment by securely tightening (turn clockwise) the push button knob, using token or screwdriver. Hold the button in while tightening it. Unless the button is tightened securely, the adjustments may slip. Punch out the station's call letters from the sheet supplied and insert the call letters in the recess in the button. Then cover the call letters with one of the clear celluloid discs supplied.

Proceed in the same manner for the remaining buttons. If a change in selection of stations is desired, the old call letters can be removed with a pin inserted in the slot under the call letters.

OPERATION:

"Push button stations" will be tuned in by pushing the button all the way in.



LOCATION OF TRIMMERS UNDER CHASSIS

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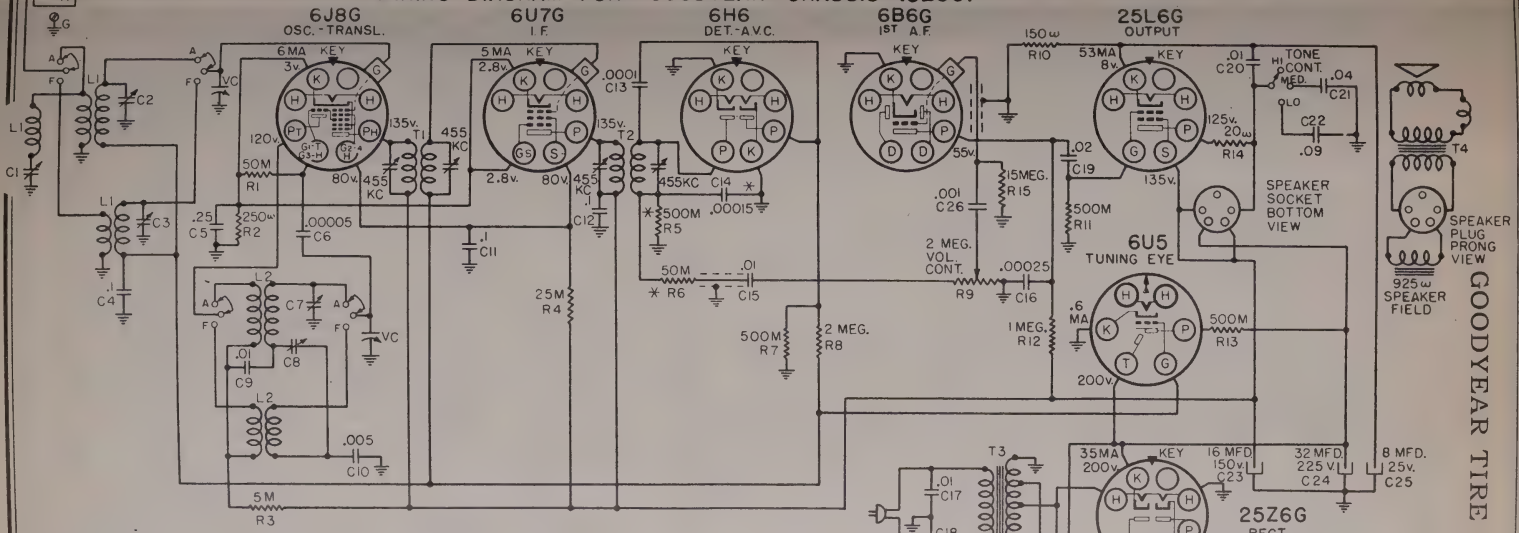
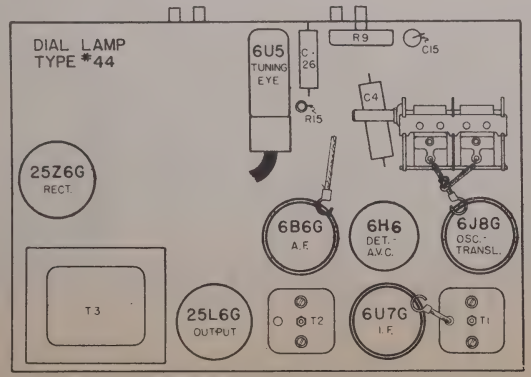
WIRING DIAGRAM FOR GOODYEAR CHASSIS 1025C7



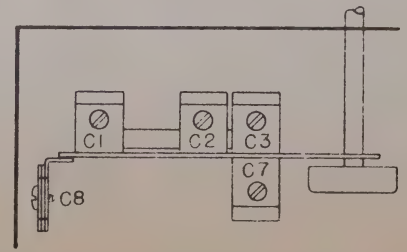
* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER-SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.



LOCATIONS OF PARTS ON TOP OF CHASSIS.

IF PEAK 455 KC



LOCATIONS OF TRIMMERS UNDER CHASSIS

MODEL 102507
MODEL 102508

GOODYEAR TIRE & RUBBER CO., INC.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across loud speaker voice coil

Output meter reading to indicate 500 milliwatts Ch. 102508 . . . . . 0.98 volts

Output meter reading to indicate 500 milliwatts Ch. 102507 . . . . . 1.33 volts

Generator ground lead connection . . . . . Receiver chassis

Dummy antenna value to be in series with generator output . . . . . See chart below

Connection of generator output lead . . . . . See chart below

Generator modulation . . . . . 30%, 400 cycles

Position of Volume Control . . . . . Fully clockwise

Position of Tone Control . . . . . HI

Position of Dial Pointer with variable fully closed Ch. 102508 Center of block to left of 550 kc calibration mark.

Position of Dial Pointer with variable fully closed Ch. 102507 Center of first mark to left of 550 kc calibration mark.

Ch. 10250~

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION
"AM"	Closed	455 kc	.1 mfd.	6J8G Grid	T3, T1	IF Output IF Input
"AM"	600 kc	455 kc*	.0003 mfd.	Ant. Term.	C1*	Wave Trap
"AM"	Fully open	1730 kc	.0003 mfd.	Ant. Term.	C7	Oscillator
"AM"	1400 kc	1400 kc	.0003 mfd.	Ant. Term.	C3	Translator
"AM"	600 kc (rock)	600 kc	.0003 mfd.	Ant. Term.	C8	Padder
"SW"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C5	Translator

IMPORTANT ALIGNMENT NOTES

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

Ch. 102508

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION
"AM"	Closed	455 kc	.1 mfd.	6A8G Grid	T3, T1	IF Output IF Input
"SW"	15 mc(rock)	15 mc	400 ohms	Ant. Term.	C5	Translator
"9MC"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	C7* C6	Oscillator Translator
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C8,C3,C2	Osc.,Trans.,Ant.
"AM"	600 kc(rock)	600 kc	.0003 mfd.	Ant. Term.	C9	Padder

IMPORTANT ALIGNMENT NOTES

The alignment must be done in the order given.

*Two peaks can be had, one with the trimmer screwed further out than the other. The correct adjustment is with the trimmer screwed further out. The other peak is the image.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

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MODEL 102507

PUSH BUTTON TUNING

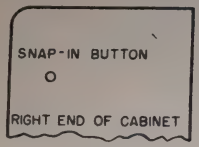
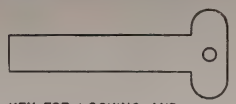


FIG. 1



KEY FOR LOCKING AND UNLOCKING PUSH-BUTTON MECHANISM.

FIG. 2

SETTING UP:

Leave the radio turned on for about 15 minutes before adjusting the push buttons. This "warming up" period will insure permanent and accurate settings.

1. Make a list of the stations that you want to set up for push button tuning. It is advisable, but not necessary, to arrange the stations in the order of their frequency (kilocycles); that is, the station of lowest frequency will be #1, the station of next higher frequency #2, etc. The top left push button can be used for station #1, the lower left one for station #2, the next upper one for station #3, etc. If you wish, short wave stations can be set up for approximate push button tuning and then tuned accurately with the tuning knob. The stations selected must give strong and reliable reception.

2. Remove the four screws that hold the plate through which the push buttons protrude, and remove the plate. (This plate is called the "escutcheon".) If your radio is a table model (not a console), remove the snap-in button at the right side of the cabinet. See Fig 1.

3. Push the tuning knob in and turn it so that the dial pointer comes to the right end of the dial. If your radio is a table model, a key, illustrated in Fig. 2, will be found in the Instruction Leaflet envelope. Insert this key in the hole in the side of the cabinet from which the snap-in button was removed and engage the key with the slot at the end of the push button locking mechanism. Unscrew (turn counter-clockwise) the key a few turns, unlocking the mechanism. (A screw driver can be used for unlocking the mechanism instead of the key supplied.)

If yours is a console model, the mechanism can be unlocked by reaching in from the back of the cabinet and unscrewing (turning counter-clockwise) the wing nut, at the end of the mechanism, a few turns. (This can be done by hand.)

4. Push the button that you wish to use for your #1 station, all the way in and hold it in firmly. Push the tuning knob in and turn it until your #1 station is tuned in exactly. Then let go of the push button, making sure not to turn the tuning knob until you have let go of the button. (Turning the knob while the button is pushed in would spoil the accuracy of the adjustment.) Be as exact as possible in tuning your station since this will determine how accurately your station will be tuned whenever you use the push button.

5. Push in your #2 button. Hold it in firmly and tune in your #2 station accurately. Then let go of the push button and then the tuning knob. Proceed in the same manner for the other stations on your list.

6. When all of the stations have been set up, push the tuning knob in and turn it so that the dial pointer comes to the left end of the dial. Then lock the mechanism by tightening (turning clockwise) the wing nut for console models or by using the key for table models. If yours is a table model, replace the snap-in button in the side of the cabinet.

7. Punch out the call letters of your desired stations from the call letter sheets supplied. Insert the call letters in the celluloid holders at the back of the escutcheon. Be sure to insert the call letters so that they are opposite their respective push buttons. Then replace the escutcheon.

8. You may change your choice of stations at any time by unlocking the mechanism as described in Step 3 and adjusting the button to the new station, as described in Step 4. Then relock the mechanism as described in Step 6. The call letters of the new station should be inserted in the call letter holder in their proper position.

Chassis 102508, 102509

PUSH BUTTON TUNING

SETTING UP:

Leave the radio turned on for about 15 minutes before adjusting the push buttons. This "warming up" period will insure permanent and accurate settings.

1. Make a list of the stations that you want to set up for push button tuning. It is helpful to arrange the stations in the order of their frequency (kilocycles); that is, the station of lowest frequency will be #1, the station of next higher frequency #2, etc. The top left push button can be used for station #1, the lower left one for station #2, the next upper one for station #3, etc. If you wish, short wave stations that can be tuned in on a SPREAD BAND scale can be set up for push button tuning. The stations selected must give strong and reliable reception.

2. Remove the four screws that hold the plate through which the push buttons protrude, and remove the plate. (This plate is called the "escutcheon".)

3. Push the tuning knob in and turn it so that the dial pointer comes to the left end of the dial. Engage the small screw driver, supplied, with the slotted shaft that is between the tuning knob and the push buttons. Unlock the mechanism by pushing the shaft in and unscrewing it (turn counter-clockwise) about four turns. Then remove the screw driver.

4. Push the button that you wish to use for your #1 station, all the way in and hold it in firmly. Push the tuning knob in and turn it until your #1 station is tuned in exactly, as indicated by the tuning eye. Be as exact as possible in tuning your station since this will determine how accurately your station will be tuned whenever you use the push button. Then let go of the push button before turning the tuning knob again. If properly done, the tuning eye indication will not change when you let go of the push button.

5. Push in your #2 button. Hold it in firmly and tune in your #2 station accurately. Then let go of the push button; then the tuning knob. Proceed in the same manner for the other stations on your list.

CAUTION: Use the small screw driver supplied for performing the next operation. Use of a larger screw driver than the one supplied will result in too much force being applied. The locking mechanism must not be turned too far to the right. Otherwise it may be impossible to obtain proper operation of the push buttons and the mechanism is liable to be permanently damaged.

6. After the last station has been set up, lock the mechanism by pushing the slotted shaft in and securely tightening it (turn clockwise), using the small screw driver, supplied (Pushing the slotted shaft in will release the last push button. The dial pointer will move to the right end of the dial as the slotted shaft is turned.) Then remove the screw driver. If the slotted shaft remains pushed in when the screw driver is removed, turning it back and forth very slightly will release it.

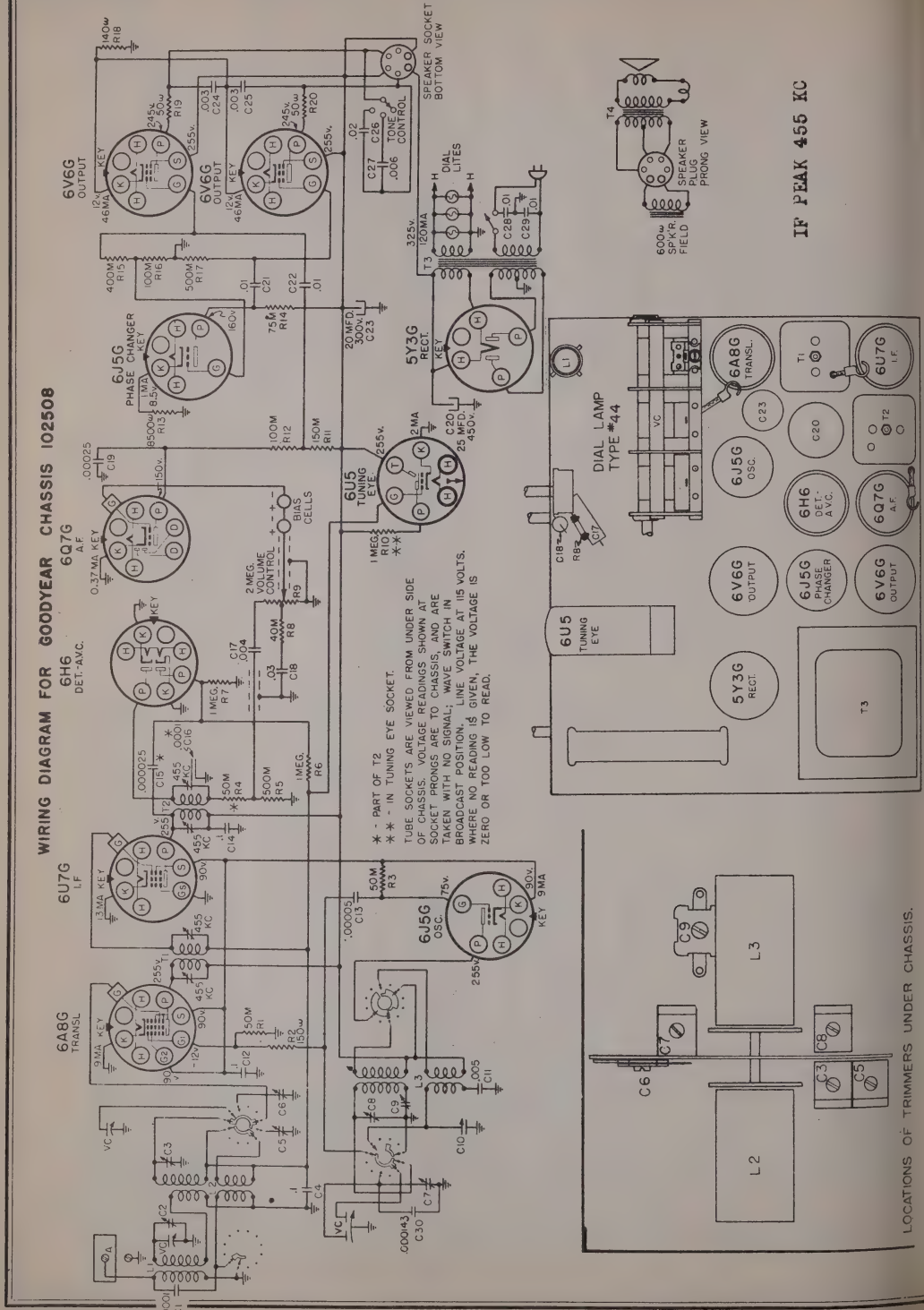
After locking the mechanism, test the setting of each button by pushing it in. Then see if the station can be tuned still more accurately by using the tuning knob. Increased accuracy of tuning with the knob will be indicated by a narrower shadow of the tuning eye. If you find any stations that have not been correctly set up, unlock the mechanism, as described in Step 3, and readjust the setting. Be sure to lock the mechanism again before tuning any stations.

7. Punch out the call letters of your desired stations from the call letter sheets supplied. Insert the call letters in the recesses in the front of the push buttons. Cover the call letters with the clear celluloid tabs supplied. Replace the escutcheon.

8. You may change your choice of stations at any time by unlocking the mechanism as described in Step 3 and adjusting the button to the new station, as described in Step 4. Then relock the mechanism as described in Step 6. The call letters of the new station should be inserted in the proper push button.

MODEL 102508

GOODYEAR TIRE & RUBBER CO., INC.


WIRING DIAGRAM FOR GOODYEAR CHASSIS 102508
6A8G TRANSL
6U7G I.F.
6H6 DET. AVC.
6Q7G A.F.
6V6G OUTPUT
6V6G OUTPUT
6J5G PHASE CHANGER
6U5 TUNING EYE
6Y3G RECT.
6J5G OSC.
* - PART OF T2
** - IN TUNING EYE SOCKET.
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
SPEAKER SOCKET BOTTOM VIEW
DIAL LAMP TYPE #44
600Ω SPK'R. FIELD
SPEAKER PLUG PRONG VIEW
IF PEAK 455 KC
LOCATIONS OF TRIMMERS UNDER CHASSIS.

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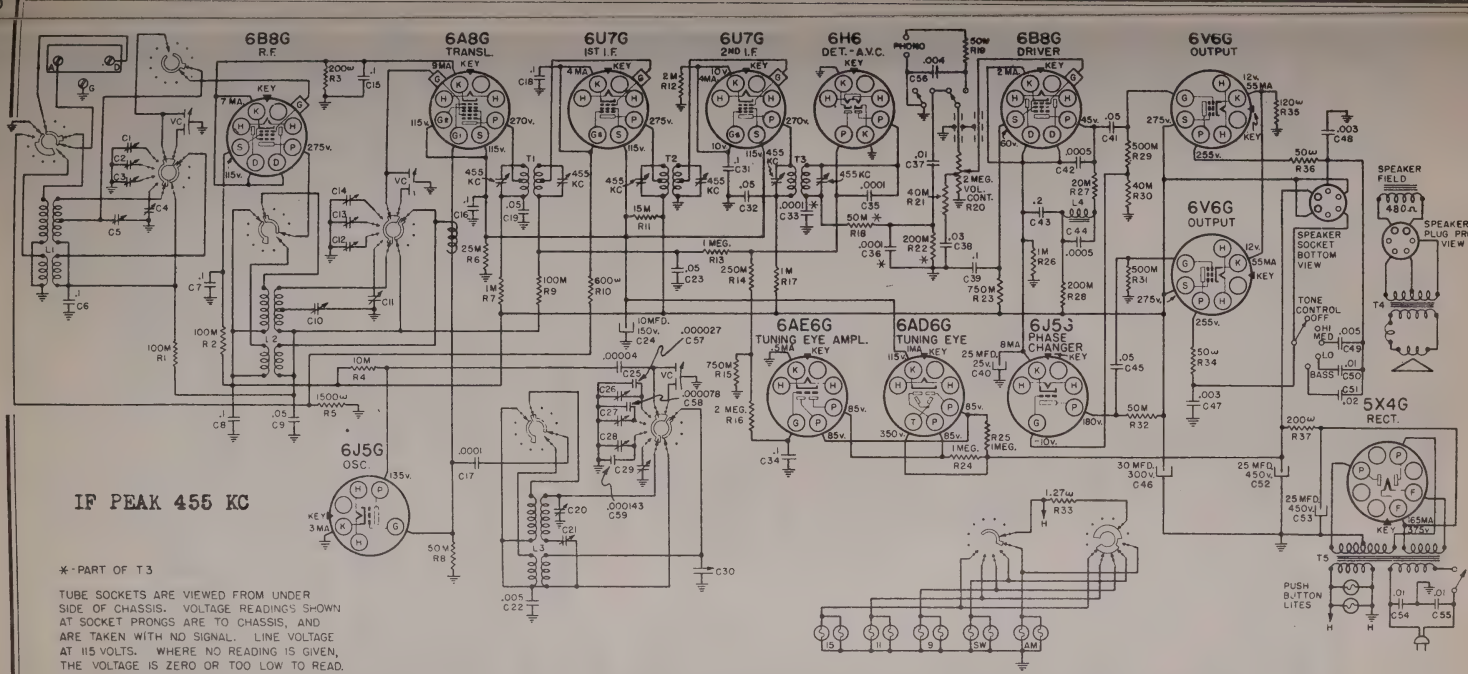
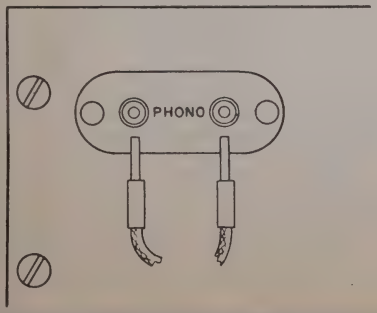


WIRING DIAGRAM FOR GOODYEAR CHASSIS 102509



PHONOGRAPH OPERATION

Provision is made so that your radio can be used to give high quality reproduction from phonograph records. The phonograph "pick up" must be of modern high impedance electric type. The Goodyear catalog #01110 record player is especially recommended.

Push the two pin plugs, that will be found at the end of the cord attached to the record player, into the holes in the connection board provided at the rear of the radio. Try the plugs in both possible positions in the connection board, and leave them in the position giving better reproduction.

The knob at the back of the radio must be in the position marked "PHONO" for phonograph operation and in the position marked "RADIO" for radio reception. The radio volume and tone controls will also function for phono reproduction.

MODEL 102509

GOODYEAR TIRE & RUBBER CO., INC.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across loud speaker voice coil

Output meter reading to indicate 500 milliwatts . . . . . 1.06 volts

Generator ground lead connection . . . . . Receiver chassis

Dummy antenna value to be in series with generator output . . . . . See chart below

Connection of generator output lead . . . . . See chart below

Generator modulation . . . . . 30%, 400 cycles

Position of Volume Control . . . . . Fully clockwise

Position of Tone Control . . . . . HI

Position of Dial Pointer with variable fully closed . . . . . Center of block to left of 550 kc calibration mark.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION
"AM"	Closed	455 kc	.1 mfd.	6A8G Grid	T3, T2, T1	IF Output, IF Interstage, IF Input.
"SW"	18 mc	18 mc	400 ohms	Ant. Term.	C39*	Oscillator
"SW"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C11, C4	Translator, RF
"9"	9.55 mc	9.55 mc	400 ohms	Ant. Term.	C38* C12 C3	Oscillator Translator RF
"11"	11.7 mc	11.7 mc	400 ohms	Ant. Term.	C37* C13 C2	Oscillator Translator RF
"15"	14.9 mc	14.9 mc	400 ohms	Ant. Term.	C36* C14 C1	Oscillator Translator RF
"AM"	1400 kc	1400 kc	.0003 mfd.	Ant. Term.	C20 C10 C5	Oscillator Translator RF
"AM"	600 kc (rock)	600 kc	.0003 mfd.	Ant. Term.	C21	Padder

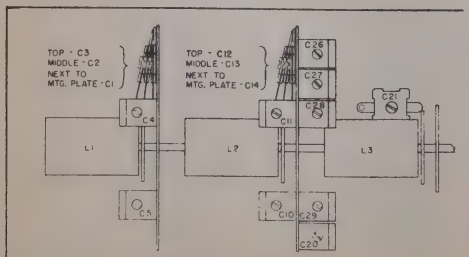
IMPORTANT ALIGNMENT NOTES

The alignment must be done in the order given.

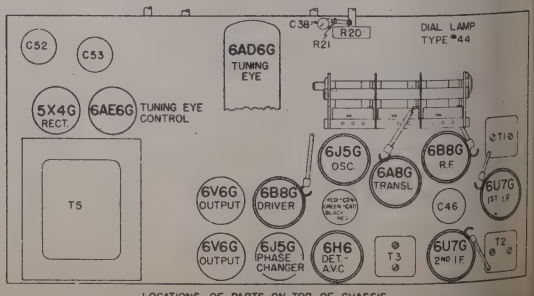
*Two peaks can be had, one with the trimmer screwed further out than the other. The correct adjustment is with the trimmer screwed further out. The other peak is the image.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.



LOCATIONS OF TRIMMERS UNDER CHASSIS.



LOCATIONS OF PARTS ON TOP OF CHASSIS.

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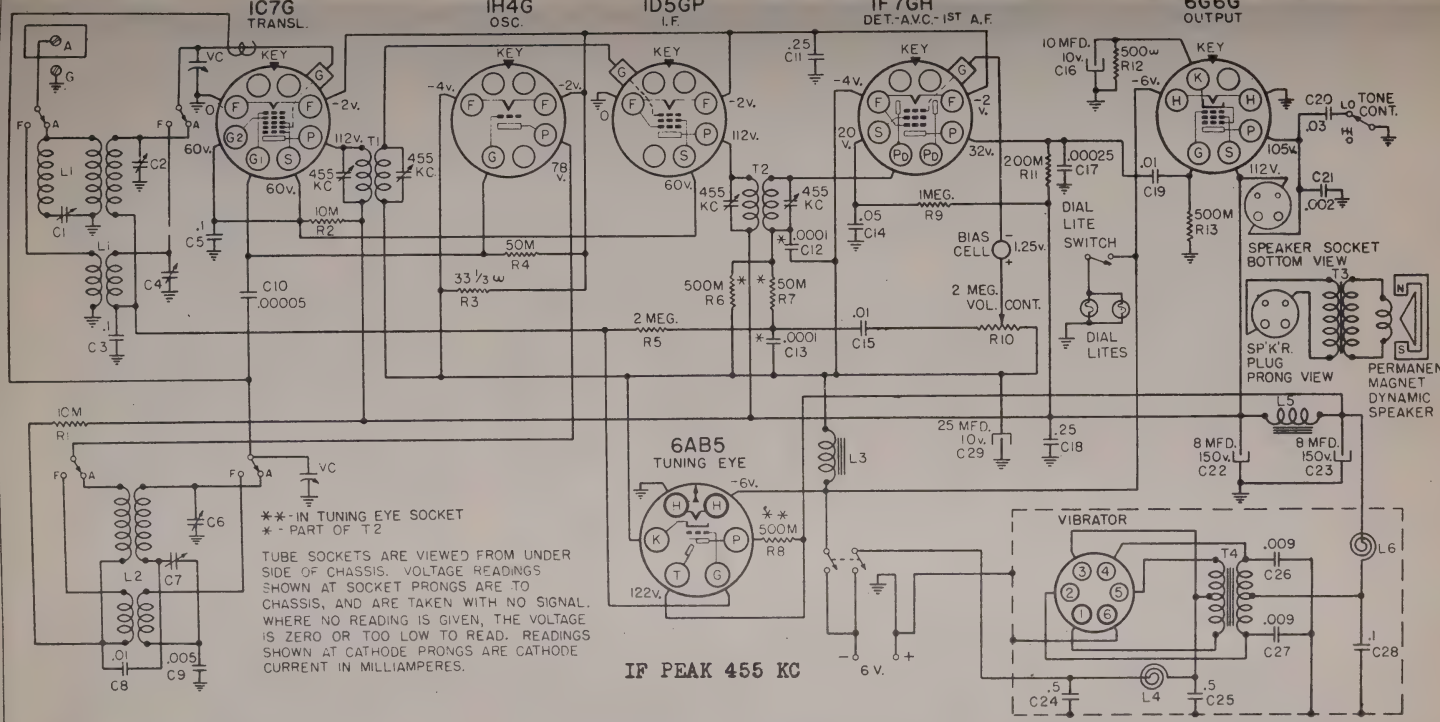


PUSH BUTTON TUNING

Ch. 102512, 102513

SETTING UP:

Unscrew (turn counter-clockwise) the push button two or three turns. (Use a penny in the button slot to unscrew it, if necessary.) Push the button all the way in. Hold it in firmly and at the same time tune in your desired station. With your station tuned in, lock the adjustment by tightening the push button knob (turn clockwise). Hold the button in while tightening it. Punch out the station's call letters from the sheet supplied and insert the call letters in the recess in the button. Then cover the call letters with one of the clear celluloid discs supplied.

Proceed in the same manner for the remaining buttons. If a change in selection of stations is desired, the old call letters can be removed with a pin inserted in the slot under the call letters.

MODEL 102512

GOODYEAR TIRE & RUBBER CO., INC.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across loud speaker voice coil

Output meter reading to indicate 50 milliwatts . . . . . 0.37 volts

Generator ground lead connection . . . . . Receiver chassis

Dummy antenna value to be in series with generator output . . . . . See chart below

Connection of generator output lead . . . . . See chart below

Generator modulation . . . . . 30%, 400 cycles

Position of Volume Control . . . . . Fully clockwise

Position of Tone Control . . . . . HI

Position of Dial Pointer with variable fully closed . . . . . Horizontal

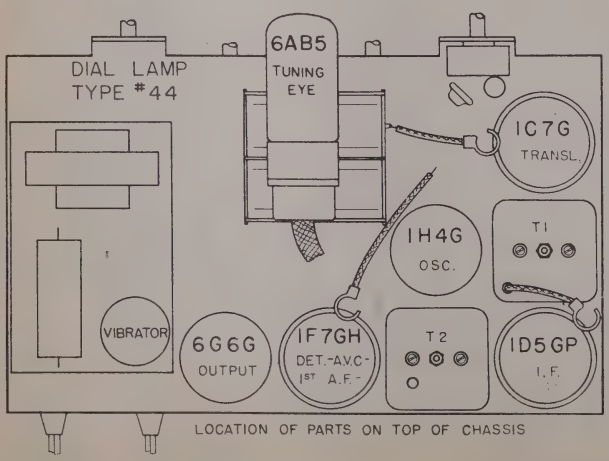
WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION
"AM"	Closed	455 kc	.1 mfd.	1C7G Grid	T2, T1	IF Output IF Input
"AM"	600 kc	455 kc*	.0002 mfd.	Ant. Term.	C1*	Wave Trap
"AM"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C6, C2	Osc.,Transl.
"AM"	600 kc(rock)	600 kc	.0002 mfd.	Ant. Term.	C7	Padder
"SW"	16 mc(rock)	16 mc	400 ohms	Ant. Term.	C4	Transl.

IMPORTANT ALIGNMENT NOTES

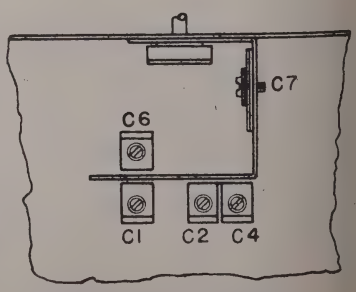
* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.



LOCATION OF PARTS ON TOP OF CHASSIS



LOCATIONS OF TRIMMERS UNDER CHASSIS

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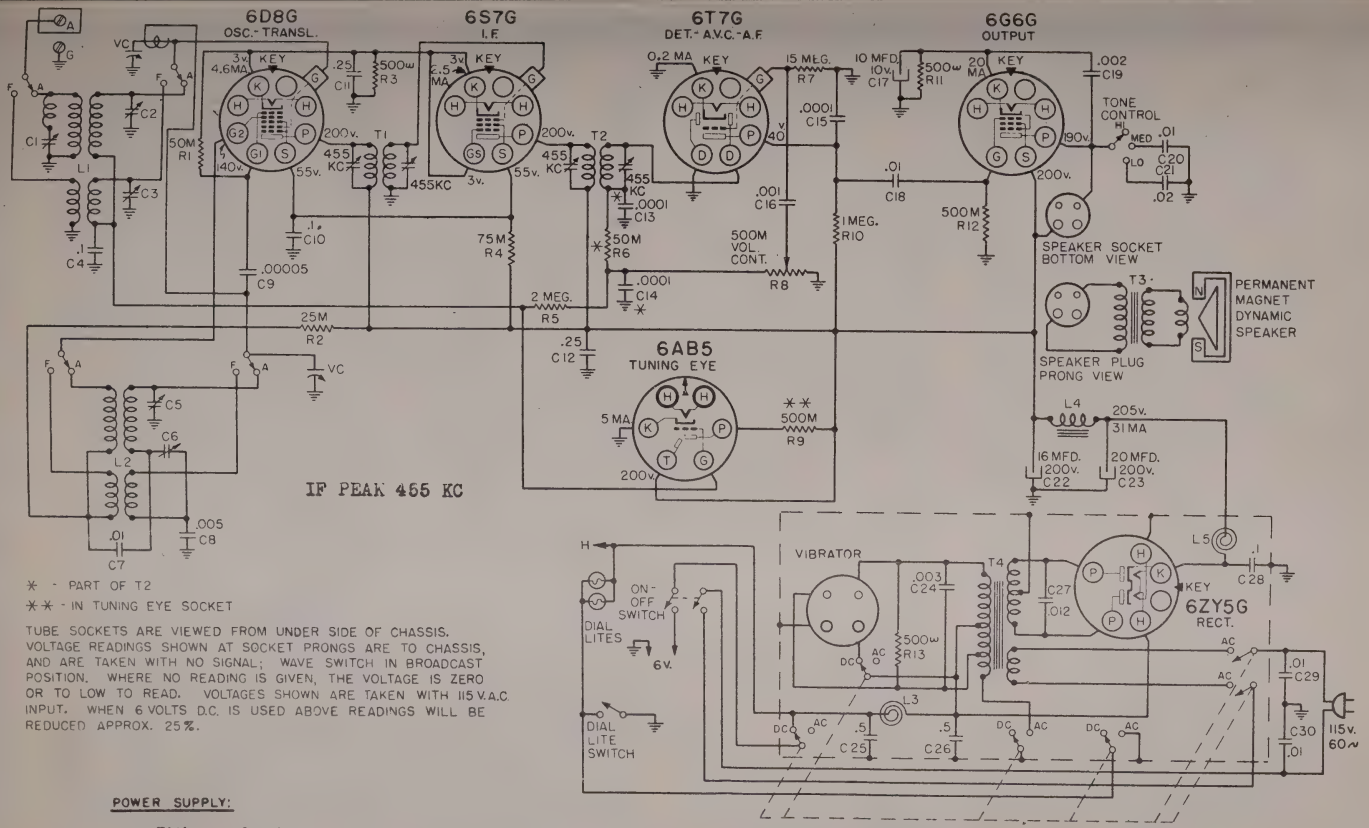


* - PART OF T2

** - IN TUNING EYE SOCKET

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TO LOW TO READ. VOLTAGES SHOWN ARE TAKEN WITH 115 V.A.C. INPUT. WHEN 6 VOLTS D.C. IS USED ABOVE READINGS WILL BE REDUCED APPROX. 25%.

POWER SUPPLY:

Either a 6 volt storage battery or a 115 volt, 50-60 cycle alternating current(AC)power supply may be used.

If a 6 volt storage battery is used,connect the clips at the ends of the flexible wires, at the rear of the receiver,to the terminals of the storage battery. Either clip may be connected to either terminal. If AC supply is to be used, insert the power cord plug into a convenient receptacle. The storage battery connection clips will then be left unconnected. There is a knob at the rear of the receiver to be turned to the marking "6 volt" or "115 volt, depending upon the type of power supply used. No damage will result if the knob is turned to the wrong position although the receiver will not operate until the knob is turned to the position that corresponds with the type of power supply used.

WIRING DIAGRAM FOR GOODYEAR CHASSIS 102513

GOODYEAR TIRE & RUBBER CO., INC.

MODEL 102513

GOODYEAR TIRE & RUBBER CO., INC.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across Loud speaker voice coil

Output meter reading to indicate 50 milliwatts . . . . . 0.33 volts

Generator ground lead connection . . . . . Receiver chassis

Dummy antenna value to be in series with generator output . . . . . See chart below

Connection of generator output lead . . . . . See chart below

Generator modulation . . . . . 30%, 400 cycles

Position of Volume Control . . . . . Fully clockwise

Position of Tone Control . . . . . HI

Position of Dial Pointer with variable fully closed . . . . . Horizontal. To be along first heavy line below 550 kc

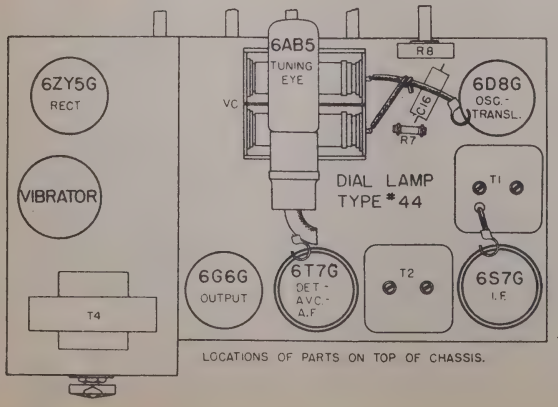
WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION
"AM"	Closed	455 kc	.1 mfd.	6D8G Grid	T3, T1	IF Output IF Input
"AM"	600 kc	455 kc*	.0003 mfd.	Ant. Term.	C1*	Wave Trap
"AM"	1500 kc	1500 kc	.0003 mfd.	Ant. Term.	C5, C2	Os.,Transl.
"AM"	600 kc(rock)	600 kc	.0003 mfd.	Ant. Term.	C6	Padder
"SW"	15 mc(rock)	15 mc	400 ohms	Ant. Term.	C3	Transl.

IMPORTANT ALIGNMENT NOTES

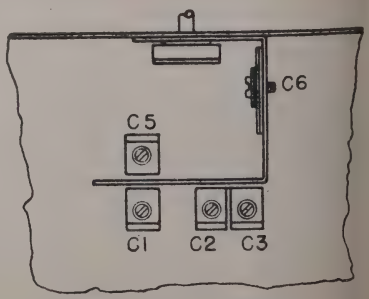
* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.



LOCATIONS OF PARTS ON TOP OF CHASSIS.



LOCATIONS OF TRIMMERS UNDER CHASSIS

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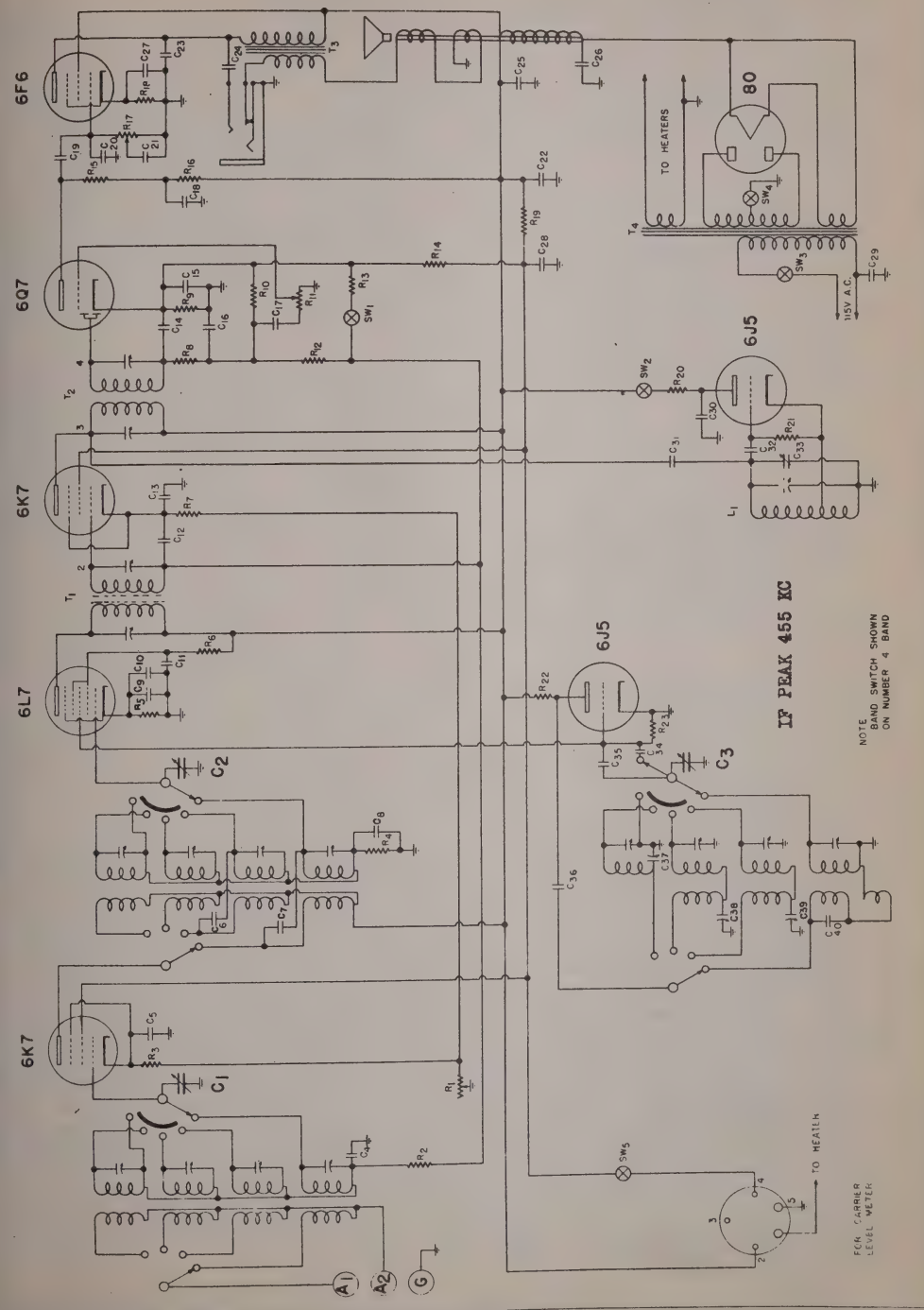
THE HALLICRAFTERS CO.



SCHEMATIC DIAGRAM — SKY CHAMPION — MODEL S-20

©John F. Rider

THE SEND-RECEIVE SWITCH ENABLES THE OPERATOR TO MAKE THE RECEIVER INOPERATIVE TEMPORARILY DURING STAND-BY PERIODS. SHOULD THE RECEIVER BE USED IN CONJUNCTION WITH A TRANSMITTER THIS FEATURE WILL PROVE VALUABLE.

ANTENNA: ON THE BACK OF THE CHASSIS WILL BE FOUND THE ANTENNA, DOUBLET AND GROUND TERMINAL STRIP. A CONVENTIONAL SINGLE WIRE ANTENNA SHOULD BE CONNECTED TO A1, AND THE JUMPER BETWEEN A2 AND G LEFT CONNECTED. A 75 FOOT PIECE OF #14 ENAMELED WIRE INSULATED AND SUSPENDED IN THE CLEAR IS RECOMMENDED FOR THIS TYPE OF ANTENNA. IF A DOUBLET ANTENNA IS USED THE TWO WIRES OF THE LEAD-IN ARE CONNECTED TO A1 AND A2 AND THE JUMPER BETWEEN A2 AND G REMOVED. A GROUND CAN BE CONNECTED TO THE G TERMINAL WITH EITHER TYPE OF ANTENNA. IT IS SUGGESTED THAT A GROUND BE LEFT OFF THE RECEIVER ONLY IF IN SO DOING THE PERFORMANCE OF THE RECEIVER IS IMPROVED. THERE ARE SO MANY DIFFERENT VERSIONS OF ANTENNA SYSTEMS THAT WE SUGGEST TO THE USER WHO WISHES TO EXPERIMENT WITH THE VARIOUS TYPES THAT HE FIRST FAMILIARIZE HIMSELF WITH THE ANTENNA SECTION OF THE A.R.R.L. HANDBOOK.

THE A.V.C. OR AUTOMATIC VOLUME CONTROL SWITCH PROVIDES OPTIONAL USE OF A.V.C. WHEN RECEIVING MUSIC OR VOICE SIGNALS IT IS ADVISABLE THAT THE SWITCH BE IN THE "ON" POSITION. WHEN RECEIVING CODE TRANSMISSIONS THE SWITCH SHOULD ALWAYS BE IN THE "OFF" POSITION.
THE B.F.O. SWITCH MUST BE IN THE "ON" POSITION TO OBTAIN THE NECESSARY BEAT NOTE FOR THE RECEPTION OF CODE SIGNALS. USING THE B.F.O. WILL BE HELPFUL IN LOCATING THE CARRIERS OF DISTANT AND POSSIBLY WEAK BROADCASTING STATIONS. ONCE LOCATED, THE B.F.O. SHOULD BE TURNED OFF OR THE WHISTLE WILL INTERFERE WITH RECEPTION.
THE PITCH CONTROL - WHEN THE B.F.O. IS "ON" - WILL ALLOW YOU TO VARY THE FREQUENCY OF THE RESULTANT BEAT NOTE TO ONE THAT IS MOST PLEASING TO YOU. A HEAD-PHONE JACK IS MOUNTED IN AN ACCESSIBLE POSITION ON THE FRONT PANEL OF THE SKY-CHAMPION. ANY TYPE OF HEADPHONES CAN BE USED BECAUSE NO DIRECT CURRENT FLOWS IN THE HEADPHONE CIRCUIT. WHEN THE PHONES ARE PLUGGED IN THE LOUD SPEAKER IS AUTOMATICALLY DISCONNECTED.

ON THE BACK OF THE CHASSIS YOU WILL FIND A SOCKET INTO WHICH YOU CAN PLUG A TYPE SM-18 CARRIER LEVEL INDICATOR. WHEN THIS METER IS USED IT WILL BE NECESSARY TO ADVANCE THE R.F. GAIN CONTROL ON THE RECEIVER AS FAR AS IT WILL GO TO THE RIGHT. DOING THIS WILL OPERATE THE SWITCH WHICH IS MOUNTED ON THE BACK OF THIS CONTROL. ADDITIONALLY THE A.V.C. SWITCH SHOULD BE IN THE "ON" POSITION TO PROPERLY CONNECT THE METER IN THE CIRCUIT. THIS METER IS AVAILABLE THROUGH THE DEALER FROM WHOM YOU PURCHASED YOUR RECEIVER.

THE TUBE-LINE-UP OF THE S-20 SKY-CHAMPION IS AS FOLLOWS:

6K7	R.F. STAGE
6L7	1ST DETECTOR - MIXER
6J5G	H. F. OSCILLATOR
6K7	I. F. AMPLIFIER
6Q7G	2ND DETECTOR, A.V.C., 1ST STAGE OF AUDIO
6F6G	AUDIO OUTPUT STAGE
6J5G	BEAT FREQUENCY OSCILLATOR
80	RECTIFIER

No.	OHMS	WATTAGE	PARTS No.
R1	10,000	R. F. GAIN	25-029
2	100,000	1/3	20-093
3	350	"	20-120
4	100,000	"	20-093
5	600	"	22-125
6	30,000	1	22-075
7	300	1/3	20-021
8	20,000	"	20-072
9	300	"	20-021
10	250,000	"	20-099
11	500,000	A. F. GAIN	25-031
12	1,000,000	1/3	20-108
13	100	"	20-009
14	25,000	1	20-073
15	100,000	1/3	20-093
16	50,000	"	20-084
17	500,000	TONE CONTROL	25-018
18	500	1	20-025
19	20,000	"	20-070
20	25,000	"	20-073
21	100,000	1/3	20-093
22	10,000	1	20-061
23	50,000	1/3	20-084

SW	SWITCHES
1	A. V. C. SPST
2	B. F. O. SPST
3	AC ON-OFF (ON TONE CONTROL)
4	SEND - RECEIVE SPST
5	EXT "S" METER (ON RF GAIN)

No.	CAPACITY	TYPE	VOLTAGE	PARTS No.
C1		MAIN		
2	408 MMFD			48-022
3		TUNING		
4	.05 MFD		200	41-004
5	.05 "		200	41-004
6	10 MMFD	MICA		40-021
7	25 "	"		40-024
8	.05 MFD		200	41-004
9	.002 "	"		40-013
10	.05 "		200	41-004
11	.05 "		400	41-005
12	.05 "		200	41-004
13	.02 "		200	41-002
14	100 MMFD	"		40-007
15	.1 MFD		200	41-006
16	100 MMFD	"		40-007
17	.05 MFD		200	41-004
18	.1 "		400	41-007
19	.05 "		400	41-005
20	.00025"	"		40-024
21	.01 "		200	41-000
22	.1 "		400	41-007
23	.01 "		600	45-002
24	.01 "		600	45-002
25	8 "		450	
26	8 "		450	42-021
27	10 "		25	
28	.1 "		400	41-007
29	.01 "		400	41-001
30	.01 "		400	41-001
31	1 MMFD	TWISTED PAIR		
32	250 "	MICA		40-024
33	25 "	PITCH CONTROL		48-021
34	100 "	MICA		40-007
35	25 "	"		40-024
36	.002 MFD	"		40-013
37	430 MMFD	PAD		44-025
38	1,300 "	"		44-024
39	2,100 "	"		44-025
40	100 "	MICA		40-007

THE SKY-CHAMPION IS AN 8 TUBE 4 BAND SUPERHETERODYNE RECEIVER COVERING THE FOLLOWING FREQUENCIES:

BAND	COVERAGE
1	540 KC TO 1,800 KC
2	1.70 MC TO 5.75 MC
3	5.62 MC TO 18.40 MC
4	17.00 MC TO 44.00 MC

SEPARATE COILS ARE USED TO COVER EACH BAND. INDUCTIVE COUPLING TO THE ANTENNA PERMITS THE MAXIMUM TRANSFER OF SIGNAL ENERGY FROM EACH SEPARATE PRIMARY TO THE PARTICULAR SECONDARY COIL IN THE CIRCUIT. THE UNUSED COILS ARE SHORTED. THE CALIBRATION ON THE MAIN DIAL IS IN KILOCYCLES ON BAND #1 AND IN MEGACYCLES ON BANDS # 2,3 AND 4.

THE HALLICRAFTERS CO.

ALIGNMENT

Set the controls as follows:
AVC and BFO switches to "OFF"; A-F and R-F gain controls to maximum volume; band switch on No. 1 band; main dial at 1800 kc or minimum capacity position.

Remove 6L7 grid cap. Connect signal generator through 0.1-mf condenser to grid of 6L7, and signal generator ground to chassis of set. Set signal generator to 455 kc. Adjust trimmers on T1 and T2 for exact resonance.

IF Alignment

Replace the condenser in the signal generator lead with a 400-ohm resistor, connecting it to the A1 terminal on the rear of the chassis. Leave jumper between A2 and G terminals connected.

Band No. 1

Place band switch on No. 1 or broadcast band.
Set generator to 1400 kc and adjust main dial to that frequency.
Adjust the following trimmers for maximum signal:

Oscillator	CA
Mixer	CB
Antenna	CC

Reset generator and receiver to 600 kc and adjust the following padder for maximum signal: C37

Band No. 2

Place band switch on No.2 band.
Set generator and receiver to 4 mc and adjust the following trimmers for maximum signal:
CJ CK CL
Reset generator and receiver to 18 mc and resonate padder C38 for maximum signal.

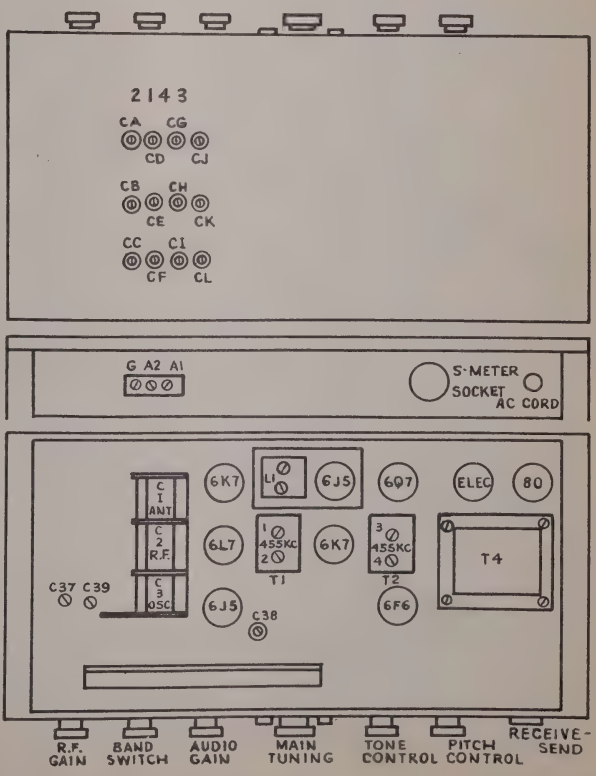
Band No. 3

Place band switch on No. 3 band.
Adjust generator and receiver to 11 mc and trim with CG,CH,and CL.
Reset generator and receiver to 7 mc and adjust padder C39.

Band No. 4

Place band switch on No.4 band.
Set generator and receiver to 4 mc and adjust CD, CE, and CF.
Reset generator and receiver to 18 mc. There is no padder on the 4 band, but 18 mc should fall within 1 division with no other adjustments.

While making the above adjustments, rock the main condenser.



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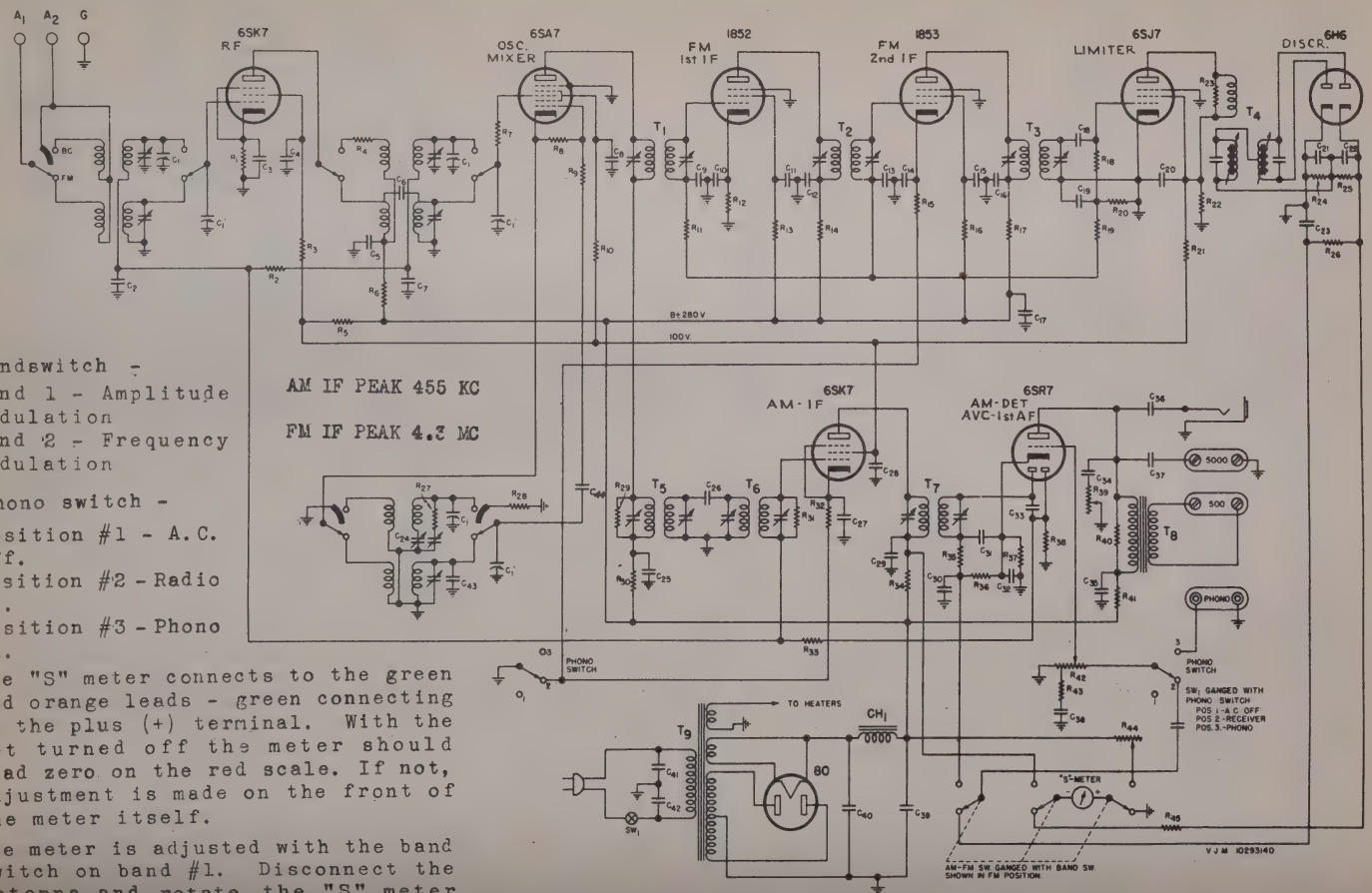
SCHEMATIC DIAGRAM-HIGH FREQUENCY FM-BROADCAST AM TUNER-MODEL S-31



Bandswitch -
Band 1 - Amplitude modulation
Band 2 - Frequency modulation

Phono switch -
Position #1 - A.C. Off.
Position #2 - Radio On.
Position #3 - Phono On.

The "S" meter connects to the green and orange leads - green connecting to the plus (+) terminal. With the set turned off the meter should read zero on the red scale. If not, adjustment is made on the front of the meter itself.

The meter is adjusted with the band switch on band #1. Disconnect the antenna and rotate the "S" meter adjustment on the rear of the chassis until the meter reads zero on the left side of the scale.

Note: Unground A_2 when using a doublet. Antenna should be erected

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Equipment needed and preliminary adjustments:

An all wave signal generator which will provide an accurately calibrated signal at test frequencies listed.
Output indicating meter.
Non-metallic screw driver.
Dummy antennas 100 ohm, and 0.1 mfd.
Volume control - Maximum all adjustments.
Tone control - Extreme clockwise position.
Connect output meter across primary of output transformer.
Allow chassis and signal generator to "heat up" for several minutes.
Connect low side of generator to chassis (Gnd)
Set gang condenser at minimum capacity for all I.F. adjustments.
1 - 100,000 ohm resistor.
1 - .002 mfd condenser.
1 - 100 mmf condenser.

A.M. BROADCAST (BAND #1) ALIGNMENT. INTERMEDIATE FREQUENCY, (455 KC.)

1 - Tune signal generator to 455 kc.
2 - Connect signal generator thru 0.1 condenser to 6SK7 I.F. (455 kc.) tube.
3 - Align T_7 for maximum output.
4 - Connect generator to either stator lug on center section of gang condenser thru a 0.1 mfd. condenser.
5 - Align T_5 and T_6 for maximum output. (Do not realign T_7).

R.F. STAGES.

1 - Tune signal generator to 1400 kc.
2 - Connect signal generator thru 100 ohms to A_1 - Ground A_2.
3 - Set receiver dial at 1400 kc (140)
4 - Adjust C_A C_B and C_C for maximum output.
5 - Set generator at 600 kc.
6 - Set dial at 600 kc. (60)
7 - Adjust C_D for maximum output.
8 - Repeat steps 3 and 4.

F.M. BROADCAST (Band #2) ALIGNMENT.

1 - Disconnect lead from high side of volume control.
2 - Set bandswitch on #2 (FM) band.
3 - Disconnect discriminator plate lead (white blue tracer) from plate (pin #8) of 6SJ7 limiter tube.
4 - Connect a 100,000 ohm resistor and an .002 mf. condenser in series from plate (pin #8) of limiter to grid (pin #2) of 6SR7 audio amplifier.
5 - Connect grid of 6SR7 to chassis.
6 - The 6SJ7 will now operate as an amplitude modulation detector.
7 - Set signal generator at 4.3 mc.
8 - Connect signal generator thru 0.1 mf. condenser to lug on small stator center section of gang condenser.
9 - Adjust T_1, T_2 and T_3 for maximum output keeping the signal generator at as low an output possible.
10 - Connect signal generator thru 100 ohm resistor to A_1 - ground A_2.
11 - Tune signal generator to 49 megacycles.
12 - Set receiver dial at 49 megacycles.
13 - Adjust C_E, C_F, and C_G for maximum output. NOTE: The oscillator tunes to the low frequency side of the signal.
14 - Tune signal generator to 43 megacycles.
15 - Set dial at 43 mc.
16 - Adjust positions of coil leads for maximum output.
17 - Repeat steps 11, 12 and 13.
18 - Replace the wire on the volume control. Remove the resistor-condenser combination from limiter, and connect the wires as they were.
19 - Reconnect signal generator as for I.F. alignment and tune to 4.3 mc.
20 - Set signal generator for strong output signal.
21 - Adjust S_1 on T_4 until a null is obtained as indicated both by the meter and aurally.
22 - Detune signal generator 100 kilocycles.
23 - Tune S_2 for maximum output.
24 - Tune signal generator back thru resonance and 100 kc to the other side of the I.F. frequency. The output should first drop and then rise to a value equal on both sides of the dip.
25 - If the output is not equal on both sides of resonance, readjust S_2.
26 - If the output is still not equal on either side of resonance a slight shift of the null point obtained with S_1 may be necessary.

C_1	Tuning Condenser 6 Section.			R_1	150	1/3	R_{24}	100,000	1/3
2	.05 mfd	200	Paper	2	100,000	1/3	25	100,000	1/3
3	.05 mfd	200	Paper	3	1,000	1/3	26	200,000	1/3
4	.02 mfd	400	Paper	4	500	1/3	27	300	1/3
5	.02 mfd	400	Paper	5	7,500	1/3	28	8	1/3
6	25 mmf		Mica	6	1,000	1/3	29	200,000	1/3
7	.05 mfd	200	Paper	7	35	1/3	30	1,000	1/3
8	.02 mfd	400	Paper	8	20,000	1/3	31	200,000	1/3
9	.01 mfd	400	Paper	9	8	1/3	32	300	1/3
10	.05 mfd	200	Paper	10	1,000	1/3	33	2,000,000	1/3
11	.02 mfd	400	Paper	11	100,000	1/3	34	35	1/3
12	.02 mfd	400	Paper	12	150	1/3	35	50,000	1/3
13	.01 mfd	400	Paper	13	40,000	1/2	36	250,000	1/3
14	.05 mfd	200	Paper	14	500	1/3	37	1,000	1/3
15	.02 mfd	400	Paper	15	150	1/3	38	1,000,000	1/3
16	.02 mfd	400	Paper	16	25,000	1/2	39	100,000	Tone Control
17	.1 mfd	400	Paper	17	500	1/3	40	100,000	1/3
18	50. mmf		Mica	18	50,000	1/3	41	2,000	1/3
19	2000. mmf		Mica	19	100,000	1/3	42	1,000,000	Vol.Cont.tap at 20,000 Ohms
20	.02 mfd	400	Paper	20	200,000	1/3	43	4,000	1/3
21	75 mmf		Mica	21	4,000	1/2	44	1,500	"S" meter adjustment Band #1
22	100 mmf		Mica	22	15,000	1/2	45	250,000	1/3
23	500 mmf		Mica	23	15,000	1/3			
24	Pad Band #1								
25	.02 mfd	400	Paper						
26	2.5 mmf		Twisted Pair						
27	.05 mfd	200	Paper						
28	.1	400	Paper						
29	.02	400	Paper						
30	25 mmf		Mica						
31	25 mmf		Mica						
32	10 mfd	25	Elect.						
33	25 mmf		Mica						
34	.05 mfd	400	Paper						
35	10 mfd	350	Elect.						
36	.02 mfd	400	Paper						
37	.1 mfd	400	Paper						
38	.05 mfd	200	Paper						
39	10 mfd	350	Elect.						
40	30 mfd	350	Elect.						
41	.01 mfd	600	Paper						
42	.01 mfd	600	Paper						
43	Oscillator drift compensator								
44	50 mmf								

ANTENNA: For best results an antenna should be cut to resonate at the high frequency end of the FM band. Probably the simplest and most effective antenna would be a half wave dipole consisting of two quarter wave (4-1/2 feet) rods placed end to end with a few inches space between them. Connect a twisted pair to the ends of the rods closest each other. A wire one half wave (9 feet) length long may be cut at the center and an insulator inserted between the halves. The feeders then connect to the wires at either side of the insulator. The advantage of using rods rather than wire for the antenna is that they may more easily be mounted vertically, removing all directional properties and producing polarization corresponding to that used by FM stations. If the antenna must be horizontal it should be placed broadside to the direction of the weakest received signal.

FREQUENCY RANGE:
Band No. 1 - 540-1650 Kilocycles
Band No. 2 - 40- 51 megacycles

POWER OUTPUT:
130 Milliwatts undistorted

POWER CONSUMPTION:
50 watts

POWER SOURCE:
115 volts 60 cycle A.C.

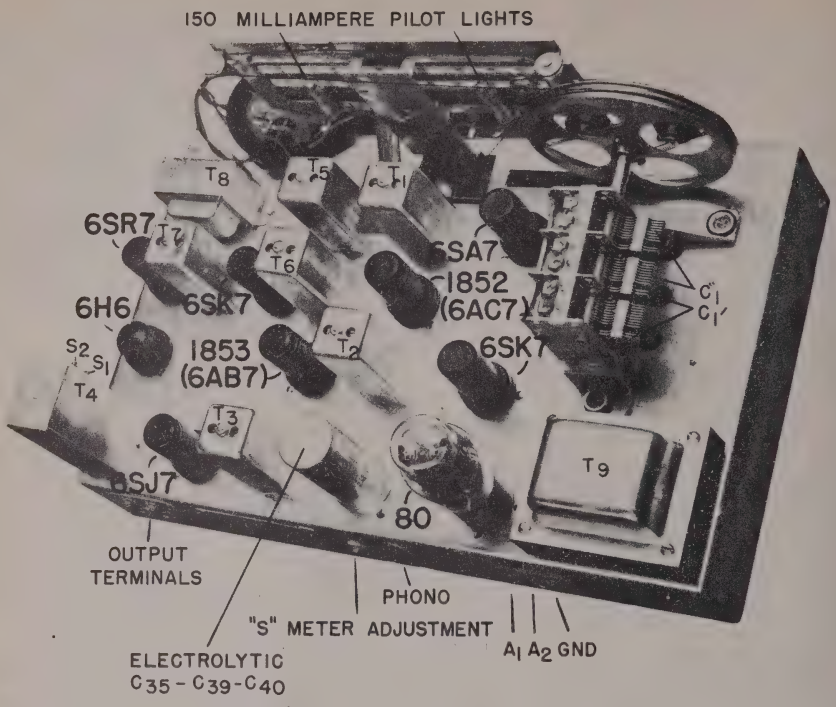
CHASSIS DIMENSIONS:
Length 16-3/4", Depth 10-3/4", Height 8-3/8"

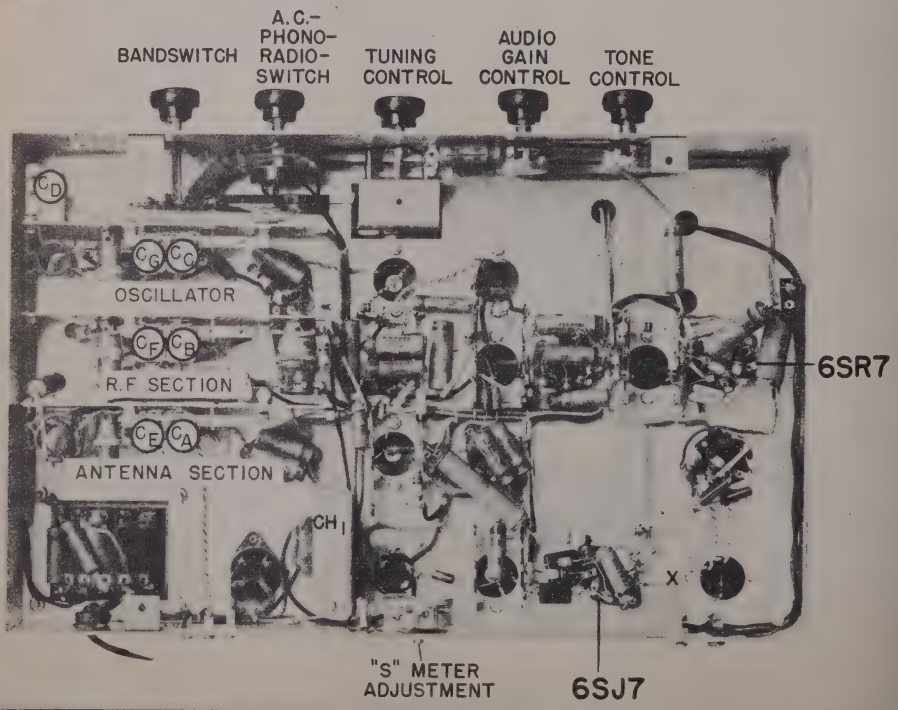
SENSITIVITY:
Band 1 (AM) 40 microvolts at 6 milliwatts output.
Band 2 (FM) 60 microvolts for full limiter action.

SELECTIVITY:
25 kc at 1000 times down at 1000 kc.
150 kc on #2 band (40-51 mc)

MODEL S-31

THE HALLICRAFTERS CO.





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MODEL S-31-A

THE HALLICRAFTERS CO.

POWER OUTPUT:

25 watts undistorted

NORMAL FIDELITY:

± 1 D.B. from 40 to 15000 c.p.s.

OVERALL GAIN:

90 D.B. from Microphone input
50 D.B. from Phono-Radio input

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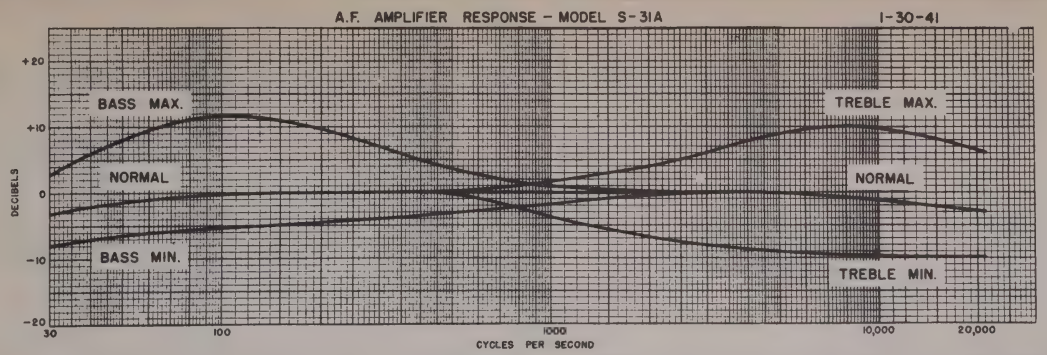


R1	- 500,000- 500,000 vol. control 425-084		R14	- 100,000 ohm,	1/2 watt
R2	- 500,000	1/2 watt	R15	- 1000 ohm	"
R3	- 1 meg.	"	R16	- 50,000 ohm	1 watt
R4	- 3000 ohm	"	R17	- 100,000	1/2 watt
R5	- 250,000	"	R18	- 100,000	1/2 watt
R6	- 500,000 vol. control #25-083		R19	- 250,000	"
R7	- 500,000	1/2 watt	R20	- 250,000	"
R8	- 1.0 meg.	"	R21	- 30,000 ohm	20 watt
R9	- 2000 ohm	"	R22	- 250,000	1/2 watt
R10	- 10,000 ohm	"	R23	- 250,000	"
R11	- 500,000- 500,000 Bass Control #25-082		R24	- 250 ohm	10 watt
			R25	- 3500 ohm	10 watt
R12	- 500,000- 500,000 Treble Control #25-082		R26	- 500 ohm	1/2 watt
			R27	- 15,000 ohm	1/2 watt
R13	- 50,000 ohm	1 watt	R28	- 3000 ohm	1/2 watt

C1	- 30 Mfd.- 25 volt	Electrolytic
C2	- 0.1 Mfd. 600 V.	Paper
C3	- 0.05 Mfd. - 200 V.	Paper
C4	- 30 Mfd. - 25 V.	Electrolytic
C5	- 1.0 Mfd. - 200 V.	Paper
C6	- 0.01 Mfd. - 600 V.	Paper
C7	- 0.1 Mfd. - 600 V.	Paper
C8-C9	- 8- 8 Mfd. - 475 V.	Electrolytic
C10-C11	- 8- 8 Mfd. - 475 V.	Electrolytic
C12	- 8- 8 Mfd. - 475 V.	Electrolytic
C13	- 30 Mfd. - 25 V.	Electrolytic
C14	- 0.1 Mfd. - 600 V.	Paper
C15	- 0.1 Mfd. - 600 V.	Paper
C16	- 0.01 Mfd. - 600 V.	Paper
C17	- 0.01 Mfd. - 600 V.	Paper

T1	- Output transformer	A5349
T2	- Power "	P5229
CH1	- Bass Choke #55-010	
CH2	- Filter Choke C1003	
PL	- 6.3 v. - 0.15 amp.	pilot lite
F	- 2 amp. fuse	

IMPORTANT: This amplifier, unless otherwise marked must be operated from 115-125 volts, 60 cycles, alternating current. If you are in doubt, 'phone your electric light company. Be sure all tubes are in their sockets before inserting plug in receptacle.

RADIO: Although the S31A was designated as a companion unit to our MODEL S-31 Tuner for Frequency Modulated and Amplitude Modulated Broadcast Reception, any suitable tuner having an output impedance of 500 ohms may be connected to the RADIO input strip. The upper terminal is grounded.

PHONO: Any high impedance phonograph pickup may be used in conjunction with the S31A by connecting to it the PHONO strip. Again, the top terminal is grounded.

MICROPHONE: The microphone circuit is designed for high impedance microphones such as the crystal and dynamic types. The microphone receptacle is located on the rear apron of the chassis.

SPEAKER: The full high fidelity capabilities of the S31A amplifier will not be realized unless a speaker system is used which is capable of reproducing the full range of the amplifier. The frequency range offered by high fidelity FM extends from 40 to 15,000 cycles per second.

It is recommended that P.M. dynamic speakers be used to eliminate the necessity of obtaining external field supplies. The S-31A was not designed to supply field excitation.

POWER CONSUMPTION:

100 watts

POWER SOURCE:

115 volts 60 cycle A.C.

PANEL DIMENSIONS:

19" x 8-3/4"

CHASSIS DIMENSIONS:

16-3/4" long - 9½" wide

OUTPUT:

500 ohms
8 ohms and 4 ohms

Additional speakers may either be connected in series or in parallel, depending upon their impedances - parallel connection being preferred when possible. Since the available output impedances are 4, 8, and 500 ohms, it will be necessary to find a combination matching these values as close as possible. Ohm's law follows in that 2- 8 ohm speakers in parallel gives 4 ohms, 2- 4 ohm speakers in series gives 8 ohms, 4- 8 ohm speakers in series parallel gives 8 ohms, etc.

When the speaker is located remotely from the amplifier the output line between it and the amplifier should be of sufficient cross section to minimize power loss. If speakers are to be located much more than 100 feet from the amplifier, the 500 ohm winding should be used with a matching transformer at the speaker end.

All speakers should have ample baffling both for fidelity and as a protection to the speaker cone.

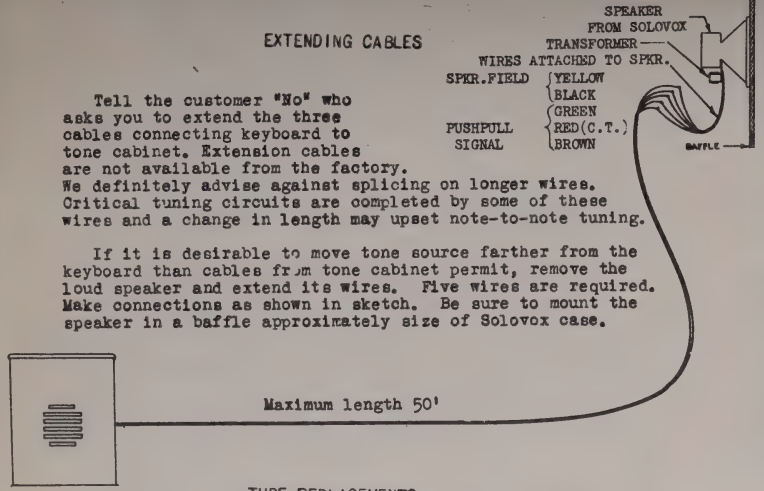
A WORD OF CAUTION - Do not operate the amplifier without a speaker load, otherwise the output tubes may be damaged.

GROUND CONNECTION: To reduce the possibility of hum and noise pickup in the high gain input stage from extraneous sources the S31A chassis should be connected to a good ground.

EXTENDING CABLES

Tell the customer "No" who asks you to extend the three cables connecting keyboard to tone cabinet. Extension cables are not available from the factory. We definitely advise against splicing on longer wires. Critical tuning circuits are completed by some of these wires and a change in length may upset note-to-note tuning.

If it is desirable to move tone source farther from the keyboard than cables from tone cabinet permit, remove the loud speaker and extend its wires. Five wires are required. Make connections as shown in sketch. Be sure to mount the speaker in a baffle approximately size of Solovox case.



TUBE REPLACEMENTS

Solovox tubes are excluded from 1 year guarantee which goes with each instrument. Tube manufacturer's regular guarantee applies. Tubes may be returned for replacement thru jobber or to us.

Free replacements are allowed only if tubes are not broken or damaged, actually test bad, and code marking shows them in guarantee. Obsolescence schedule is shown here for your guidance. Tubes with code dates other than those shown are obsolete and not subject to adjustment.

Tubes Coded	Obsolete date
T-1	Jan. 1, 1942
N-1	Apr. 1, 1942
Z-1	July 1, 1942
V-1	Oct. 1, 1942
T-2	Jan. 1, 1943
N-2	Apr. 1, 1943

ADJUSTMENT OF OSCILLATORS

The service man should have a thorough knowledge of oscillator adjustment because he will most likely be called upon to perform this service more frequently than any other. A change in setting of the master tuning knob, a change of keyboards or installation of a new oscillator tube will necessitate readjustment of the oscillators. It is often advisable for the service man to give instructions on oscillator adjustment to the Solovox owner. The following is a detailed explanation of oscillator adjustment.

The master oscillator is tuned by the condensers in the keyboard and supplies frequencies for the highest octave of the six octave tonal range. The buffer oscillator, which is considered as a controlled oscillator although it has no adjustment potentiometer, is used as an electronic link between the master oscillator and the rest of the controlled oscillators and has its circuit constants predetermined so as to oscillate at the same frequency as the master oscillator. Each of the remaining controlled oscillators when supplied with the proper amount of locking signal should oscillate at one half the frequency of the preceding oscillator. This locking signal is the same signal that is generated by the preceding oscillator but the amplitude is regulated by the adjustment potentiometer and then impressed upon the grid of the following oscillator tube.

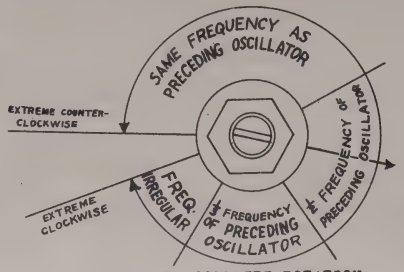


FIG. I COMPLETE ROTATION OF OSCILLATOR ADJUSTMENT POTENTIOMETER ARM

NOTE--Position of slot shown here does not necessarily mean that every slot will assume this position when correctly adjusted.

Assuming that the master and preceding oscillator are operating correctly, the following is an explanation of what happens in a complete rotation of an adjustment potentiometer. See figure #I. Turning the potentiometer to its extreme counter clockwise position the oscillator will operate at the same frequency as the preceding oscillator because the amplitude of the locking signal is too great. Now, turning the potentiometer clockwise, a point is reached where the oscillator locks-in at one-half the frequency of the preceding oscillator because the amplitude of the locking signal is of proper intensity to cause this condition. It is then operating exactly one octave below the preceding oscillator and for correct adjustment the potentiometer arm should be set midway between the top and bottom limits of this 1/2 frequency range. Turning the potentiometer further clockwise, a point will be reached where it will either lock-in at one-third the frequency (this is an octave and a fifth below musically speaking) or, it may refuse to lock-in and will start to hunt a frequency of its own which bears no definite mathematical relation to the frequency of the preceding oscillator. A "gurgle" is usually present at the point where the oscillator starts to change to a different frequency.

Conditions that may make oscillator adjustment difficult or impossible are the following: 1. Improper operating voltages at the grid, plate or cathode of an oscillator tube. 2. Defective oscillator tube. 3. Inoperative master or buffer oscillator. 4. Defective parts associated with the oscillator circuits.

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PROCEDURE FOR ADJUSTMENT OF OSCILLATORS. The primary requisites for adjusting oscillators are that the master and buffer are operating correctly and that you must start by adjusting the 2nd oscillator and then progressively adjust each succeeding oscillator. After you have become familiar with the method of adjustment as described in "To The Solovox Owner" you may try the following method which is somewhat quicker. Push "on" the "Soprano" only and adjust the 2nd and 3rd oscillator by depressing F key in the middle and lowest octave respectively. Then, push "on" the "Bass" only and adjust the 4th, 5th and 6th oscillator by depressing F key in the highest, middle and lowest octave respectively. You may check adjustment of the six octave tonal range by running down the scale, first with the "Soprano" only "on" and then with the "Bass" only "on". Of course, in this check the low C key with the "Soprano" "on" should be chromatically related to the high B key with the "Bass" "on."

If the adjustment potentiometers should get so far out of adjustment that you become confused, the following hint may prove helpful. Turn all potentiometers to their extreme counter clockwise positions and then follow the normal oscillator adjustment procedure.

IMPROVEMENTS WHICH CAN BE ADDED TO EARLY MODELS.

KEY TENSION

Lower key springs (control contacts) were increased in thickness effective with keyboard #18936. This change eliminates contact tip breakage and slightly increases key tension.

We suggest this improvement be added to early keyboards if trouble is experienced with broken contacts or customer complains of light key tension. Material required: 12 AO-18538-0 contact spring assemblies (furnished with small tin of rocker arm grease) - $1.20 per set, list. Time required: 1 hour. Replacement procedure is as follows:

1. Remove keyboard cover plate by taking out screws underneath and in back of key action. Slide metal screw strip at bottom of keyboard out and remove contact springs with a small screw driver.

2. Set keyboard on blocks to relieve pressure on keys and install new contact springs by manipulating bakelite key actuator into proper position. Make sure small anti-rattle spring is also threaded thru hole.

3. Apply a small amount of rocker arm grease at junction of actuator and contact arm. This will eliminate key squeaks sometimes noticeable. Be sure to use lubricant sparingly so none of it touches contacts.

4. Test to make sure contact is made when each key is depressed. If some contacts seem to make too lightly, bend tip down slightly - don't kink.

5. Now reassemble and test for normal operation.

VIBRATO OPERATION

The vibrato effect is produced by a magnetically driven reed having a piece of powdered iron core attached to it in such a way as to move in and out of an inductance coil mounted near the reed thereby causing the inductance of the coil to vary periodically. This coil is connected to a tap on the master oscillator tuning coil and causes the oscillator frequency to vary. The reed, which has to be started mechanically, is given a "kick" by the vibrato starter spring when the volume control lever is pulled forward in turning "on" the instrument. After the reed is once started, the magnetic drive keeps it in motion as long as the instrument is "on" regardless of whether the vibrato tablet is "on" or "off".

The action of the reed may be described as follows: When the reed is moving towards the driving coil, L2, the vibrato driving contact is closed thus producing a strong magnetic field which pulls the reed towards the driving coil. When the reed reaches the end of its swing and starts to move away from the driving coil, the vibrato driving contact is open thus causing a collapse of the magnetic field. Then, when the reed reaches the end of its swing in this direction and starts moving towards the driving coil again, the cycle of action is repeated. The 175 ohm resistor is in series with the coil to prevent sparking of the contacts.

VIBRATO CHANGES - Several changes have been made in the vibrato assembly pertaining to the size and amount of the reed weight washers and the spacing between the reed and the driving magnet coil. The changes, with the serial number of the keyboard in which the change was made, are the following:

KBD Serial #15612 - The original 3 weight washers of 5/8" diameter were replaced with 3 weight washers of 3/4" diameter in order to decrease the vibrato speed. See Service Letter S2.

KBD Serial #44000 - The vibrato driving coil mounting bracket was moved back away from the reed 9/64" and only one 3/4" weight washer was used. This was done to reduce the vibrato mechanical noise to a minimum.

KBD Serial #52825 - The Vibrato driving coil mounting bracket was moved 1/16" closer to the reed and two 3/4" weight washers were used. This was done to insure reliable operation with an unobjectionable amount of noise and is the happy medium between the two previous changes.

VIBRATO TROUBLES

VIBRATO NOISE - If a customer objects strongly to the vibrato mechanical noise in keyboards with serial numbers below 44000 it may be reduced by incorporating the following change: Move the driving coil back 1/16" and use only two 3/4" weight washers. By removing the coil from the mounting bracket and using long nose pliers the mounting bracket can be bent back to the required 1/16". A convenient way to assure the proper position of the driving coil is to measure the distance from the end of the brass coil mounting bracket to the inside edge of the flange

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...the back of the chassis. For a two weight washer vibrato assembly the distance should be 5/16" as shown in figure #1. Then readjust the position of the reed to the mid-point of the felt cushions as outlined in section 3 of Service Letter 8-2. It should be noted that in certain installations the vibrato noise may be accentuated by the keyboard construction of the piano.

VIBRATO STOPPING - A few cases of unreliable vibrato operation have been reported in keyboards using the single weight washers (Keyboard serial numbers between 44000 and 52824). The vibratos in this serial number group, while being very quiet, are more susceptable to stopping on account of low line voltage and slight imperfections of parts. Any slight drag on the vibrato driving contact will be transmitted to the reed and may cause slowing down or stopping of the reed. Driving contact drag may be caused by the following: 1- A burr on the light colored bakelite washer which causes friction between the washer and the brass stud. 2- Solder rosin deposits on the bakelite washers. 3- Spring tension on the bakelite washers too great.

If the vibrato in one of the keyboards listed in the above serial number group shows signs of being unreliable, we suggest the following remedy: Move the driving coil 1/16" nearer the reed and use two 3/4" weight washers instead of one. As mentioned previously, a convenient way to assure the proper position of the driving coil is to measure the distance from the end of the brass coil mounting bracket to the inside edge of the flange at the back of the chassis. For a two weight washer vibrato assembly the distance should be 5/16" as shown in figure #1. Adjust the reed to the mid-point between the stop felt cushions.

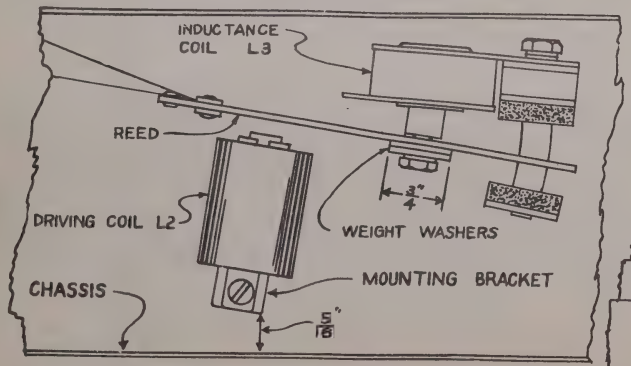


Fig. 1. Showing position of vibrato driving coil and vibrato reed using two weight washers - first used in Solovox Keyboard starting with serial #52825. This change may be incorporated in any keyboard to insure reliable operation of the reed and to reduce mechanical noise.

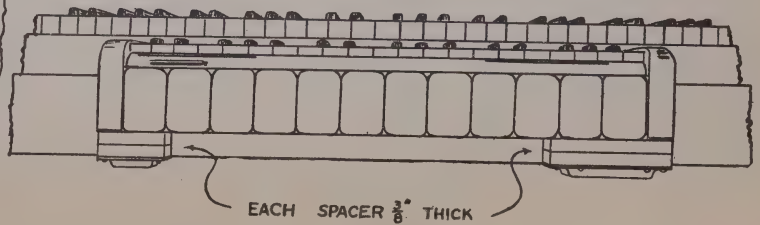
Another cause of vibrato stopping which applies to all keyboards regardless of serial number is grounding of the driving contact by a piece of foreign metal lodging between the contact arm and the chassis.

Also in shipment, the spring coil, which is used only as a flexible lead between the driving contact and the terminal lug, may change position and ground out against the chassis. This may result in intermittent operation.

KEYBOARD SPACERS

The Solovox keyboard should be so located that the distance between the surfaces of the piano white keys and the Solovox white keys is more than one and less than two inches. Occasionally the dimensions of a piano are such that the Solovox keyboard will not naturally fit within this range. For such instances special bakelite bracket spacers which will raise the keyboard 3/8 inch are available at the factory. As many as three sets may be attached to the instrument, raising the keyboard 3/8, 3/4 or 1-1/8 inches as desired. The sketch below illustrates an installation requiring two sets of spacers.

It is important however, to pre-determine exactly how many spacers are to be used and to order exactly that amount so that the proper length screws will be received. Screws must not enter the bottom surface of the instrument more than 1/8 inch otherwise serious damage will result. When ordering please specify PO-18626-1 and PO-18627-1 spacers. Available in black only.



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SPECIAL SOLOVOX SERVICE NOTES

TROUBLE:- Difficult or impossible to adjust oscillators-- some tones "gargle" or play wrong notes.

A survey in the field shows that 80% of all the Solovox service problems are confined to trouble experienced with a single fixed carbon resistor of critical value which makes it impossible to properly adjust the oscillators and causes the tones to "gargle" or play wrong notes when this resistor changes in value due to dampness.

This resistor is of the fixed carbon type having a value of 200,000 ohms (250,000 ohms for some models) and is connected in the voltage divider circuit for the bias on the controlled oscillators (shown at the upper left in the figure 1 wiring diagram supplied with each instrument). The physical location of this resistor in the Solovox tone cabinet is shown on the reverse side of this sheet. If the tones "gargle" or play wrong notes, connect a DC meter across the 8000 ohm wire wound resistor also shown on the reverse side of this sheet using a 1000 ohms per volt meter on the 10 volt scale. The meter should read approximately 2 volts with no keys depressed, and smoothly drops to zero and then to a slightly positive voltage as the top seven white keys are progressively played starting from the top key (key farthest to the right). If this voltage is low, remove the resistor and replace with a new one (such as an I.R.C. metallized resistor or Centralab resistor). If possible, use a 2 watt resistor as they are more stable than the 1 watt size. After replacing this resistor, be sure to readjust the oscillators as described on page 2 in "To Solovox Owners".

TROUBLE:- Volume low.

Ten percent of all Solovox service trouble lies with another fixed carbon resistor which increases in resistance due to humidity and thereby causes the maximum volume attainable to go down.

This resistor is also of the fixed carbon type, having a value of 330,000 ohms (370,000 ohms in some models) and is connected in the volume control voltage divider circuit shown at the lower right in the figure 1 wiring diagram. The physical location of this resistor is also shown on the reverse side of this sheet. If the volume is low even when the "maximum value control" is turned for maximum volume, remove it and replace with a new 300,000 or 250,000 ohm resistor (such as an I.R.C. metallized resistor or Centralab resistor). If possible, use a 2 watt resistor as they are more stable than the 1 watt size.

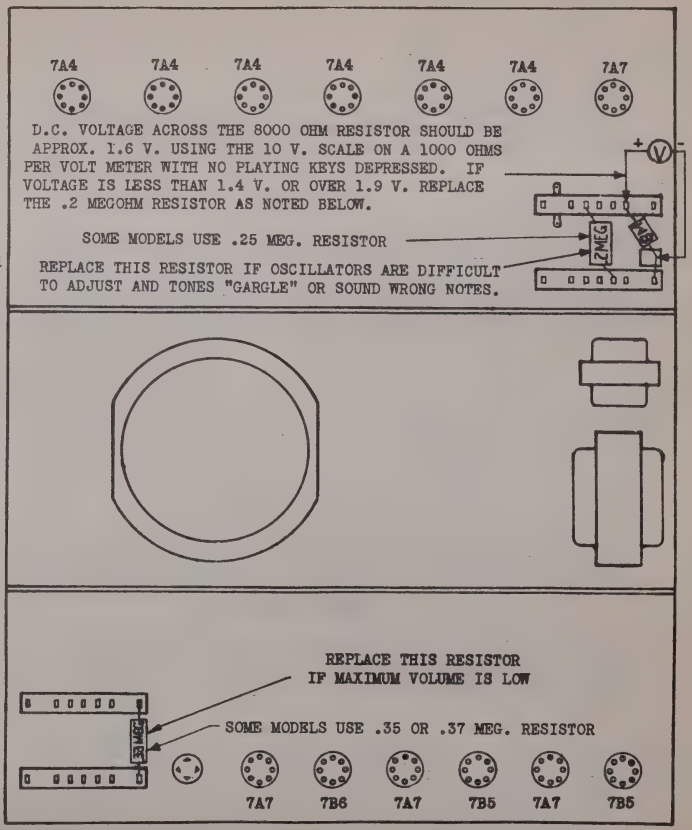
7A4
7A4
7A4
7A4
7A4
7A4
7A7
D.C. VOLTAGE ACROSS THE 8000 OHM RESISTOR SHOULD BE APPROX. 1.6 V. USING THE 10 V. SCALE ON A 1000 OHMS PER VOLT METER WITH NO PLAYING KEYS DEPRESSED. IF VOLTAGE IS LESS THAN 1.4 V. OR OVER 1.9 V. REPLACE THE .2 MEGOHM RESISTOR AS NOTED BELOW.
SOME MODELS USE .25 MEG. RESISTOR
REPLACE THIS RESISTOR IF OSCILLATORS ARE DIFFICULT TO ADJUST AND TONES "GARGLE" OR SOUND WRONG NOTES.
.2MEG
REPLACE THIS RESISTOR IF MAXIMUM VOLUME IS LOW
SOME MODELS USE .35 OR .37 MEG. RESISTOR
7A7
7B6
7A7
7B5
7A7
7B5

FIGURE 1

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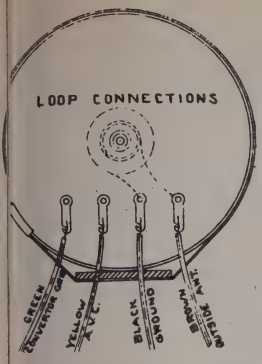
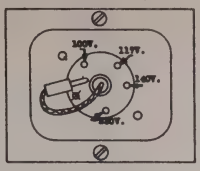
MODELS 307-4, 307TP-2



The above diagram is shown for use should the loop ever be replaced or the connections broken.

Universal Type Transformer.



ROTATE TRANSPARENT DISC UNTIL HOLE IS IN LINE WITH DESIRED VOLTAGE TAP AND THEN INSERT PLUG. DO NOT TOUCH OR CHANGE VOLTAGE PLUG WHILE SET IS CONNECTED TO ELECTRIC CURRENT.

Voltages	Insert in
90-110 V.	100 V.
110-125 V.	117 V.
125-150 V.	140 V.
200-250 V.	230 V.

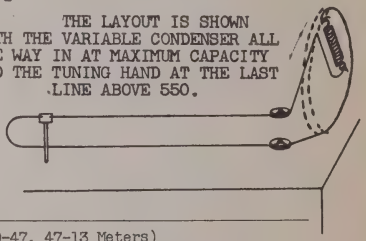
Dial Cord Layout - 300 Series

THE STRING TENSION of the drive string is maintained by the coil spring mounted on the large drive pulley. Too much tension will cause an extra load in tuning. Lack of tension will naturally cause backlash.

See that dial light sockets do not touch top edge of tuning hand as it moves across dial plate.

Since the pull against the large pulley is quite great, see that the set screws in the pulley hub to the condenser shaft are tight to avoid slipping.

THE LAYOUT IS SHOWN WITH THE VARIABLE CONDENSER ALL THE WAY IN AT MAXIMUM CAPACITY AND THE TUNING HAND AT THE LAST LINE ABOVE 550.



CONSUMPTION 50 WATTS

TUNING RANGES - 540 to 1700 KC, 2.2 to 7 MC, 7 to 22 MC, (555-175, 140-47, 47-13 Meters)

I. F. - 465 KC	TYPE - Conventional	POWER OUTPUT - (MAX.) - 2.7 WATTS; UPO 1.5 W.

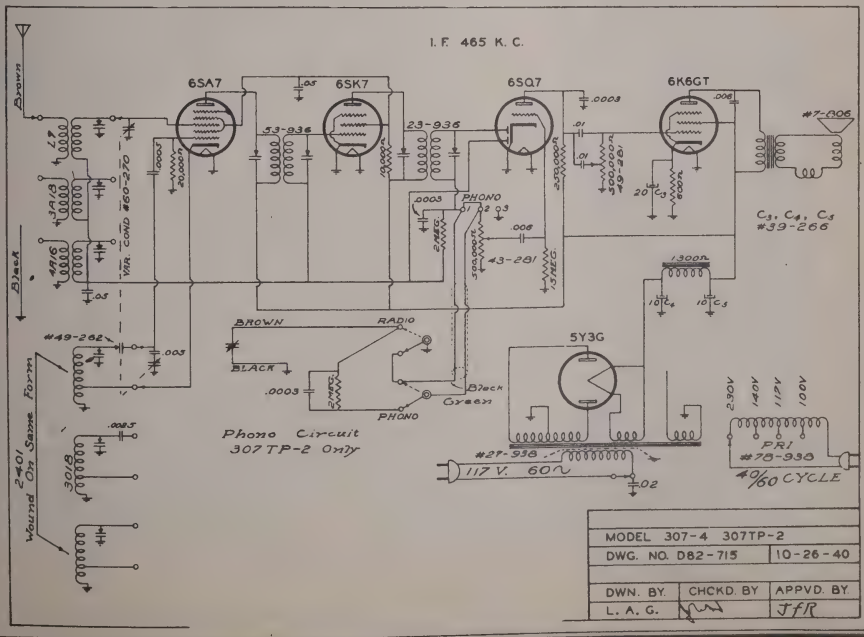
CONTROLS - Upper left - Volume; Upper right - TUNING; Lower left - TONE and POWER SWITCH;

Lower right - BAND SWITCH, Clockwise movement shifts to higher frequency bands.

TUNING SYSTEM:-

String driven horizontal movement hand, rubber tip friction tuning shaft -- Ratio 7 to 1.

SPEAKER = Electro-Dynamic	SIZE = 6"	V.C.IMP.(400CPS) = 4 Ohms	FIELD = 1300 Ohms



MODELS 307-4
307TP-2

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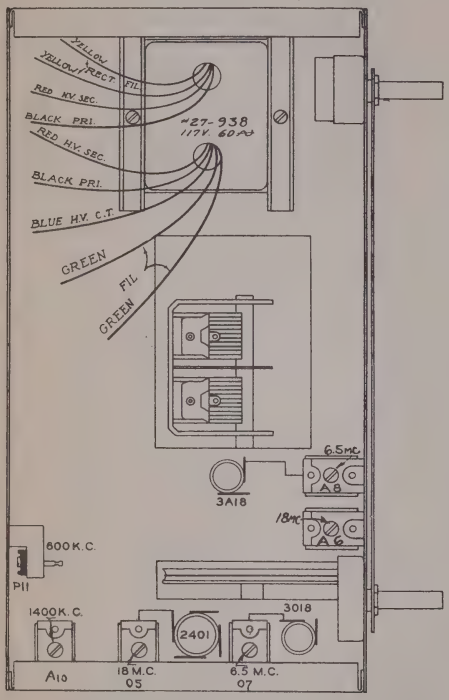
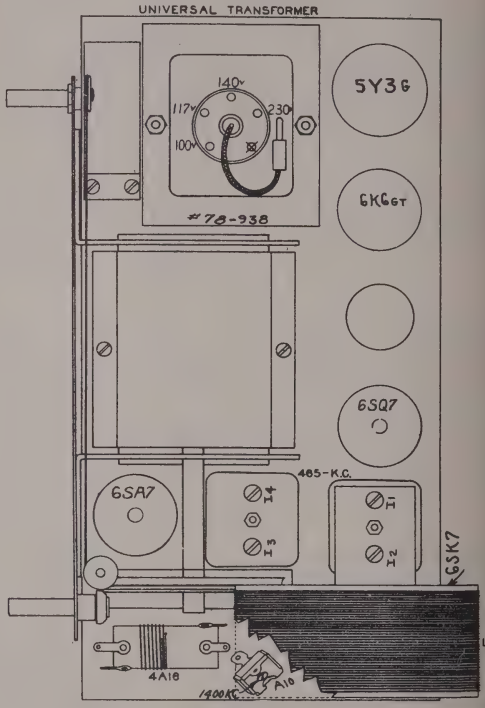
SOCKET VOLTAGE READINGS:

Voltage taken from ground with line voltage at - 117 AC
High Voltage reading off rectifier - 300 V.
Drop across speaker field - 65 V.
Voltage taken with 1,000 Ohm per volt meter.

TUBE	FUNCTION	CATH-ODE	SCR. GRID	PLATE	OSC. PLATE
6SA7	Mixer		105	245	105
6SK7	IF		105	245	
6SQ7	Det.			60	
5K6GT	Output	16	245	235	





NOTES

A - Each step of the alignment should be repeated in the original order for greater accuracy. Keep output from Signal Generator low. The I.F. trimmers are reached through the two holes on the top of each I.F. can.
B - When aligning the short wave bands, do not adjust to the IMAGE frequency. For example, if the adjustment is correctly made at 18 MC, then a weaker image will be heard at 17,070 KC, in other words 930 KC less on the dial.
C - When adjusting this pad, move the tuning hand back and forth and adjust padder until the peak of greatest intensity is obtained.
D - See that the tuning hand is set exactly on the last line above 540 when the condenser is at maximum capacity.
E - Check for oscillator cross-over between 18 and 22 MC. If necessary for stability, turn the antenna trimmer "IN" slightly.

ALIGNMENT PROCEDURE

Wave-Band Switch Position	Position of Dial Pointer	Signal Generator Frequency	Signal Generator Connection	See Note	Trimmers Adjusted (In order shown)	Trimmer Function
BC	Min.Cap.	465 KC	6SA7 Grid	A	I_1, I_2, I_3, I_4	IF
SW	18 MC	18 MC	Brown lead	B,D,E	O_5, A_6	Osc. Ant.
Int.	6.5 MC	6.5 MC	Brown lead		O_7, A_8	Osc. Ant.
BC	1400 KC	1400 KC	Brown lead		O_9, A_{10}	Osc. Ant.
BC	600 KC	600 KC	Brown lead	C	P_{11}	Osc. Pad.

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MODEL 445

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MODEL 445

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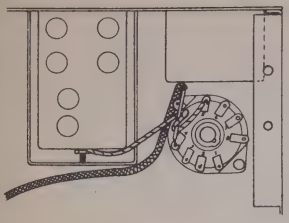


THE BEAT FREQUENCY OSCILLATOR

The adjacent figure shows an underneath view of the socket for the BFO 6J5 tube and its associated coil unit. The means of coupling this oscillator with the incoming signal is the conventional method of allowing small capacity between the BFO grid lead and the diode circuit. The shielded lead shown comes from the diode of the 2nd detector and is anchored on a dummy terminal of the BFO socket. The oscillator grid (green) lead is capacity coupled to this lead by one or more turns wrapped around the unshielded portion of the diode lead. THE AMOUNT OF THIS COUPLING IS CRITICAL.

INSUFFICIENT CAPACITY results in a weak beat oscillator or no apparent oscillator at all with weak incoming signals.

TOO MUCH CAPACITY COUPLING causes severe repeat BFO harmonics which appear all over the bands.

To increase or decrease the BFO action, remove the bottom from the cabinet and vary this coupling to suit. Keep in mind that should the turns be increased, there may be too much coupling if the turns are wound too TIGHT around the diode lead.

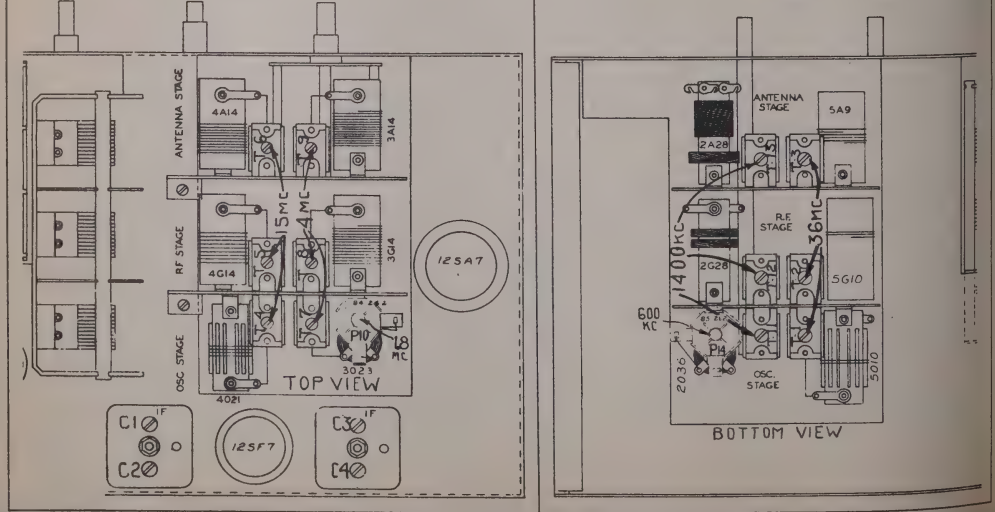
FOR TRIMMER LOCATIONS, SEE CHART BELOW

The alignment is made with the BFO Off, the AVC Off, and the Band Spread set to 100.
The main dial hand must stop EXACTLY ON the last line at the end of the scale when the condenser is fully closed without force on the tuning control.
There will be an overload effect on powerful broadcast stations when the AVC is OFF.
NOTE 1: After the alignment of the I.F. stages is completed, align the BFO system as follows:
1. Set pitch control 3 turns back from the "IN" position and turn on the BFO Switch.
2. Adjust the trimmer in the BFO can to obtain maximum sound which will be a hissing noise. Turn tuning knob to be sure this sound is not some tunable frequency that is causing it.
3. Check beats against some broadcast station to determine if the strength of the beat is normal.

NOTE 2: In this band (17 to 43 MC) only the oscillator follows the received signal 465 KC lower in frequency. Therefore when checking for the image, if the alignment has been made at 36 MC, it will be found at about 37 MC. This will determine if the alignment was correctly made at 36 MC.
NOTE 3: Check for image on all bands except that 17 to 43 MC band at a point 930 KC lower on the dial.
NOTE 4: Rock main dial slightly for point of maximum signal as the padding condenser is being adjusted.

ALIGNMENT PROCEDURE

DUMMY ANTENNA	SIG. GEN. CONNECTION TO	GEN. FREQ.	BAND SW. POSITION	DIAL SETTING	SEE NOTE	ORDER OF TRIMMER ADJUSTMENTS	TRIMMER FUNCTION
.05 mfd.	Grid of 12SA7	465 KC	1.7-.55	Off Station	1	C1,C2,C3,C4	I.F.-peak
400 Res.	A & DG	1400 KC	1.7-.55	1.4		T11,T12,T13	Osc-RF-Ant.
"	"	600 KC	1.7-.55	.60	4	P14	Osc. Pad.
"	"	5 MC	5.5-1.7	5	3	T7,T8,T9	Osc-RF-Ant.
"	"	1.8 MC	5.5-1.7	1.8	4	P10	Osc. Pad.
"	"	16 MC	18-5.6	16 MC	3	T4,T5,T6	Osc-RF-Ant.
"	"	36 MC	43-17	36 MC	2	T1,T2,T3	Osc-RF-Ant.



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HOWARD RADIO CO.

MODEL 718-X RADIO PHONO COMBINATION - NEW PRODUCTS MODEL 200 RECORD CHANGER

DESCRIPTION OF OPERATION

To load the instrument with records, turn the changer blades AJ to the position as shown in the top view (counter-clockwise) and place a stack of ten 12" or twelve 10" records on the center spindle, allowing them to rest upon the lower changer blades.

The operation of the changer mechanism is controlled by means of the single button AG on the base plate AK. Turn the button to point to automatic. Then press down, to start cycle. The changer will then automatically play all records in the order stacked.

To remove records, after all have been played, lift slightly each set of changer blades AJ, and pivot clockwise approximately a half of a complete turn. (180°). There will then be no obstructions to prevent removing the records.

To change records any time when the needle is on the record, merely press down momentarily on the control button.

To play records singly, turn changer blades AJ away from center of table (clockwise), and turn the control button to Manual.

DESCRIPTION OF CHANGE CYCLE

The change cycle consists of automatically removing the pickup arm from last played record, releasing the next record, and placing the pickup arm in the playing position. There are three conditions which cause the mechanism of the instrument to start and proceed through the change cycle.

1. Pressing down control button AG rotates reject rod BD. The bent end of BD (which is same as DC) strikes the ratchet casting DF, which is fastened to trip rod DE (BE in bottom view), rotating rod BE. This pivots the bent end of BE away from the end of follower CL, allowing the heavy end of follower CL to drop, pivoting about its axis (which extends through follower arm BJ and drive arm CJ) and engaging it in the worm CN. The worm CN has a left and right thread which carries the follower CL to the opposite end of CN and returns it. This action through the axis pin of follower CL causes the pivoting of drive arm CJ and clutch arm CK about their common axis.

The construction of drive arm CJ and clutch arm CK together with the clutch spring CG, provides protection against breakage of the instrument or records in case of jamming.

The clutch arm CK thrusts the drive link BL, actuating the blade bell crank BM, and in turn the blade crank CE through tie bar CF which is riveted to the blade bell crank BM. This action operates the changer blades AJ.

2. When a record has been played and the pickup arm has reached a definite distance from the center spindle following the spiral groove towards the center of the record, the stop adjusting screw DV in the pickup crank strikes the ratchet casting DF, which in turn rotates the trip rod DE, causing the engagement of the follower CL, etc.

3. Records that have an eccentric groove inside of the playing or modulated grooves will give the pickup arm AC an oscillatory movement. This oscillation is transmitted to the pickup crank DT, which, when in the playing position, drags the pawl DU across the ratchet DF, with the pawl spring DS tending to hold the pawl DU straight out, and any back movement of the arm DA and crank DT causes the pawl DU to catch on the ratchet DF, pushing it away against the tension of ratchet spring DG and rotating trip rod DE. DE in turn releases follower CL, engaging it in worm CN, etc.

The operation of the pickup arm DA (AC in top view) is controlled by the cam DW which is synchronized with the changer blades AJ. The rack link BH transmits action from the blade bell crank BM, through the rack DD (BC in bottom view), to cam pinion DH.

The determination of the set down position of the pickup arm AC originates at the selector AA. As the changer blades AJ pivot in operation, the selector AA is intercepted by the edge of a record. This stops the rotation of the selector crank CC fastened to the selector (CD in bottom view), and in turn the axial movement of selector rod CB (same as DP), said axial movement being caused by selector spring DM.

The rod CB interferes with the arcial movement of the pickup crank DT, in accordance with the size of the record passing through the blades AJ, causing the cam follower DR to follow the outer groove or to be allowed to ride into the inner groove in the face of cam DW. The outer groove controls the setdown position for 12" records, and the inner controls the 10" records.

ADJUSTMENTS

Should the changer blades AJ be forceably turned out of proper adjustment, loosen the clamping screws in the blade crank CE and or the blade bell crank BM, and with the machine in neutral at the end of a cycle or in the playing position, turn the blades so that the upper blades are equi-distant and within 1/8" of the edge of a 12" record. Then clamp screws securely.

To adjust the setdown position of tone arm, turn off the machine during cycle just before the pickup arm descends to a record, loosen the set screw in crank DT, and while holding the crank DT in place, turn the pickup arm AC until it is straight above the outside groove of the record. Then retighten the set screw.

The adjustment of the ratchet DF on rod DE (BE in bottom view); the selector crank CC on the switch button shaft; the small casting on the straight end of DC (BD in bottom view); and the selector crank CC on the selector CD are limited and obvious to the authorized repair man, from the description of cycle.

REPLACING MOTOR

Remove idler wheel and the three motor mounting screws. Be sure to save metal bushing spacers, which slip inside of rubber grommets. These prevent rubber from being squeezed out of shape which would prevent proper cushioning of motor. Place motor of proper rating in same position as present motor and replace spacers, washers and screws as before.

LUBRICATION

No lubrication should be necessary. However, in case of squeaks or stiffness of operation a drop of any good light machine oil on each of the bearings on the spindle worm, motor, and at other pivot points should be applied. Also, a light application of grease to the worm itself might help.

MODEL 718-X

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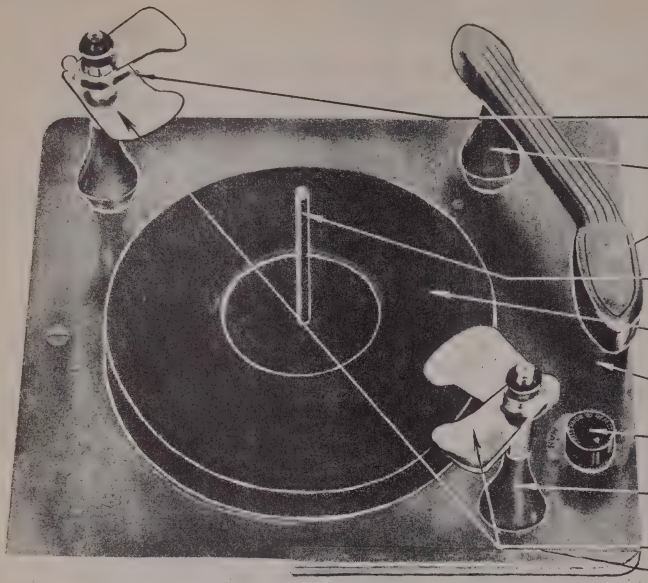
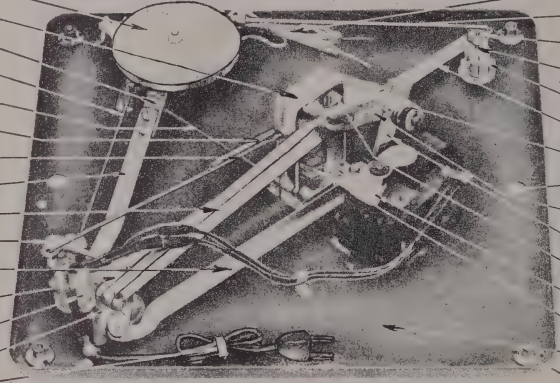
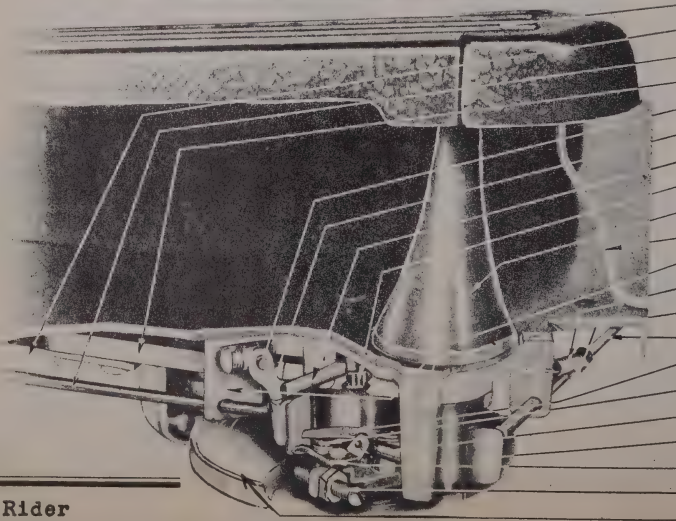


AA SELECTOR R-422
AB PICKUP POST R-615
AC PICKUP ARM R-474
AD TURNTABLE SHAFT R-614
AE TURNTABLE R-608
AF PICKUP ARM REST R-5
AG CONTROL KNOB R-476
AH CHANGER POSTS R-612 or R-408
AJ CHANGER BLADES R-172 or R-172A
AK BASE PLATE



R-403 CAM BA
R-413 SUB FRAME BB
R-438 CAM RACK BC
R-451 REJECT ROD BD
R-426 TRIP ROD BE
R-133 MANUAL SP. BF
R-629 MANUAL ROD BG
RACK LINK BH
R-616 FOLLOWER ARM BJ
R-420 SWITCH CRANK BK
DRIVE LINK BL
BLADE BELL CRANK BM
R-467 SWITCH BN
R-418 SWITCH BRACKET BP
R-319 CORD & PLUG BQ

CA PICKUP CORD R-560
CB SELECTOR ROD R-424
CC SELECTOR CRANK R-425
CD SELECTOR R-422
CE BLADE CRANK
CF TIE BAR
CG CLUTCH SPRING R-432
CH MOUNTING HOLES
CJ DRIVE ARM R-414
CK CLUTCH ARM R-621
CL FOLLOWER R-407
CM MOTOR R-480
CN WORM R-404
CP BASE PLATE
CQ "TEE" NUTS



DA PICKUP ARM R-474
DB RACK LINK
DC REJECT ROD R-451
DD CAM RACK R-438
DE TRIP ROD R-426
DF RATCHET R-440
DG RATCHET SPRING R-775
DH CAM PINION R-410
DJ PICKUP ARM POST R-615
DK PICKUP CORD R-560
DL CAM BRACKET R-427
DM SELECTOR SPRING R-419
DN SELECTOR STUD
DP SELECTOR ROD R-424
DQ CAM FOLLOWER SPRING R-423
DR CAM FOLLOWER R-415
DS PAWL SPRING R-461
DT PICKUP CRANK R-416
DU PAWL R-205
DV STOP ADJUSTING SCREW R-443
DW CAM R-403

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MODEL 810

HOWARD RADIO CO.

I.F. PEAK 465 KC
105-125V 60~ TRANS. #32-938
UNIVERSAL 40~ TRANS. #36-938
VC - VARIABLE CONDENSER #70-270
C3, C4, C5 - ELECT. CONDENSER #51-266
C4 - DUAL CONDENSER #13-266 (200mmf)
T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 - TRIMMER COND. #37-262
S,F, ETC, - SECTION ONE FRONT-BAND SWITCH #38-914
.001 mf, .000075mf, .000175mf - SILVER MICA CONDENSERS
C2, C6 - ELECT COND. #53-266
S,R - REAR OF SECTION ONE OF BAND SWITCH, SHORTS OUT 3,000Δ RESISTOR ON BANDS B, C & D.
ON SAME COIL FORM

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SOCKET VOLTAGE READINGS FOR MODEL 810

* Socket Terminal Number

Voltage taken from ground with voltage at 117 Volts AC. Drop across speaker field 55 V. Use at least a 1000 Ohm per Volt Meter. High voltage reading off rectifier 315 V.

TUBE	FUNCTION	CATH.	SG.	PLATE
6SD7GT	R.F.	1&4 5	100 6	255 8
6SA7GT	Converter		100 4	260 3
6SK7GT	I.F.	3 5	100 6	255 8
6SQ7	Det.			85 6
6SQ7	Mic.Amp.			75 6

TUBE	FUNCTION	CATH.	SG.	PLATE
6U5	Tuning eye			260
6SL7GT	Inverter	1.5 3		80 2
	A.F.	1.5 6		80 5
6K6GT	Output	18 8	260 4	250 3
6K6GT	Output	18 8	260 4	250 3

ALIGNMENT PRECEDURE FOR MODEL 810 SPREAD BAND

DUMMY ANTENNA	SIG. GEN. CONNECTION TO	GEN. FREQ.	BAND SW. POSITION	DIAL SETTING	ORDER OF TRIMMER ADJUSTMENTS	TRIMMER FUNCTION	SEE NOTE
.05 Mfd.	Grid of 6SA7	465 KC	"A" Band	Off Station	See Pictorial ① ② ③ ④	I. F. peak to max. output	1
400 Ohm Resistor	Ant.	1400 KC	"A" Band	1400 KC	See Pictorial ⑤	BC Osc.	-
"	"	600 KC	"A" Band	600 KC	⑥ Rock Dial	BC Osc. Pad.	-
"	"	5 MC	"B" Band	5 MC	⑥ then ⑦	Pol.Band Osc. - Ant. Check Image at 4.1	-
"	"	10 MC	"C" Band	15.6 MC on "D" Band	⑨ then ⑩	⑨ Osc. Pad. ⑩ Ant. Pad.	2
"	"	12 MC	"C" Band	12 MC	⑪ then ⑫	⑪ Osc. Trimmer ⑫ Ant. Trimmer	2
"	"	16 MC	"D" Band	2.4 MC on "B" Band	⑬ then ⑭	⑬ Osc. Pad. ⑭ Ant. Pad.	3
"	"	20 MC	"D" Band	20 MC	⑮ then ⑯	⑮ Osc. Trimmer ⑯ Ant. Trimmer	3

NOTE 1: The I.F. adjustments are reached through holes in top of cans on under side of chassis.

NOTE 2: Trimmers 11 and 12 set to minimum capacity temporarily; peak 9 and 10. Then peak 11 and 12. Check dial calibration at 9, 10, and 12 MC.

NOTE 3: Trimmers 15 and 16 set to minimum capacity temporarily; peak 13 and 14. Then peak 15 and 16. Check dial calibration at 15, 16, 18, and 20 MC.

EQUIPMENT REQUIRED:

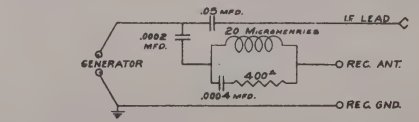
1. Signal generator to accurately cover the alignment frequencies shown in the table.
2. Output Meter (0 to 3 V. AC, if used in voice coil circuit).
3. Dummy Antenna. Although the values as shown in the table for antenna load may be satisfactory, we urgently recommend the circuit below to properly take care of the frequencies for correct alignment.

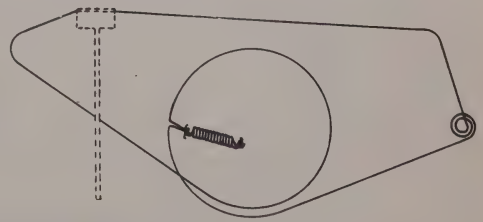
START ALIGNMENT WITH:

Volume control full "ON" to right and Band Switch in "A" Band position. After checking for pointer travel to last line above 550, set dial to point where there is no interference with generator signal and proceed with I.F. alignment.

NOTE THAT THIS IS A SPREAD BAND RECEIVER AND THE ALIGNMENT PROCEDURE IS NOT CONVENTIONAL. ONE SET OF COILS COVERS TWO SHORT WAVE BANDS WHICH ARE SPREAD BY MEANS OF PADDING CIRCUITS.

NOTE ALSO THAT A SETTING POINT FOR THE DIAL HAND POSITION IS GIVEN ON A DIFFERENT BAND OTHER THAN THE BAND BEING ALIGNED AND THE FREQUENCY SETTING OF THE GENERATOR. THIS IS NECESSARY TO OBTAIN THE PROPER BAND-SPREAD.



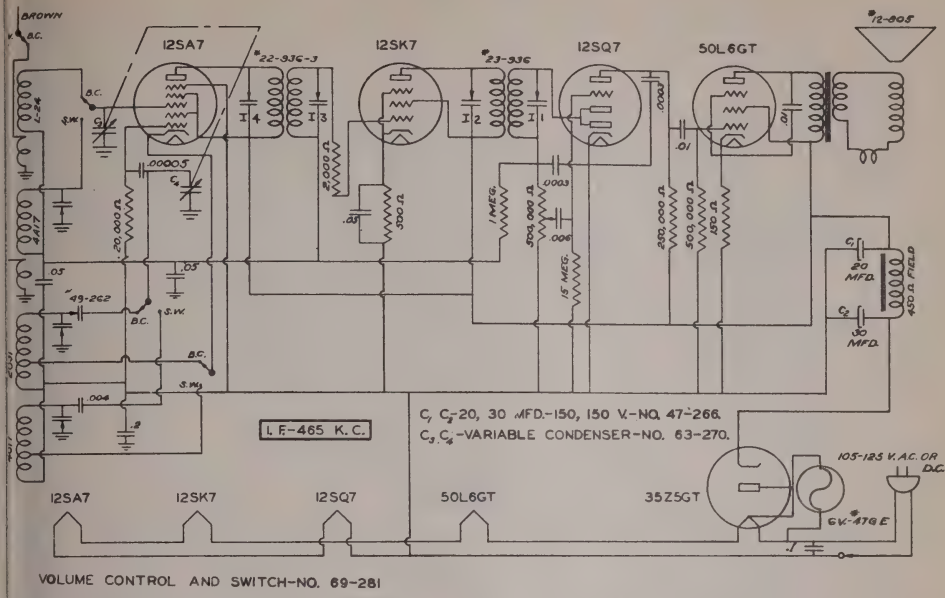


CONDENSER GANG IN MAXIMUM POSITION

LAYOUT SHOWING HOW TO ASSEMBLE DIAL CABLE ON MODEL 806-808 ETC, VERTICAL MOUNTING.

MODEL 802

HOWARD RADIO CO.



TUNING RANGES = 540 to 1720 KC and 4.6 to 16 MC (178-550 and 18-65 Meters)

I. F. 465 KC	TYPE Conventional	POWER OUTPUT - (MAX.) 1 Watt	UPO .5 W.		
SPEAKER = Electro-dynamic	SIZE = 5"	V.C. IMP. (400CPS) = 5 Ohms	FIELD = 450 Ohms		

ALIGNMENT PROCEDURE

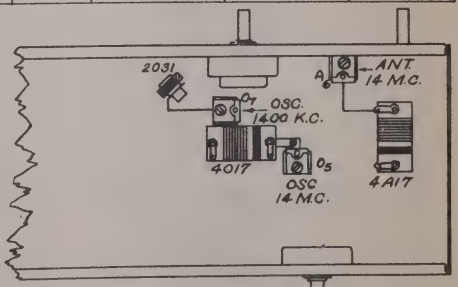
Wave-Band Switch Position	Position of Dial Pointer	Signal Generator Frequency	Signal Generator Connection	See Note	Trimmers Adjusted (In order shown)	Trimmer Function	Check for Image at
KC	540	465	Grid of 12SA7	A	I_1, I_2, I_3, I_4	IF	
MC	14 MC	14 MC	Ant. (Brown)	B	O_5, A_6	Osc. Ant.	13 MC
KC	1400 KC	1400 KC	Ant. (Brown)		O_7	Osc.	

A- Each step of the alignment should be repeated in the original order for greater accuracy. Keep output from Signal Generator low. The I.F. trimmers are reached through the two holes on the top of each I.F. can.

B- When aligning the short wave bands, do not adjust to the IMAGE frequency. For example, if the adjustment is correctly made at 14 MC, then a weaker image will be heard at 13,070 KC, in other words 930 KC less on the dial.

The tubes are connected in series in the order as shown by the schematic diagram.

The dual section filter condenser has a common negative, but note that it does not return to ground as the can is insulated from the chassis.



SOCKET VOLTAGE READINGS

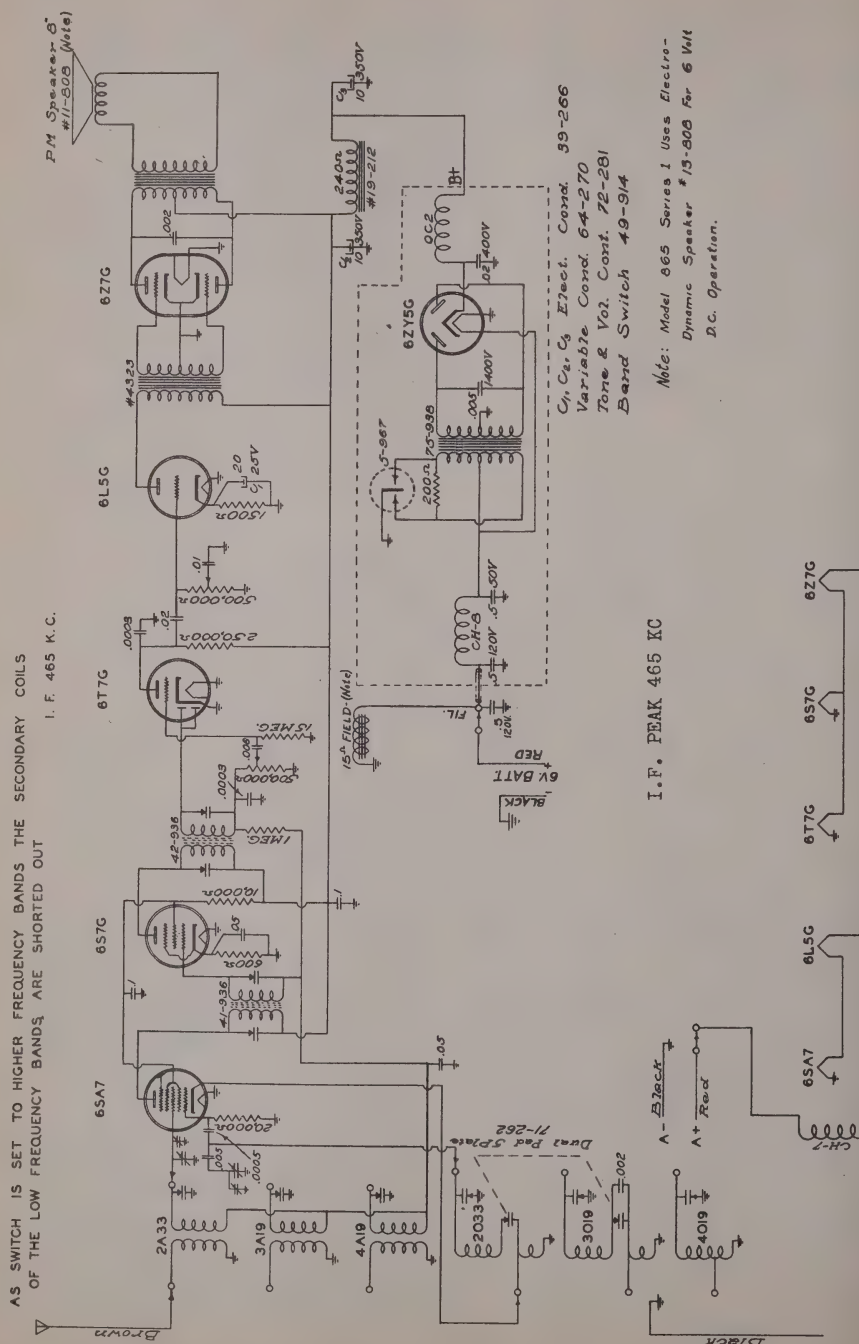
TUBE	FUNCTION	CATH.		SG.		PLATE	
12SA7	Mixer		*	92	4	92	3
12SK7	I.F.Amp	2.1	5	92	6	92	8
12SQ7	Det.					42	6
50L6GT	Output	6	8	92	4	82	3
35Z5GT	Rectifier	121	8				

* Socket Terminal Number.

Voltage taken from B- with line voltage at 117 V. A.C.
High voltage reading off rectifier = 115V.
Drop across speaker field = 29V.
Use at least a 1000 Ohm per volt meter.
High voltage reading off rectifier = 121V.

MODEL 865

HOWARD RADIO CO.



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HOWARD RADIO CO.

MODEL 865
MODEL 868

MODEL 865

POWER SUPPLY = 6 Volt Battery Supply — DRAIN = 2.6 Amps.

ANTENNA SYSTEM = Conventional. Connect Antenna to BROWN lead. Connect Ground to BLACK lead.

TUNING RANGES = 540 to 1700 KC, 2.2 to 7 MC, 7 to 22 MC.

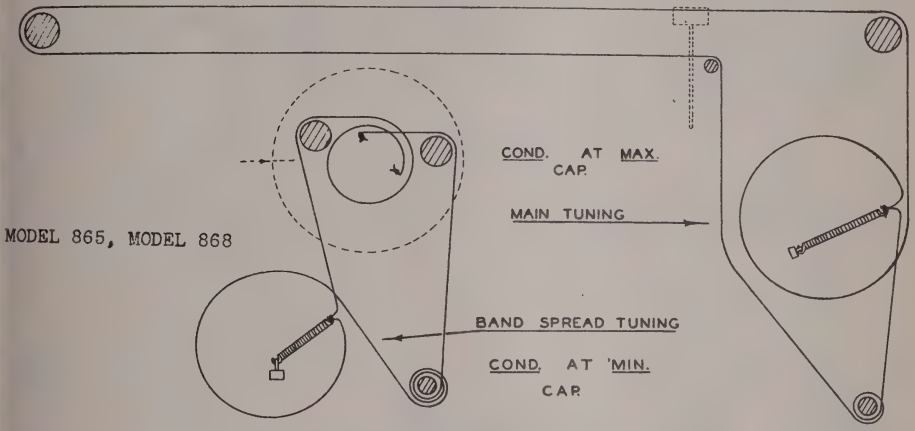
I.F. = 465 KC. TYPE = Iron Core | POWER OUTPUT = (MAX.) = 2 WATTS.

CONTROLS: Lower Left, Volume; Middle left, Tone; Upper left, On-Off;
Lower Right, Band Switch; Middle Right, Tuning; Upper right, Band Spread.

TUNING SYSTEM:
Horizontal dial, string drive, fly wheel tuning. Band Spread with 320 degree disc indicator.

SPEAKER = Electro dynamic | SIZE = 8" | VOICE COIL = 3 OHMS (400 CPS) | FIELD = 15 OHMS

STRING LAYOUT INTERNATIONAL SERIES



MODEL 865
ALIGNMENT PROCEDURE

See Fig. 1 and Fig. 2.

Wave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Generator Connection	See Note	Trimmers Adjusted (In order shown)	Trimmer Function
Broadcast	Max. Cap.	465 KC	Converter Grid	A,D	I_1, I_2, I_3, I_4	IF
7-22 MC	21	21 MC	Ant. (Brown)	B	O_5, A_6	Osc.,Ant.
2.2-7 MC	6	6 MC	" "		O_7, A_8	Osc.,Ant.
2.2-7 MC	2.2	2.2 MC	" "	C	P_9	Osc. Pad.
Broadcast	1400	1400 KC	" "		O_{10}, A_{11}	Osc.,Ant.
Broadcast	600	600 KC	" "	C	P_{12}	Osc. Pad.

A--Each step of the alignment should be repeated in the original order for greater accuracy. Keep output rom Signal Generator low. The I.F. trimmers are reached through the two holes on the top of each I.F. can.
B--When aligning the short wave bands, do not adjust to the IMAGE frequency. For example, if the adjustment s correctly made at 21 MC, then a weaker image will be heard at 21,000 KC less 930 KC, or about 20,070 KC on he dial.
C--When adjusting this pad, move the tuning hand back and forth and adjust padder until the peak of greatest ntensity is obtained.
D--See that the tuning hand is set exactly on the last line above 540 when the condenser is at maximum capa- ity.

SOCKET VOLTAGES
MODEL 865, 6 Volt

TUBE	FUNCTION	CATHODE	SCR. GRID	PLATE
6SA7	Mixer	3	70	145
6S7G	IF	3	70	145
6T7G	Det.	x	x	50
6L5G	Audio	6 V. Bias	x	145
6Z7G	PP Output	x	x	140

MODEL 865
MODEL 868

HOWARD RADIO CO.

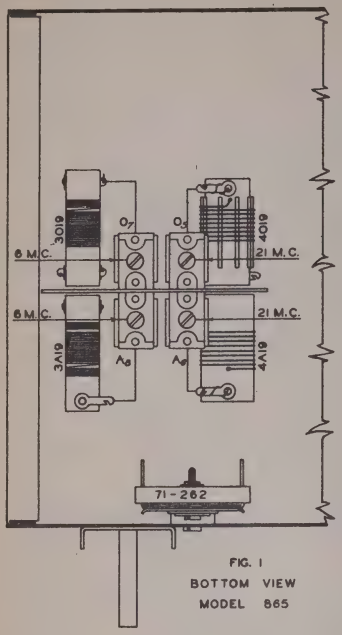


FIG. 1
BOTTOM VIEW
MODEL 865

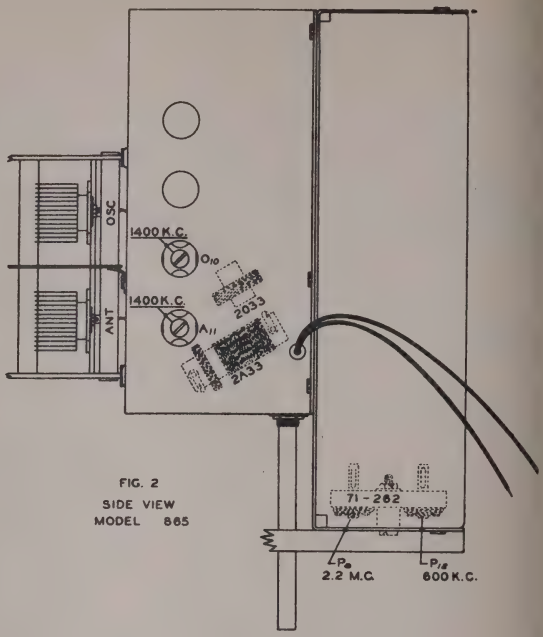


FIG. 2
SIDE VIEW
MODEL 865

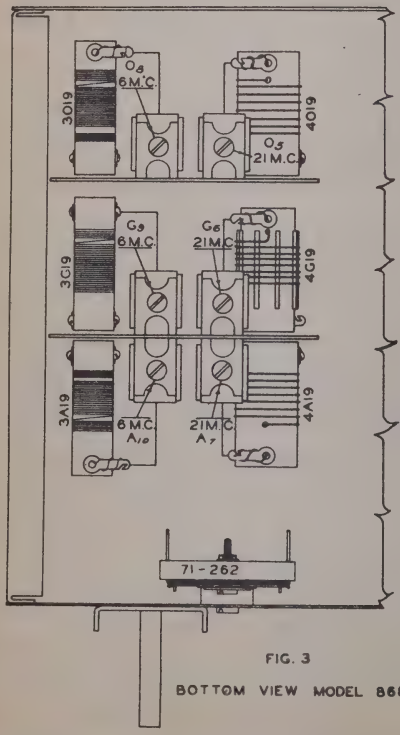


FIG. 3
BOTTOM VIEW MODEL 868

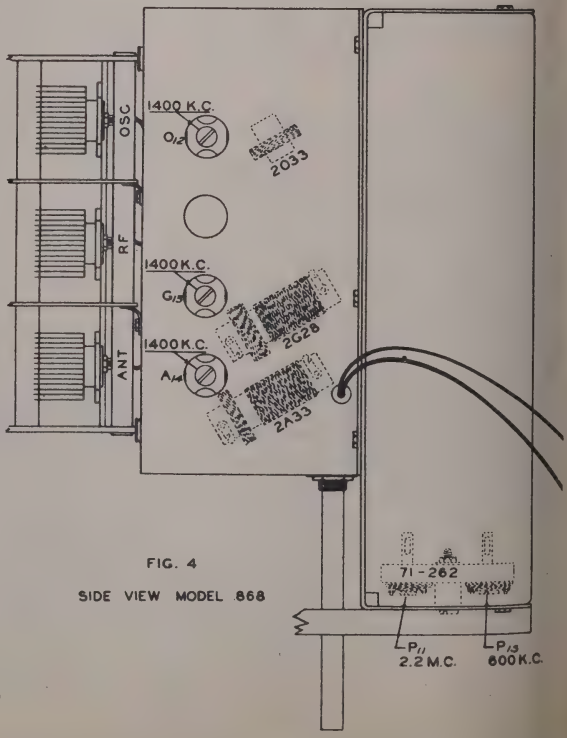


FIG. 4
SIDE VIEW MODEL 868

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MODEL 868

HOWARD RADIO CO.

MODEL 868

HOWARD RADIO CO.

POWER SUPPLY-(Standard Models) = 105-125 V. 60 Cycle CONSUMPTION - 95 WATTS

ANTENNA SYSTEM = Conventional. Connect Antenna to BROWN lead. Connect Ground to BLACK lead.

TUNING RANGES = 540 to 1700 KC, 2.2 to 7 MC, 7 to 22 MC.

I. F. = 465 KC. Two tuned stages and one resistance coupled stage.

POWER OUTPUT = (MAX.) 6 WATTS UPO = 4 W.

CONTROLS: Lower Left: Volume; Middle Left; Tone; Upper Left: Power Off-On;
Lower Right: Band Switch; Middle Right: Tuning; Upper Right: Band Spread.

TUNING SYSTEM:
Horizontal dial, string drive, fly wheel tuning. Band Spread with 320 degree disc indicator.

SPEAKER = Electro dynamic	SIZE = 8"	VOICE COIL = 3 OHMS (400 CPS)	FIELD = 500 OHMS

MODEL 868
ALIGNMENT PROCEDURE

Wave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Generator Connection	See Note	Trimmers Adjusted (In order shown)	Trimmer Function
Broadcast	Max. Cap.	465 KC	Converter Grid	A,D	I_1, I_2, I_3, I_4	IF
7-22 MC	21	21 MC	Ant. (Brown)	B	O_5, G_6, A_7	Osc,RF,Ant.
2.2-7 MC	6	6 MC	" "		O_8, G_9, A_{10}	Osc,RF,Ant.
2.2-7 MC	2.2	2.2 MC	" "	C	P_{11}	Osc,Pad.
Broadcast	1400	1400 KC	" "		O_{12}, G_{13}, A_{14}	Osc,RF,Ant.
Broadcast	600	600 KC	" "	C	P_{15}	Osc,Pad.

A--Each step of the alignment should be repeated in the original order for greater accuracy. Keep output from Signal Generator low. The I.F. trimmers are reached through the two holes on the top of each I.F. ca
B--When aligning the short wave bands, do not adjust to the IMAGE frequency. For example, if the adjustment is correctly made at 21 MC, then a weaker image will be heard at 21,000 KC less 930 KC, or about 20,0 KC on the dial.
C--When adjusting this pad, move the tuning hand back and forth and adjust padder until the peak of greates intensity is obtained.
D--See that the tuning hand is set exactly on the last line above 540 when the condenser is at maximum capacit

MODEL 868
SOCKET VOLTAGE READINGS

Voltage taken from ground with line voltage at - 120 V.
High voltage reading off rectifier - 300 V.
Drop across speaker field - 65 V.
Voltage taken with 1,000 Ohm per volt meter.

TUBE	FUNCTION	CATH-ODE	SCR. GRID	PLATE	OSC. PLATE
6SD7GT	R.F.	2.5	95	235	
6SA7	Mixer		95	235	95
6SK7	I.F.Amp.	3	95	195	
6SK7	I.F.Amp.	3	95	215	
6SQ7	Diode-AVC			47	

TUBE	FUNCTION	CATH-ODE	SCR. GRID	PLATE	OSC. PLATE
6K6GT	Output	17	235	225	
6K6GT	Output	17	235	225	
6J5GT	Inverter	7.5		145	
80	Rect.				
6U5	Tuning Eye			235	

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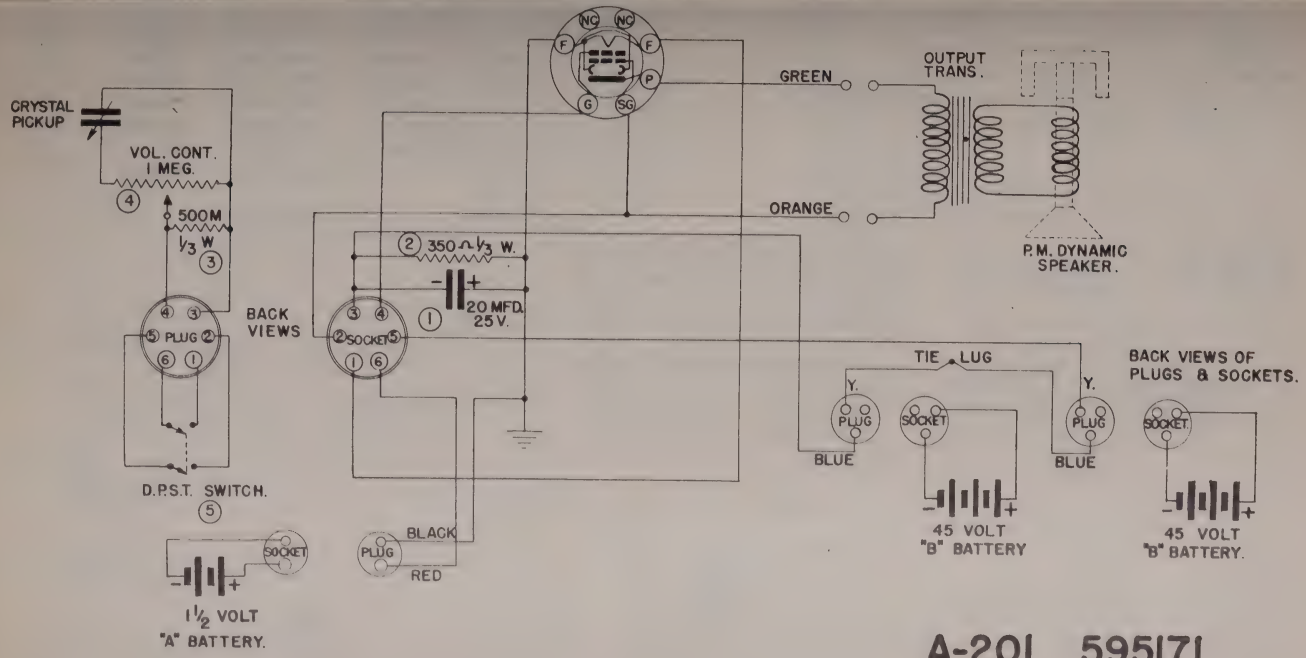

THE MAGNAVOX CO.

A-201 595171

SPECIFICATIONS

"A" Battery voltage.....1.5 volt;
"B" Battery voltage..... 90 volt;
"A" Battery drain..... .10 amp.;
"B" Battery drain..... .0111 amp.;
Power output..... .27 watt;
Type tube:..... 1Q5G;
Speaker transformer..... 8000 ohms;

Illus. No.	Part No.	Part Name	Description
1.	273611	Condenser	Molanode, 20 mfd. 25 V.
2.	230031	Resistor	Carbon, 350 ohm 1/3 W.
3.	239755	Resistor	Carbon, 500,000 ohm 1/3 W.
4.	220016	Control	Volume, 1 megohm
5.	160014	Switch	Off-on switch
	800009	Battery	Complete set of three batteries

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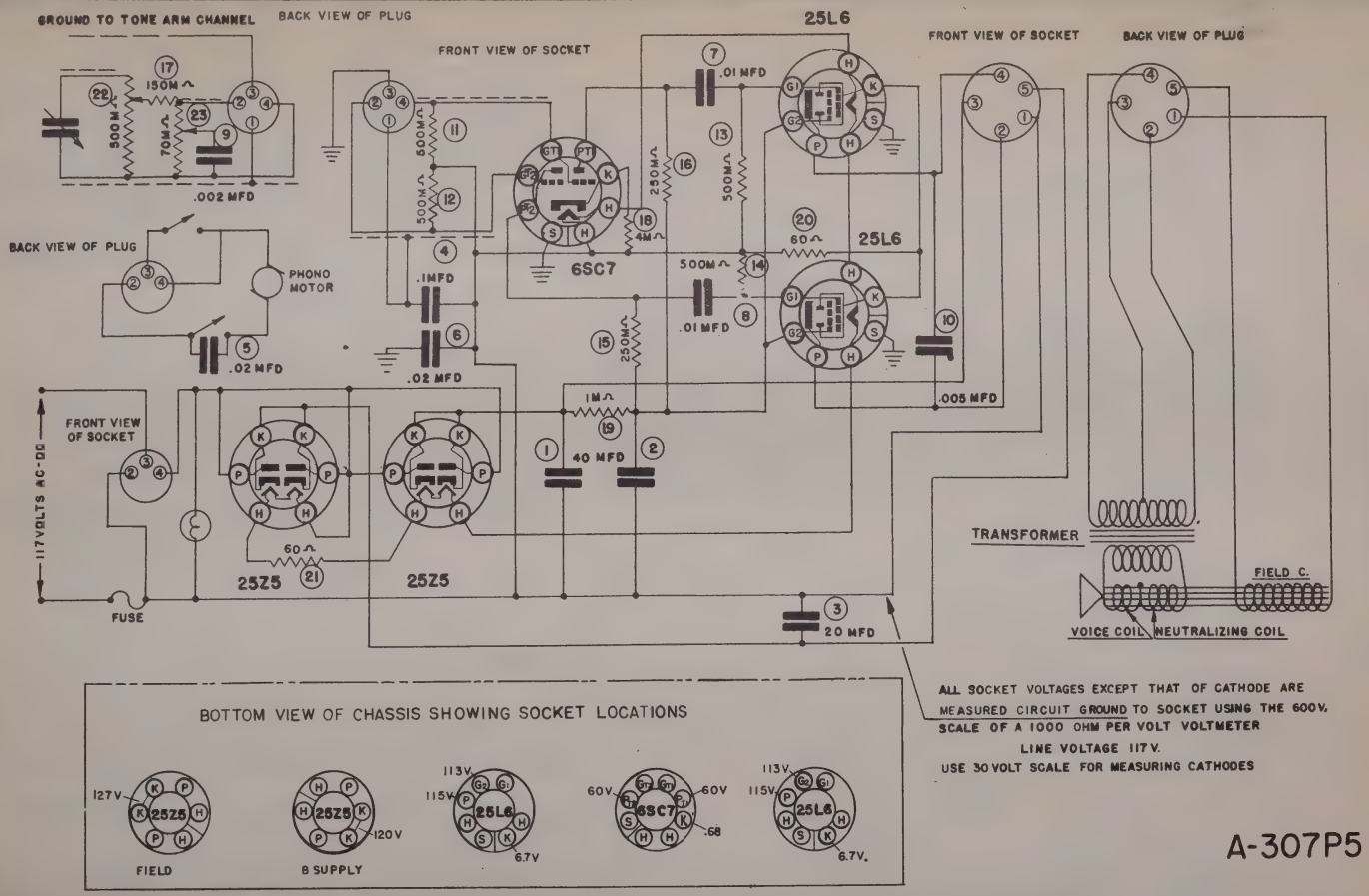

A-307P5

Primary voltage.....117 V. AC-DC;
Power consumption..... 60 watts;
Power output..... 3 watts;
Type tubes..... 1 - 6SC7; 2 - 25L6G; 2 - 25Z5;
Speaker:
Field Coil..... 1800 ohms ;
Transformer..... 2000 ohms ;

FOR DATA AND PARTS LIST, SEE INDEX

THE MAGNAVOX CO.

In the earlier models of this amplifier, the interstage transformer was wired in the circuit in such a way that a D.C. voltage was applied to the primary winding, and occasionally causing corrosion in the leads. This trouble was corrected by grounding the low side of the primary winding (brown lead). The condenser coupling the 6C5 plate to the transformer is replaced with a .5 Mfd. value.

The capacity of the tuning condenser across the filter choke should be checked and its value is .2 Mfd., it should be replaced with a .3 Mfd. condenser.

A pronounced hum in this amplifier may often be traced to an unbalance in 6L6G tubes. If substitution of new tubes fails to remedy the condition, the 6C5 tube should be replaced as a possible cure.

Illus. No.	Part No.	Part Name	Description
C1. C5.	274224	Condenser	Electrolytic, 25 mfd. 25 V. 25 mfd. 50 V.
C2.	254147	Condenser	Tubular, .5 mfd. 400 V.
C3.	254147	Condenser	Tubular, .5 mfd. 400 V.
C4.	254147	Condenser	Tubular, .5 mfd. 400 V.
C6.	254153	Condenser	Tubular, .01 mfd. 600 V.
C7.	254153	Condenser	Tubular, .01 mfd. 600 V.
C8.	254182	Condenser	Tubular, .2 mfd. 200 V.
C9.	254147	Condenser	Tubular, .5 mfd. 400 V.
C10.	274194	Condenser	Electrolytic, 10 mfd. 500 V.
C11.	274194	Condenser	Electrolytic, 10 mfd. 500 V.
C12.	254152	Condenser	Tubular, .1 mfd. 200 V.
C13.	254161	Condenser	Tubular, .002 mfd. 600 V.
R1.	234447	Resistor	Carbon, 200,000 ohm 1/2 W.
R2.	234426	Resistor	Carbon, 2000 ohm 1/2 W.
R3.	234434	Resistor	Carbon, 15,000 ohm 1/2 W.
R4.	234434	Resistor	Carbon, 15,000 ohm 1/2 W.
R5.	234434	Resistor	Carbon, 15,000 ohm 1/2 W.
R6.	242607	Resistor	Wire wound, 200 ohm W. L.
R7.	234518	Resistor	Carbon, 7500 ohm 2 W.
R8.	234518	Resistor	Carbon, 7500 ohm 2 W.
T1.	320187	Transformer	Input
T2.	330188	Transformer	Output
T3.	300106	Transformer	Power, 117 V. AC, 60 cycle
1.	350122	Choke	Tone filter choke
	350113	Choke	Filter choke

CONTROL PANEL

C1.	259228	Condenser	Tubular, .02 mfd. 600 V.
C2.	254161	Condenser	Tubular, .002 mfd. 600 V.
C3.	254142	Condenser	Tubular, .001 mfd. 600 V.
	254163	Condenser	Tubular, .003 mfd. 600 V.
C4.	254161	Condenser	Tubular, .002 mfd. 600 V.
C5.	259228	Condenser	Tubular, .02 mfd. 600 V.
R2.	234446	Resistor	Carbon, 150,000 ohm 1/2 W.
R3.	222446	Control	Bass, 1 megohm with switch
R4.	222444	Control	Volume, 1 megohm
R5.	234439	Resistor	Carbon, 50,000 ohm 1/2 W.
R6.	222445	Control	Treble, 200,000 ohm
	362463	Choke	Filter choke coil
	182465	Socket	Pickup receptacle

MODEL A-1101
MODEL A-3001C

THE MAGNAVOX CO.

MODEL A1101 AMPLIFIER

Illus. No.	Part No.	Part Name	Description
1.	254153	Condenser	Tubular, .01 mfd. 600 V.
2.	254136	Condenser	Tubular, .15 mfd. 400 V.
3.	270012	Condenser	Molanode, 8 mfd. 350 V.
4.	273611	Condenser	Molanode, 20 mfd. 25 V.
5.	273611	Condenser	Molanode, 20 mfd. 25 V.
6.	273610	Condenser	Molanode, 30-10 mfd. 450 V.
7.	239757	Resistor	Carbon, 2 megohm 1/3 W.
8.	234437	Resistor	Carbon, 30,000 ohm 1/2 W.
9.	234475	Resistor	Carbon, 20,000 ohm 1 W.
10.	234521	Resistor	Carbon, 15,000 ohm 2 W.
11.	230038	Resistor	Carbon, 2000 ohm 1/3 W.
12.	230057	Resistor	Carbon, 110 ohm 5 W.
13.	320001	Transformer	Input transformer
14.	300009	Transformer	Power, 117 V. 50-60 cycle
		CONTROL PANEL	
1.	254161	Condenser	Tubular, .002 mfd. 600 V.
2.	254161	Condenser	Tubular, .002 mfd. 600 V.
3.	259935	Condenser	Tubular, .02 mfd. 600 V.
4.	254153	Condenser	Tubular, .01 mfd. 600 V.
5.	239751	Resistor	Carbon, 50,000 ohm 1/3 W.
6.	222444	Control	Volume, 1 megohm
7.	222446	Control	Bass, 1 megohm, with power switch
8.	222445	Control	Treble, 200,000 ohm
9.	362463	Choke	Tone filter choke

MODEL A3001C AMPLIFIER

1, 2, 5.	270007	Condenser	Molanode, 20-20 mfd. 25V. 5mfd. 450 V.
3.	254127	Condenser	Tubular, .02 mfd. 600V.
4.	254147	Condenser	Tubular, .5 mfd. 400V.
6.	250064	Condenser	Tubular, .002 mfd. 1200V.
7.	254147	Condenser	Tubular, .5 mfd. 400V.
8, 9.	273610	Condenser	Molanode, 30-10 mfd. 450V.
10.	239757	Resistor	Carbon, 2 megohm 1/3 W.
11.	234426	Resistor	Carbon, 2000 ohm 1/2 W.
12.	234477	Resistor	Carbon, 30,000 ohm 1 W.
13.	234475	Resistor	Carbon, 20,000 ohm 1 W.
14.	239991	Resistor	Carbon, 7500 ohm 1/2 W.
15.	240009	Resistor	Wire wound 200 ohm, 5 W.
16.	259935	Condenser	Tubular, .02 mfd. 110 V. AC
17.	320240	Transformer	Input transformer
18.	330188	Transformer	Output transformer
19.	300106	Transformer	Power transformer
20.	350113	Choke	Filter choke
		CONTROL PANEL	
1.	259935	Condenser	Tubular, .02 mfd. 110 V. AC
2.	254163	Condenser	Tubular, .003 mfd. 600 V.
	254161	Condenser	Tubular, .002 mfd. 600 V.
3.	254161	Condenser	Tubular, .002 mfd. 600 V.
4.	254142	Condenser	Tubular, .001 mfd. 600 V.
5.	230019	Resistor	Carbon, 250,000 ohm 1/2 W.
6.	234439	Resistor	Carbon, 50,000 ohm 1/2 W.
7.	222446	Control	Bass, 1 megohm with switch
8.	222444	Control	Volume, 1 megohm
9.	222445	Control	Treble, 200,000 ohm
10.	362463	Choke	Tone filter choke

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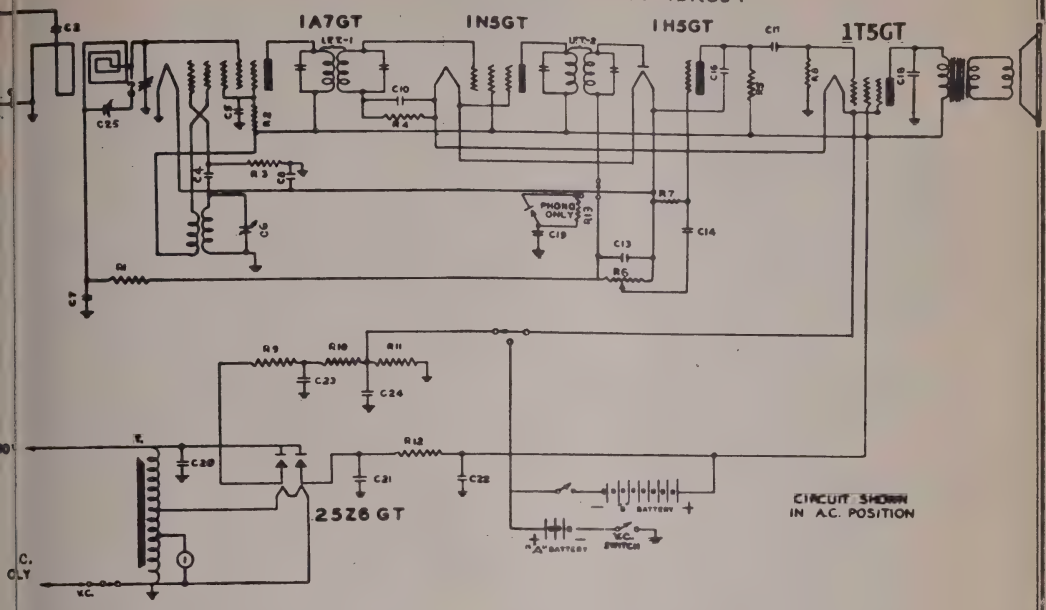
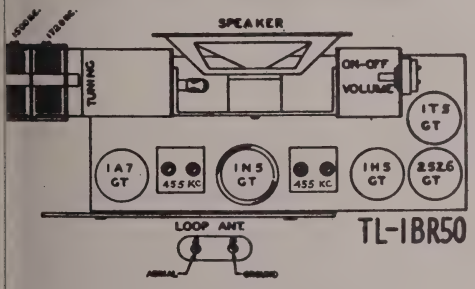
MAJESTIC RADIO & TELEV. CORP.

MODELS 1BR50, 1BR50-P

SCHEMATIC DIAGRAM-MODEL-1BR50-1BR50-P



TUBE LAYOUT MODELS-1BR50-1BR50P



The tube complement is as follows:

1-1A7GT	Converter
1-1N5GT	Intermediate Frequency Amplifier
1-1H5GT	Diode Detector, Automatic Volume Control, and Audio Driver
1-1T5GT	Pentode Power Output Tube
1-25Z6G	Half Wave Rectifier

chematic	Part	Description	Schematic	Part	Description
2,C1					
10,C17	C-15754	.01 mf	R1,R4	R-15500	2 meg.
3,C6	Y-CV-44	Var.Cond.	R2	R-15617	30K ohm
13,C4,C16	CM-21	100 mmf	R3	R-15523	200K ohm
5,C7	C-15752	.05 mf	R5	R-15520	500K ohm
8	C-15761	.1 mf	R6	Y-VC-41	Vol.Cont.
18,C14	C-15753	.002 mf	R7	R-15559	3 meg.
19	C-15761	.1 mf	R8	R-15517	1 meg.
20	C-15756	.05 mf	R9,R10,R11	Y-RC-10	Vol.Div. 350 800 300 ohm
21,C22	Y-CE-47	8-16 mf			
23,C24	Y-CE-57	40-100 mf	R12	R-16	8K ohm
1	Y-TP-55	Pwr. Trans.	R13	R-15512	250K ohm
FT-1	Y-C1-77	1st I.F.			
FR-2	Y-C1-78	2nd I.F.			

MODEL 1D50-H
MODEL 1S49

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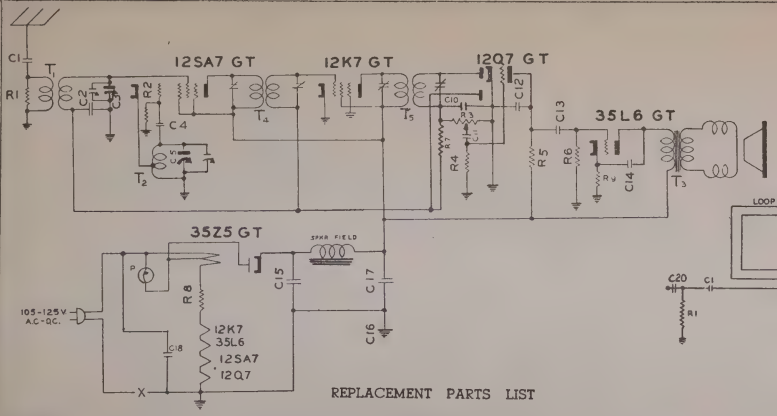
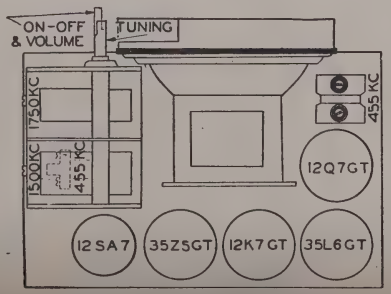


REPLACEMENT PARTS LIST

Schematic Location	Part No.	Description
R1	R-15531	Carbon res. 10K ohm ½W20%
R2	R-15510	Carbon res. 20K ohm ½W20%
R3	Y-VC-37	Volume Control
R4	R-79	Carbon resistor 15meg ½W20%
R5	R-15512	Carbon res. 250K ohm ½W20%
R6	R-15520	Carbon res. 500K ohm ½W20%
R7	R-15500	Carbon resistor 2meg ½W20%
R8	R-86	Carbon res. 70 ohm 2W20%
R9	R-98	Carbon res. 150 ohm ½W10%
C2	C-33	Tubular cond. .05 mfd. 200V
C1	C-18	Tubular cond. .01 mfd. 400V
C11	C-15753	Tubular cond. .002 mfd. 600V
C13	C-15754	Tubular cond. .01 mfd. 400V
C14,C18	C-15760	Tubular cond. .05 mfd. 400V
C4	CM-29	Mica cond. 50 mmfd.
C10	CM-30	Mica cond. 250 mmfd.
C12	CM-31	Mica cond. 100 mmfd.
T-1	Y-CR-5	Antenna Coil
T-2	Y-CS-105	Oscillator Assembly
T-3		Speaker Transformer
T-4	Y-CS-106	1st I. F. Transformer
T-5	Y-CS-107	2nd I. F. Transformer

SCHEMATIC MODEL 1S49

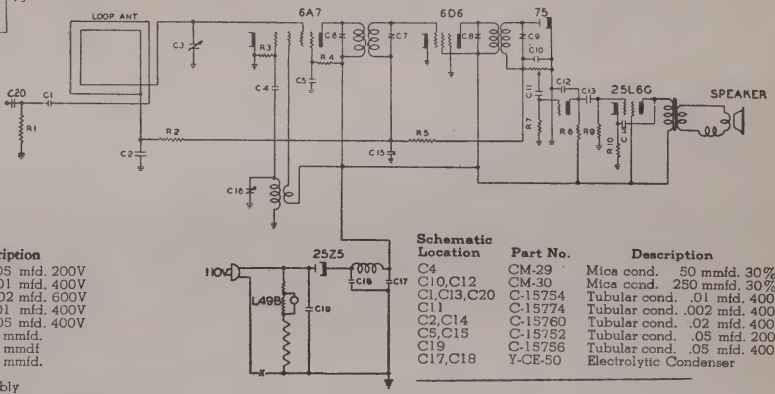
12SA7GT Frequency Converter
12K7GT IF Amplifier
12Q7GT 2nd Det. Audio Driver
35L6GT Beam Power Ampl.
35Z5GT Rectifier



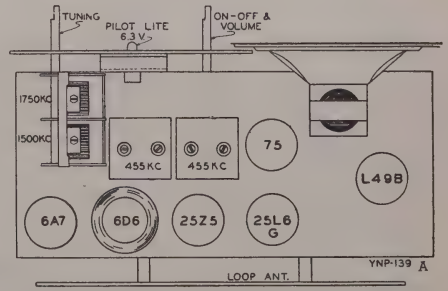
TUBE LAYOUT—MODEL 1S49

Schematic Location	Part No.	Description
R1	R-15531	Carbon res. 10K ohm ½W20%
R2	R-15515	Carbon res. 100K ohm ½W20%
R3	R-15511	Carbon res. 50K ohm ½W20%
R4	R-53	Carbon res. 15K ohm ½W20%
R5	R-15500	Carbon resistor 2meg ½W20%
R6	Y-VC-30	Volume Control
R7	R-79	Carbon resistor 15meg ½W20%
R8,R9	R-15520	Carbon res. 500K ohm ½W20%
R10	R-80	Carbon res. 110 ohm ½W20%

1D50-H



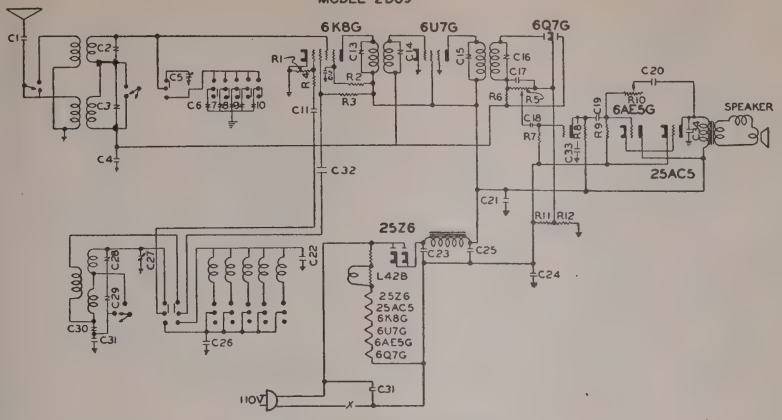
Schematic Location	Part No.	Description
C4	CM-29	Mica cond. 50 mmfd. 30%
C10,C12	CM-30	Mica cond. 250 mmfd. 30%
C1,C13,C20	C-15754	Tubular cond. .01 mfd. 400V
C11	C-15774	Tubular cond. .002 mfd. 400V
C2,C14	C-15760	Tubular cond. .02 mfd. 400V
C5,C15	C-15752	Tubular cond. .05 mfd. 200V
C19	C-15756	Tubular cond. .05 mfd. 400V
C17,C18	Y-CE-50	Electrolytic Condenser



6A7 Frequency Converter
6D6 IF Ampl.
75 2nd Det., AVC, Audio Driver
25L6G Beam Power Ampl.
25Z5 Rectifier
L49B Plug-in Ballast

MAJESTIC RADIO & TELEV. CORP.

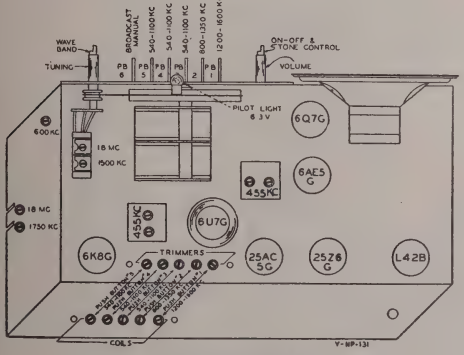
MODEL 2D69



PARTS LIST FOR MODEL 2D69

Schematic Location	Part No.	Description
R1	R-54	Carbon res. 50K ohm ½W20% (Insulated Type)
R2	R-53	Carbon res. 15K ohm ½W20%
R3	R-15541	Carbon res. 5K ohm ½W20%
R4	R-15601	Carbon res. 100 ohm ½W20%
R5,R10	Y-VC-33	Volume and Tone Control
R6	R-15500	Carbon resistor 2meg. ½W20%
R7,R9	R-15517	Carbon resistor 1meg. ½W20%
R8	R-15512	Carbon res. 250K ohm ½W20%
R11,R12	R-87	Carbon res. 70 ohm ½W20%

Schematic Location	Part No.	Description
C1,C18,C19, C32,C34	C-15754	Tubular cond. .01 mfd. 400V
C4,C21	C-15752	Tubular cond. .05 mfd. 200V
C31	C-15756	Tubular cond. .05 mfd. 400V
C11	CM-29	Mica cond. 50 mmf 30%
C17,C33	CM-31	Mica cond. 100 mmf. 30%
C20	CM-30	Mica cond. 250 mmf. 30%
C22	CM-33	Mica cond. 250 mmf. 5% } Sil.
C26	CM-34	Mica cond. 150 mmf. 5% } cap.
C31	CM-9	Mica cond. 5500 mmf. 30%
C2,C3, C28,C29	Y-CT-24	} Antenna Trimmer } Oscillator Trimmer
C5,C27	Y-CV-33	2 Gang Condenser
C6,C7,C8, C9,C10	Y-CT-26	Trimmer Strip
C13,C14, C15,C16	Y-CT-1	I. F. Trimmer
C30	Y-CT-27	Padder Condenser
C23,C24,C25	Y-CE-46	Electrolytic Condenser



TUBE LAYOUT - MODEL 2D69
FIGURE 1

L42B Plug-in Ballast
6K8G Frequency Converter
6U7G IF Ampl.
6Q7G 2nd Det., AVC, AF Ampl.
6AE5G Driver
25Z6G Rectifier
25AC5G Power Output

PUSH BUTTON ADJUSTMENT:

Push button in of desired station. At rear of receiver, adjust corresponding coil of chosen button until desired is heard with maximum volume and best tone. Adjust trimmer corresponding to chosen button until that station is heard with maximum volume. Repeat for all push buttons.

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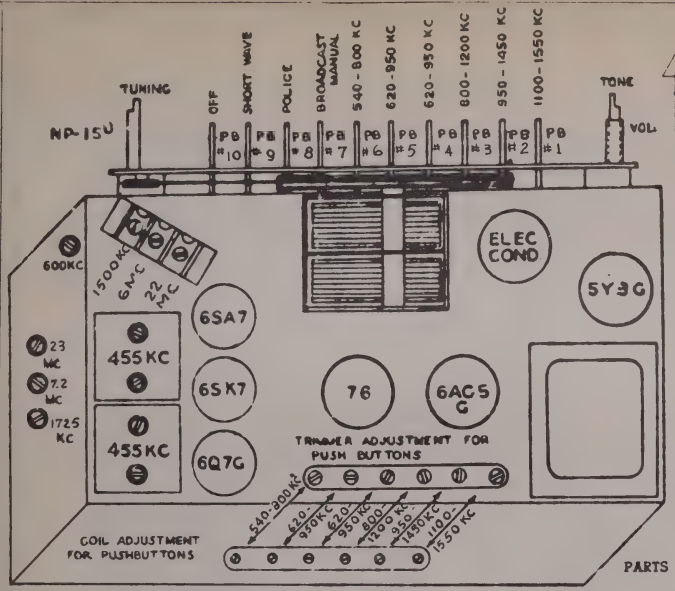
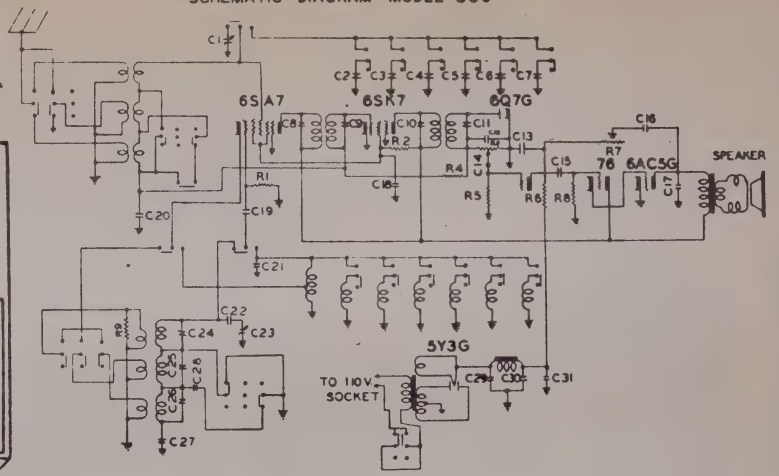


SCHEMATIC DIAGRAM - MODEL 369



PARTS LIST MODELS 369 and 3C69

TUBE LAYOUT - MODEL 369

Schematic Location	Part No.	Description
R3	Y-VC-35	Volume and tone control
R1	R-15510	Carbon res. 20K ohm ½W 20%
R2	R-15531	Carbon res. 10K ohm ½W 20%
R4, R8	R-15517	Carbon res. 1 meg. ½W 20%
R5	R-79	Carbon res. 15 meg. ½W 20%
R6	R-15512	Carbon res. 250K ohm ½W 20%
R9	R-76	Carbon res. 400 ohm ½W 20%

Schematic Location	Part No.	Description
C27	Y-CT-4	Padding Condenser
C29,C30	CE-52	Electrolytic
C20	C-15757	Tubular cond. .05 mfd. 200V
C15	C-15754	Tubular cond. .01 mfd. 400 V
C17	C-15759	Tubular cond. .006 mfd. 600V
C31	C-15757	Tubular cond. .1 mfd. 400V
C14	C-15774	Tubular cond. .002 mfd. 400V
C18	C-15756	Tubular cond. .05 mfd 400V

Schematic Location	Part No.	Description
C12,C13,C19	CM-31	Mica cond. 100 mmf. 30%
C16	CM-30	Mica cond. 250 mmf. 30%
C22	CM-2	Mica cond. 4330 mmf. 5%
C28	CM-36	Mica cond 2770 mmf. 5%
C21	CM-13	Mica cond. 100 mmf. 5%
C2,C3,C4, C5,C6,C7	Y-SW-20	Push-Button Switch
	Y-CT-28	Trimmer strip

The receiver operates with the following tubes:

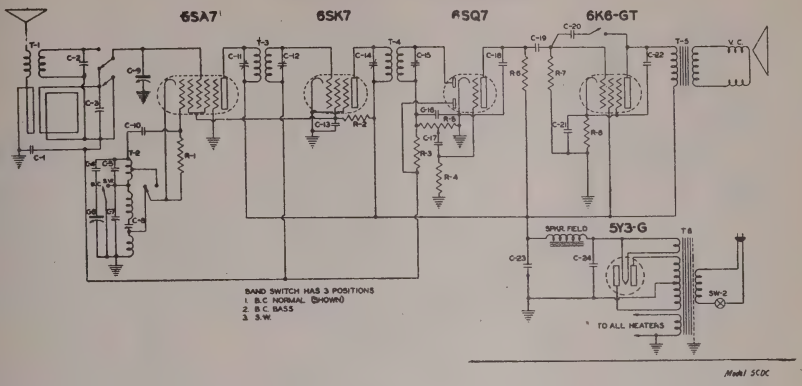
1-6SA7	Single ended frequency converter
1-6SK7	Single ended intermediate frequency amplifier
1-6Q7G	2nd detector, A. V. C. and A. F. driver
1-76	Output tube driver
1-6AC5G	Dynamically coupled output stage
1-5Y3G	Rectifier

1. Select the stations that you wish to set up on the push-buttons.
2. Determine on which push-buttons these stations should be set up, according to above table.
3. Push the button on which you should set up a particular station.
4. Using a screw driver, adjust the coil corresponding to the proper push-button until the desired station is heard with maximum volume and best tone.
5. Adjust the trimmer condenser corresponding to the proper push-button until the desired station is heard with maximum volume.
6. Repeat for other push-buttons.

MODELS 5CDC, 5CEC

MAJESTIC RADIO & TELEV. CORP.

SCHEMATIC DIAGRAM

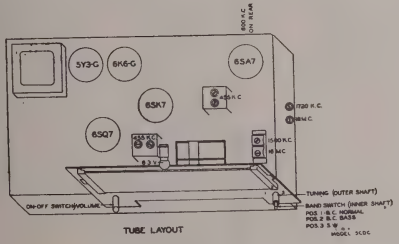


REPLACEMENT PARTS LIST

Schematic Location	Part No.	Description
C1	C-15752	Tubular cond. .05 mfd. 200V
C13	C-15756	Tubular cond. .05 mfd. 400V
C17,C22	C-31	Tubular cond. .004 mfd. 400V
C19	C-15754	Tubular cond. .01 mfd. 400V
C4	CM-9	Mica cond. 5500 mmfd. 5%
C10	CM-29	Mica cond. 50 mmfd.
C16,C18	CM-30	Mica cond. 250 mmfd
C20	CM-31	Mica cond. 100 mmfd.
C21,C23,C24	Y-CE-43	Elecrolyic Condenser

Schematic Location	Part No.	Description
R1	R-15510	Carbon res. 20K ohm ½W 20%
R2	R-15544	Carbon res. 15K ohm 1W 20%
R3	R-15500	Carbon resistor 2meg ½W 20%
R4	R-50	Carbon resistor 5meg ½W 20%
R6	R-15512	Carbon res. 250K ohm ½W 20%
R7	R-51	Carbon res. 500K ohm ½W 20%
R8	R-126	Carbon res. 400 ohm ½W 20%
T1	Y-CS-96	Antenna Coil
T2	Y-OSA-13	Oscillator Coil
T3	Y-CI-44	2nd I. F. Assembly
T4	Y-IFA-100	1st I. F. Assembly

TUBE LOCATION CHART



6SA7GT Frequency Converter
6SK7GT IF Ampl.
6SQ7GT 2nd Det., AVC, AF Ampl.
6K6G Power Output
5Y3G Rectifier

MODEL 5CDC operates on 110 - 115 volts 60 Cycles

MODEL 5CEC operates on 110 - 115 volts 50 - 60 cycles

Frequency Ranges:-

A - 538 to 1720 kilocycles - BC and some police calls

B - 5.8 to 18.6 megacycles - Foreign and Domestic Short Wave Bands

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MODELS 5C36, 431X

MODELS 5TUIO 5TUIO

MAJESTIC RADIO & TELEV. CORP.

FOR NEW PRODUCTS MODEL 300 RECORD CHANGER SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS"

MODEL 5C36
MODEL 431X (DOTTED LINES)

Parts shown in dotted lines used in Model 431X only

SCHEMATIC DIAGRAM MODEL 5TUIO & 5TUIOW

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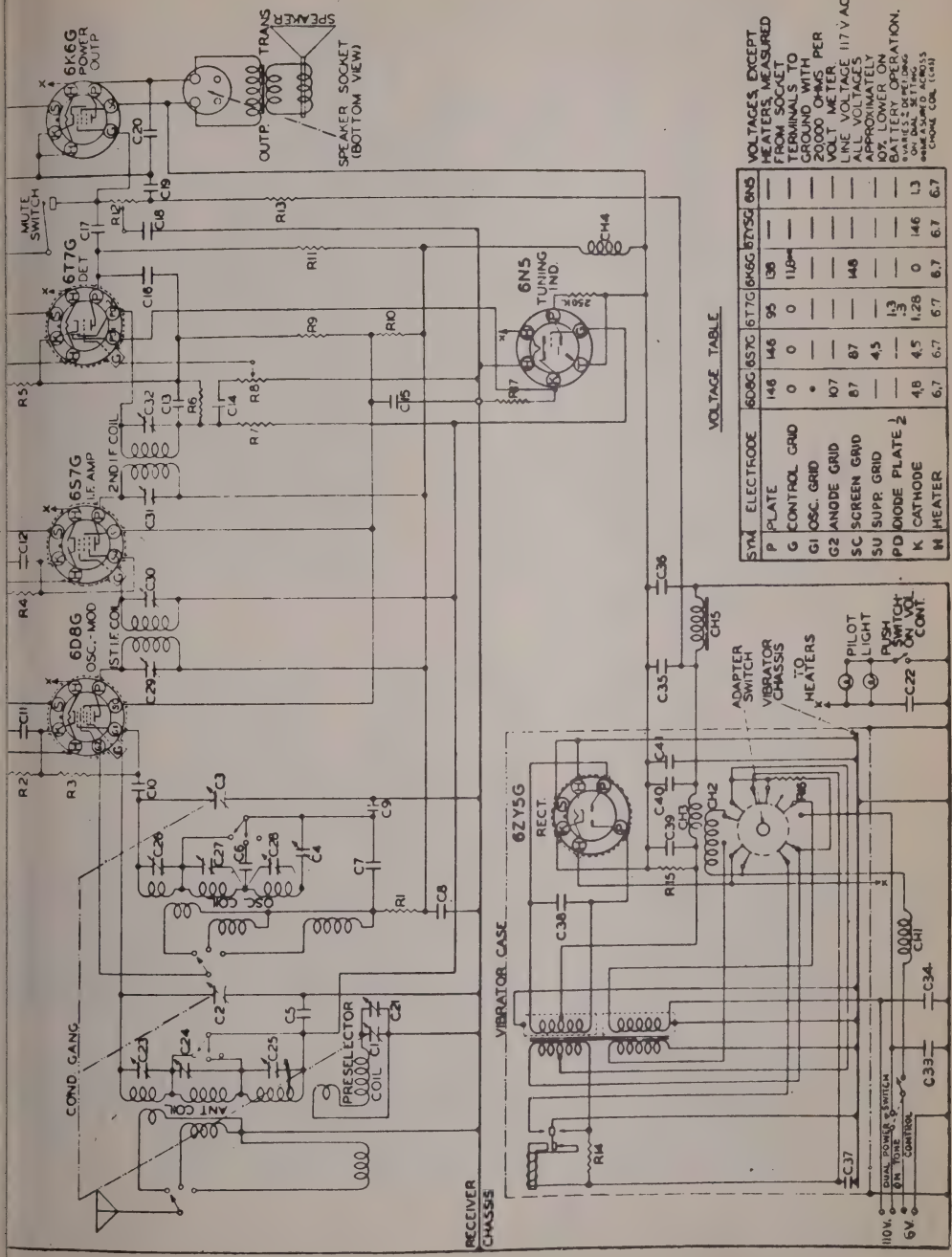
MAJESTIC RADIO & TELEV. CORP.

MODELS 69, 690
Chassis 169



VOLTAGE TABLE

STM	ELECTRODE	6D8G	6S7G	6T7G	6K6G	6Z5G	6N5
P	PLATE	146	146	95	135	—	—
G	CONTROL GRID	0	0	0	11.5	—	—
G1	OSC. GRID	•	—	—	—	—	—
G2	ANODE GRID	107	—	—	148	—	—
SC	SCREEN GRID	87	87	—	—	—	—
SU	SUPP. GRID	—	4.5	—	—	—	—
PD	DIODE PLATE ½	—	—	1.3	—	—	—
K	CATHODE	4.8	4.5	1.28	0	146	1.3
H	HEATER	6.7	6.7	6.7	6.7	6.7	6.7

VOLTAGES, EXCEPT HEATERS, MEASURED FROM SOCKET TERMINALS TO GROUND WITH 20000 OHMS PER VOLT METER. LINE VOLTAGE 117 V A.C. APPROXIMATELY 10% LOWER ON BATTERY OPERATION.

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REPLACEMENTS PARTS LIST—CHASSIS 169

Schematic Location	Part No.	Description
C1, C2, C3	Y-CV-6	Cond. 3 Gang Variable
C11, C15, C39, C40	C-6	Cond. Tub. .05MF. 200V. (H.F.)
C41	C-13	Cond. Tub. .5MF. 180V. D.C.
C22, C37	C-14	Cond. Tub. .5MF. 120V. D.C.
C38	C-16	Cond. Tub. .007MF. 1500V.
C8	C-15751	Cond. Tub. .25MF. 200V.
C5, C12, C19	C-15761	Cond. Tub. .1MF. 200V.
C14, C17	C-15772	Cond. Tub. .02MF. 200V.
C18	C-7	Cond. Tub. .005MF. 600V.
C20	C-15753	Cond. Tub. .002MF. 600V.
C33, C34	C-5	Cond. Tub. .01MF. 400V. (H.F.)
C7	C-15754	Cond. Tub. .01MF. 400V.
C6	CM-1	Cond. Mica 2550MMF. 5%
C9	CM-2	Cond. Mica 4330 MMF. 5%
C16	CM-15918	Cond. Mica 100MMF. 20%
C10	CM-15929	Cond. Mica 50MMF. 20%
C13	CM-15928	Cond. Mica 250MMF. 20%
C35, C36	Y-CE-24	Cond. Elec. Dry 20MF. 250V.
C4	Y-CP-16472	Cond. Variable Padder 250-750MMF.
C21	Y-CP-16474	Cond. Preselector Trim. 1.5-15MMF.
C23, C24, C25 C26, C27, C28	Y-CP-1	Cond. Ant. Trim. 3-30MMF. Cond. Osc. Trim. 3-30MMF.
C29, C30 C31, C32	Y-CT-2	Cond. 1st I.F. Trim. Cond. 2nd I.F. Trim.
R15	R-35	Resistor Carbon 200K. ¼W. 10% (Insulated Type)
R3	R-15511	Resistor Carbon 50K. ¼W. 20%
R11	R-15605	Resistor Carbon 100K. ¼W. 10%
R13	R-15512	Resistor Carbon 250K. ¼W. 20%
R5	R-15537	Resistor Carbon 400 Ohms ¼W. 10%
R6	R-15520	Resistor Carbon 500K. ¼W. 20%
R7	R-15517	Resistor Carbon 1 MEG. ¼W. 20%
R4	R-15519	Resistor Carbon 700 Ohms. ¼W. 10%
R2	R-15533	Resistor Carbon 600 Ohms ¼W. 10%
R10	R-36	Resistor Carbon 7500 Ohms ½W. 10%
R9	R-15572	Resistor Carbon 30K. ½W. 10%
R1	R-6	Resistor Carbon 12K. ¼W. 20%
R14, R16	R-15536	Resistor Carbon 100 Ohms ¼W. 10%
R17	R-15571	Resistor Carbon 500 Ohms ¼W. 10%
R8	Y-VC-3	Volume Control 1 MEG. and Push Switch
R12	Y-TC-2	Tone Control ½ MEG. and Switch
CH1, CH2	Y-CK-1	"A" Choke Assembly
CH3, CH4	Y-CK-2	R.F. "B" Choke Assembly
CH5	Y-CK-6	Filter Choke 325 Ohms
	Y-CS-9	Ant. Coil Assembly
	Y-CS-10	Osc. Coil Assembly
	Y-CI-1	1st. I.F. Coil Assembly
	Y-CS-11	Preselector Coil Assembly
	Y-CI-2	2nd I.F. Coil Assembly
Model 69	Y-SP-7	Speaker 6" (per. mag.)
Model 69	SPA-22	Speaker Voice Coil and Cone
Model 69	SPA-30	Speaker Transformer
Model 690	Y-SP-3	Speaker 8" (per. mag.)
Model 690	SPA-23	Speaker Voice Coil and Cone
Model 690	SPA-31	Speaker Transformer
	Y-TP-21	Power Transformer
	Y-V-1	Vibrator

HOW TO INDEX AUTOMATIC TUNING ON MODEL 690A CONSOLE

For manual tuning, turn the center knob marked Manual Automatic on the front of the cabinet to the left. For automatic tuning, turn it to the right.

SETTING UP OF PUSH BUTTONS

1—PRELIMINARY

a—Determine the frequency of your desired stations in kilocycles. This can be found in your newspaper.

b—Determine on which push button each station should be logged by checking the frequency of each station with the allowed frequency coverage of each push button as shown on sketch.

2—PROCEDURE

a—Turn Automatic Manual knob in the center of cabinet to the left to manual position and tune in the desired station manually to identify its program.

b—Turn this same knob to the right to automatic position.

c—Push in proper push button to be set.

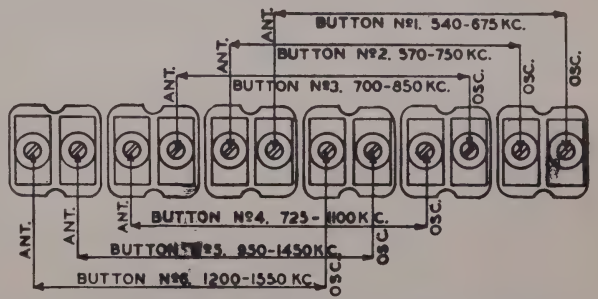
d—Using a screw driver, adjust the trimmer marked "Osc." corresponding to the proper push button until your station is heard with maximum volume and best quality. (See Sketch.)

e—Then adjust the corresponding antenna trimmer as marked in sketch to the maximum volume.

f—Repeat steps a, b, c, d, and e for other stations and push buttons.

Due to the changes of climatic conditions the trimmer condensers are apt to vary slightly. This can be overcome by slight readjustment with a screw driver on the respective trimmer condensers affected.

TRIMMER CONDENSERS VIEWED FROM BACK OF SET



Buttons are numbered in sequence from left to right when viewing the cabinet from the front. Thus No. 1 button is at the extreme left and No. 6 button is at the extreme right.

No. 1 BUTTON is used for stations operating between 540 and 675 KC's
No. 2 BUTTON is used for stations operating between 570 and 750 KC's
No. 3 BUTTON is used for stations operating between 700 and 850 KC's
No. 4 BUTTON is used for stations operating between 725 and 1100 KC's
No. 5 BUTTON is used for stations operating between 950 and 1450 KC's
No. 6 BUTTON is used for stations operating between 1200 and 1550 KC's

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DIAL LIGHTS

Two No. 44 pilot lights are mounted within the dial assembly. In the event of replacement, this can be effected by merely drawing the lamp socket back from the dial, replacing the defective light and inserting same back into dial.

ALIGNMENT PROCEDURE

Correct alignment is extremely important. The receiver is properly aligned at the factory and should not be disturbed unless it is absolutely necessary. The procedure is as follows: Turn wave change switch to broadcast position (full counter clockwise) and rotate variable condenser until it is about 50% engaged. Apply a 455 KC signal to the grid of 6A8G mixer tube through a tubular condenser on the order of .1 MFD. Referring to chassis layout, adjust C29, C30, C31 and C32 for maximum signal using of course some sort of indicating device such as an A.C. voltmeter or output meter across the voice coil of the speaker. It may be necessary to apply a very strong signal to "find" the signal until alignment is approached. It is advisable to maintain as low a signal imput as conveniently possible in order to minimize the possibility of misalignment resulting from A.V.C. and overload effects. If a squeal is heard while tuning, rotate the gang condenser slightly and it should disappear. Naturally, the ground side of the generator should be connected to the chassis either directly or through the .1 MFD. condenser.

SHORT WAVE BAND

Rotate the wave band switch to full clockwise position. Connect high side of generator output to antenna lead through a 400 ohm dummy antenna. Completely disengage variable condenser. Apply 18.5 meg. signal. Unscrew trimmer C26 to a minimum capacity, slowly turn the screw so that the trimmer capacity increases until the signal is heard. Apply 16 meg. signal, rotate gang condenser until this signal is heard. Adjust C23 for maximum response. It may be found advisable to "rock" generator frequency back and forth through signal to offset detuning effect from inter action between imput and oscillator circuits at high frequencies. Check alignment through medium of sensitivity at 11 meg. and 6 meg. respectively. When aligning at 16 megacycles, it is well to point out here that the trimmer C23 may indicate 2 maxima. The maxima obtained with the trimmer tighter, is the desired one. This can be checked by leaving the gang condenser set and shifting the generator to a higher frequency viz: 17 megacycles, where the image should appear. If it is properly aligned, it should require about 10 times the signal voltage for the image to give the same output as the real signal.

POLICE BAND

Shift waveband switch to middle position. Apply 5.7 meg. signal still using 400 ohm dummy antenna. Disengage variable condenser completely. Adjust trimmer C27 in the same manner as previous band until maximum signal is heard. Apply 5 Meg. signal, rotate gang condenser until same is heard. Adjust trimmer C24 until response is maximum. Check for image in the same manner as previous band. Check alignment at 3.5 and 2 megacycles respectively.

BROADCAST BAND

Use a 200 MMF. mica condenser for dummy antenna on this band. Shift wave change switch to full counter clockwise position. Adjust trimmer C21 and C25 to medium tight position.

Rotate gang until dial pointer indicates 600 KC. Apply 600 KC signal and adjust padder C4 for maximum signal. Disengage gang completely and apply 1750 KC signal; adjust C28 for same. Apply 1500 KC signal and rotate gang until this frequency is found. Adjust trimmers C21 and C25 for maximum response. Shift gang to 600 KC and apply 600 KC signal. "Rock" gang condenser and adjust C4 for maximum signal. Disengage gang and apply 1750 KC signal; if necessary adjust C28 to bring same in.

SETTING UP OF PUSH BUTTONS

1656 S
FIG 2

Model 1656-S has 12 push buttons. Number 12 push-button is used for the phonograph. Number one (1) push-button is used for distance reception.

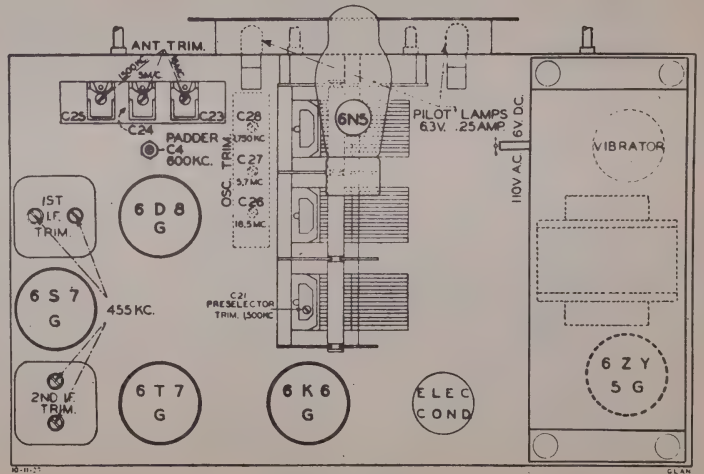
To adjust the push-buttons, turn the band switch knob, the second one from the left, all the way to the left. Select stations to be set up on the push-buttons.

Push the button you wish to set. Going to the back of the receiver, adjust the coil corresponding to the push-button (see figure 2) by turning the screw in the center of the coil by means of a screw driver, until the station you desire to hear is heard with maximum volume and best quality, and the tuning indicator closes the most.

When the buttons are set up and the wave band switch is turned all the way to the left, counter clockwise, pushing any one of the buttons will cause the receiver to receive the station set up on that particular button.

It is desirable to turn the tone control to high fidelity when listening on the push-buttons.

Only local or strong stations should be set up on the push-buttons.

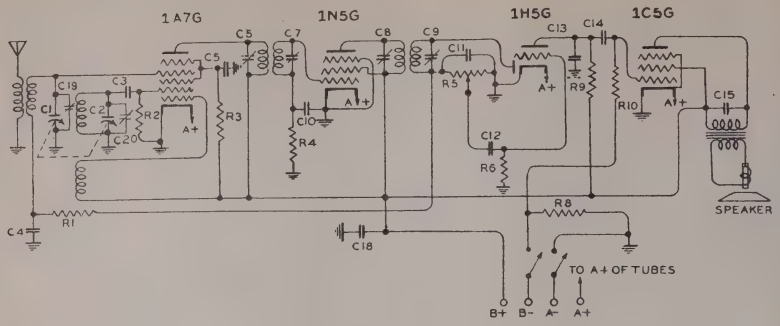


CHASSIS LAYOUT

MODELS 69 AND 690
Chassis 169

MODEL 410-A

MAJESTIC RADIO & TELEV. CORP.

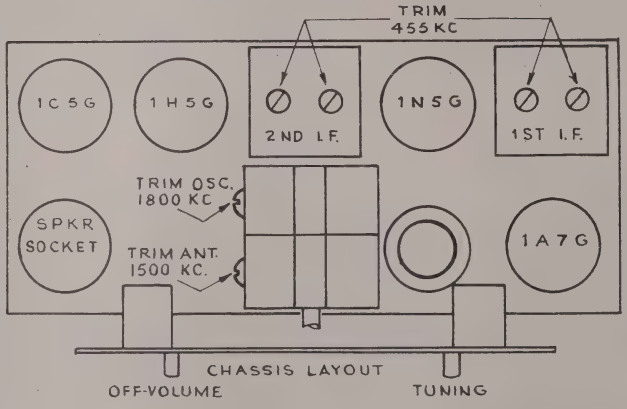


REPLACEMENT PARTS LIST

Schematic Location	Part No.	Description
C4,C5	C-15752	.05 mfd. 200V
C10,C12,C14	C-15763	.01 mfd. 200V
C15	C-25	.006 mfd. 400V
C3,C11,C13	CM-15918	100 mmf. Type "O" Mica
C1,C2	Y-CV-26	Variable Condenser
C6,C7,C8,C9	Y-CT-2	I. F. Trimmer condenser
C18	CE-35	8 mfd. 150V Electrolytic

Schematic Location	Part No.	Description
R9	R-15520	500K ½W 20%
R10	R-15517	1 meg. ½W 20%
R8	R-72	600 ohms ½W 20%
R2	R-15523	200K ½W 20%
R6	R-15559	3 meg. ½W 20%
R3	R-44	70K ½W 10%
R1,R4	R-15500	2 meg. ½W 20%
R5	Y-VC-26	Volume Control

TUBE LOCATION CHART



Batteries and battery packs recommended:

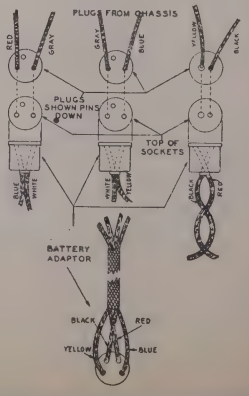
BATTERIES: 1-½ Volt "A" Battery
Eveready 742A
Ray-O-Vac P-94A or equivalent

45 Volt "B" Battery
Eveready 762
Ray-O-Vac P-5303 or equivalent

BATTERY PACKS: General No. 60A—4H or equivalent
Eveready No. 748 " "
Ray-O-Vac No. AB94 " "

The battery adapter is supplied for such battery packs as:
Burgess No. 17GD60
Ray-O-Vac No. AB-82

Method of Connecting Adapter



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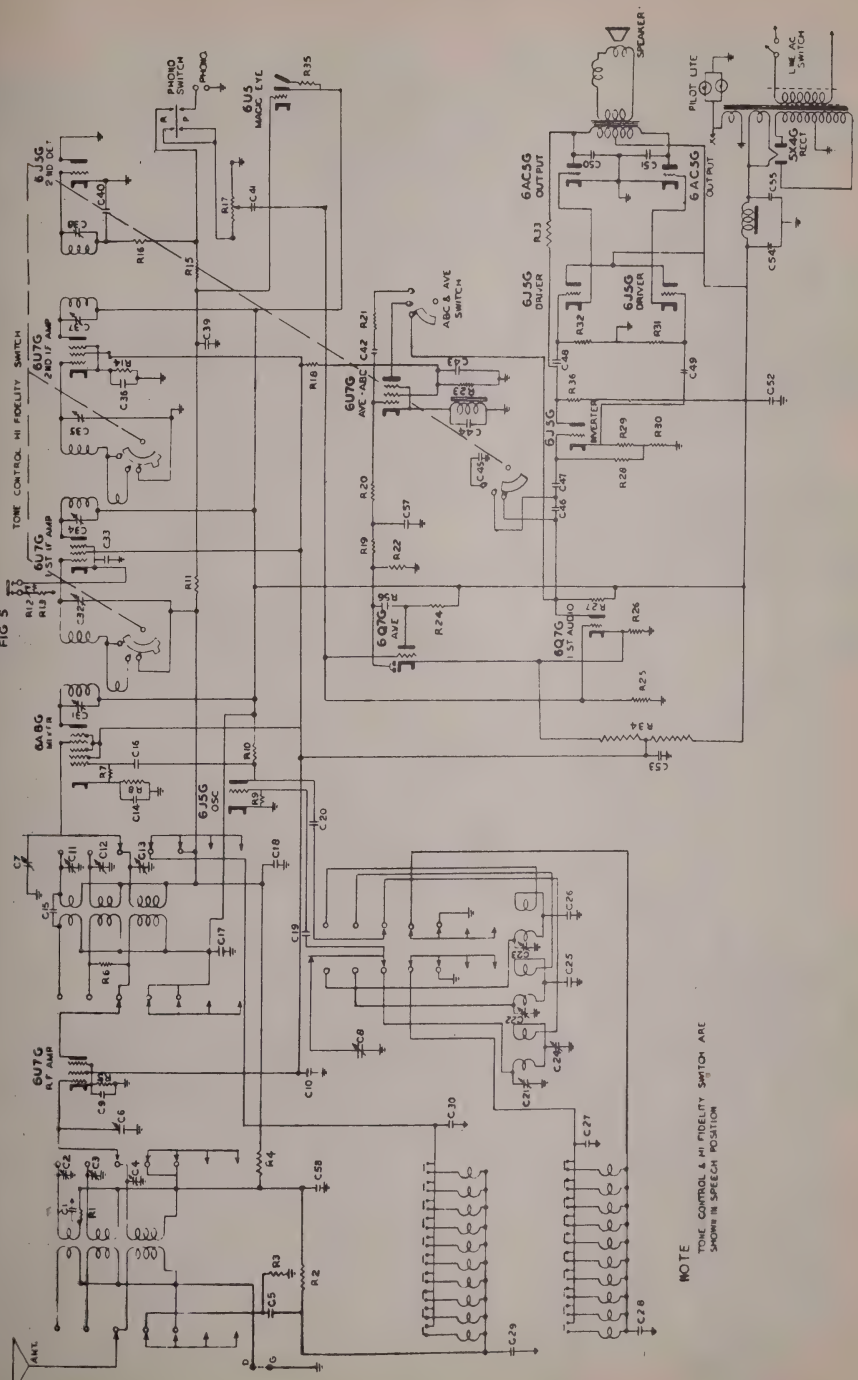
MAJESTIC RADIO & TELEV. CORP.

MODEL 1656-S



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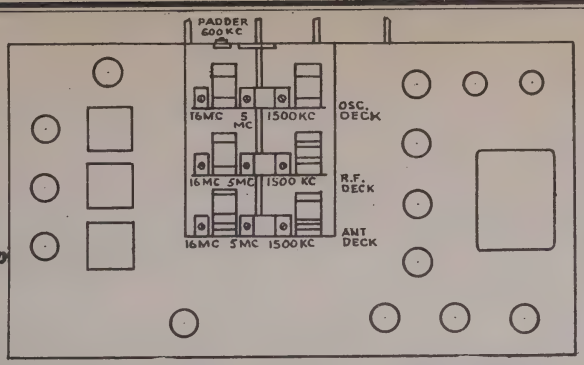

FIG 4 CHASSIS LAYOUT (BOTTOM VIEW)

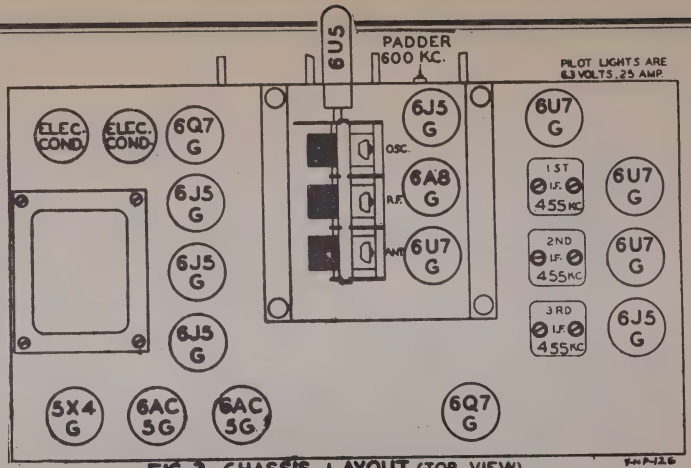

FIG 3 CHASSIS LAYOUT (TOP VIEW)

Schematic	Part	Description
R1,R2,R4,R16	R-15515	100K ohm
R3,R5	R-15542	1000 ohm
R6	R-15530	2500 ohm
R7,R9	R-15511	50K ohm
R8	R-92	500 ohm
R10	R-15501	25K ohm
R11,R20,R24,R31,R32	R-15512	250K ohm
R12	R-15510	10K ohm
R13	R-89	700 ohm
R14	R-15564	1500 ohm
R15,R19,R21,R22,R25,R28	R-15517	1 Megohm
R17	Y-VC-9	Vol.Cont.
R18	R-15544	15K ohm
R23	R-2	5000 ohm
R26	R-15601	100 ohm
R27	R-15520	500K ohm
R29	R-91	3000 ohm
R30	R-90	22K ohm
R33	R-15500	2 Megohm
R34	Y-RC-3	Candohm Res.
R35		2 Megohm
R36	R-93	25K ohm
C1,C9,C10,C14,C18,C58	C-6	.05 mfd.
C2,C3,C4	Y-CT-3	R.F.Trim.
C5,C17,C20	C-5	.01 mfd
C6) C7) C8)	Y-CV-7	3-Gang Var.
C11,C12,C13	Y-CT-3	Det.Trim.
C15	CM-32	10 mmf.
C16	CM-30	250 mmf.
C19	CM-29	50 mmf.
C21,C22,C23	Y-CT-3	Osc.Trim.
C24	Y-CT-4	600 KC
C25	CM-35	1330 mmf.
C26	CM-36	2770 mmf.
C27	CM-25	274 mmf.
C28	CM-26	710 mmf.
C29	CM-27	2000 mmf.
C30	CM-24	484 mmf.
C31,C32,C34,C35,C37,C38	Y-CT-2	I.F.Trim.
C33,C36,C39,C53	C-15752	.05 mfd.
C40	CM-31	100 mmf.
C41,C47	C-15760	.02 mfd.
C42	C-31	.004 mfd.
C43	C15761	.1 mfd
C44	C-9	.15 mfd.
C45,C56,C48,C49	C-15754	.01 mfd.
C46	C-30	.001 mfd.
C50,C51	C-32	.005 mfd.
C52	C-15750	.25 mfd.
C54	Y-CE-13	40 mfd.
C55	Y-CE-15	30 mfd.
C57	C-15770	.2 mfd.

MEISSNER MFG. CO.

MODEL 9-1047A

8 TUBE AC RECEPTOR FOR FM

41.2 TO 50.4 MC

INTERMEDIATE FREQUENCY 4.3 MC

MODEL 9-1047A

MEISSNER MFG. CO.

CONNECTIONS TO AN AC-DC RECEIVER

This Receptor is not recommended for use with any AC-DC receiver because of the hazards to safety involved in connecting this unit to an AC-DC set having its chassis connected to the power line, and because of almost insurmountable hum troubles on sets having the chassis insulated from the power line.

ALIGNMENT

Alignment of the Receptor may be accomplished by any competent Serviceman having the equipment usually used in alignment of All-Wave receivers. Neither a Frequency Modulated oscillator nor a Cathode Ray oscilloscope is necessary.

DISCRIMINATOR ALIGNMENT

Connect the audio output leads of the Receptor to any convenient audio amplifier or "Phono" plug of any receiver, and connect on output meter (having a low range of 1 to 5 Volts) across the voice coil of the speaker. Temporarily increase the gain of the 6SJ7 limiter tube by shunting a 2,000-ohm resistor across the resistor thru which "B" voltage is supplied to the red wire of the discriminator transformer, No. 01860. Apply a 4.3-mc signal to the grid of the limiter tube through a .05-mfd coupling condenser.

When a Frequency Modulated signal is used for aligning the Discriminator, the adjustment is made for maximum output in much the same manner as the conventional alignment of a 456-KC (AM) I-F transformer on an AM signal, but if only an AM generator is available for alignment the Discriminator, the primary is aligned for maximum output and the secondary for balance or zero output, since one of the functions of the Discriminator is to eliminate amplitude modulated signals.

In tuning the secondary of the discriminator there are three places of **minimum** response; (1) out of resonance with the condenser too tight, (2) **CORRECT**, and (3) out of resonance, with the condenser too loose. The proper minimum has the characteristic that the signal rises very rapidly as the trimmer is turned **IN EITHER DIRECTION**. The other two minima mentioned above **DO NOT** have this characteristic and are incorrect. The trimmer farthest from the 6SJ7 tube tunes the secondary of the discriminator and by slowly rotating this trimmer the point of minimum audio response will be found and will indicate correct alignment of this trimmer. Now **MISTUNE** this trimmer as little as possible but enough to hear a signal and to obtain an output meter indication with which to align the primary trimmer for **MAXIMUM** response. Leaving the secondary trimmer mistuned, to assist in the I-F alignment, move the signal input to the grid of the second 6SK7 I-F amplifier tube, and align this stage, always reducing input as sensitivity increases so as to remain below the level at which the "Limiter" works. Unless this precaution is observed, the resonance indication is broadened. In the same way align the remaining I-F transformers finishing with the signal applied to the 6SA7 grid. The **SECONDARY** of the discriminator may now be retuned to **minimum** response and the 2000-ohm shunt resistor removed, completing the I-F alignment.

R. F. ALIGNMENT

For reasons of stability, the oscillator in the Receptor operates on the low side of the R-F signal. Because of the high intermediate frequency (4.3 mc) there is no possibility of aligning the oscallator on the image. If there is reason to believe that the trimmers are badly out of alignment, a very practical initial adjustment would be to adjust **ALL THREE TRIMMERS** to a position about one-fourth turn from maximum capacity. Then apply a 48mc signal (or equivalent harmonic of some lower frequency) to the antenna terminals of the Receptor through a dummy antenna of 200 to 400 ohms, set the pointer to 48MC and adjust the trimmer on the center (oscillator) section of the gang condenser to give the maximum response **OF THE TUNING EYE.** Align the antenna (front) and R-F (rear) trimmers for maximum response and check the sensitivity at various points within the band. When properly aligned the antenna and oscillator trimmers are about one-fourth turn from maximum capacity with the R-F trimmer about two turns from minimum.

SERVICE DATA (FOR PROFESSIONAL SERVICE MEN)

Power Consumption - - - - 45 Watts & 117 Volts A.C.
Intermediate Frequency - - - - - - - - 4.3 Megacycles
Tuning Range - - - - - - - - - - 40.5—50.5 Mc.

VOLTAGES AT SOCKETS

The voltages that should be considered normal at each tube-socket terminal are indicated in the table below. All voltages indicated are measured between the socket terminal and ground (chassis). Readings shown are positive on the socket terminal with the chassis as the negative terminal except where a negative voltage reading is given in which case the chassis is positive. Readings marked "AC" indicate normal AC heater voltage and should not be read with a DC meter.

These voltages are read with a Line Voltage of 117 Volts and no signal being received.

Readings are taken with a 1000-ohm-per-volt meter. Plate and screen voltages are read on the 250-volt scale. All readings under 50 volts are read on the 50-volt scale.

VOLTAGE CHART

FUNCTION	TYPE	1	2	3	4	5	6	7	8
R. F. Amp.	6SK7	0	0	3.6	0	3.6	110	6.3AC	105
Mixer	6SA7	0	0	100	100	.....	0	6.3AC	0
1st IF	6SK7	0	0	3.6	0	3.6	110	6.3AC	110
2nd IF	6SK7	0	0	3.0	0	3.0	105	6.3AC	105
Limiter	6SJ7	0	0	0	0	0	38	6.3AC	26
Discr.	6H6	0	0	0	0	0	0	6.3AC	0
Tuning Eye	6U5	0	15	0	163	0	6.3AC	.....	.....
Rectifier	6x5GT	0	0	170 AC	NC	170AC	NC	6.3AC	170

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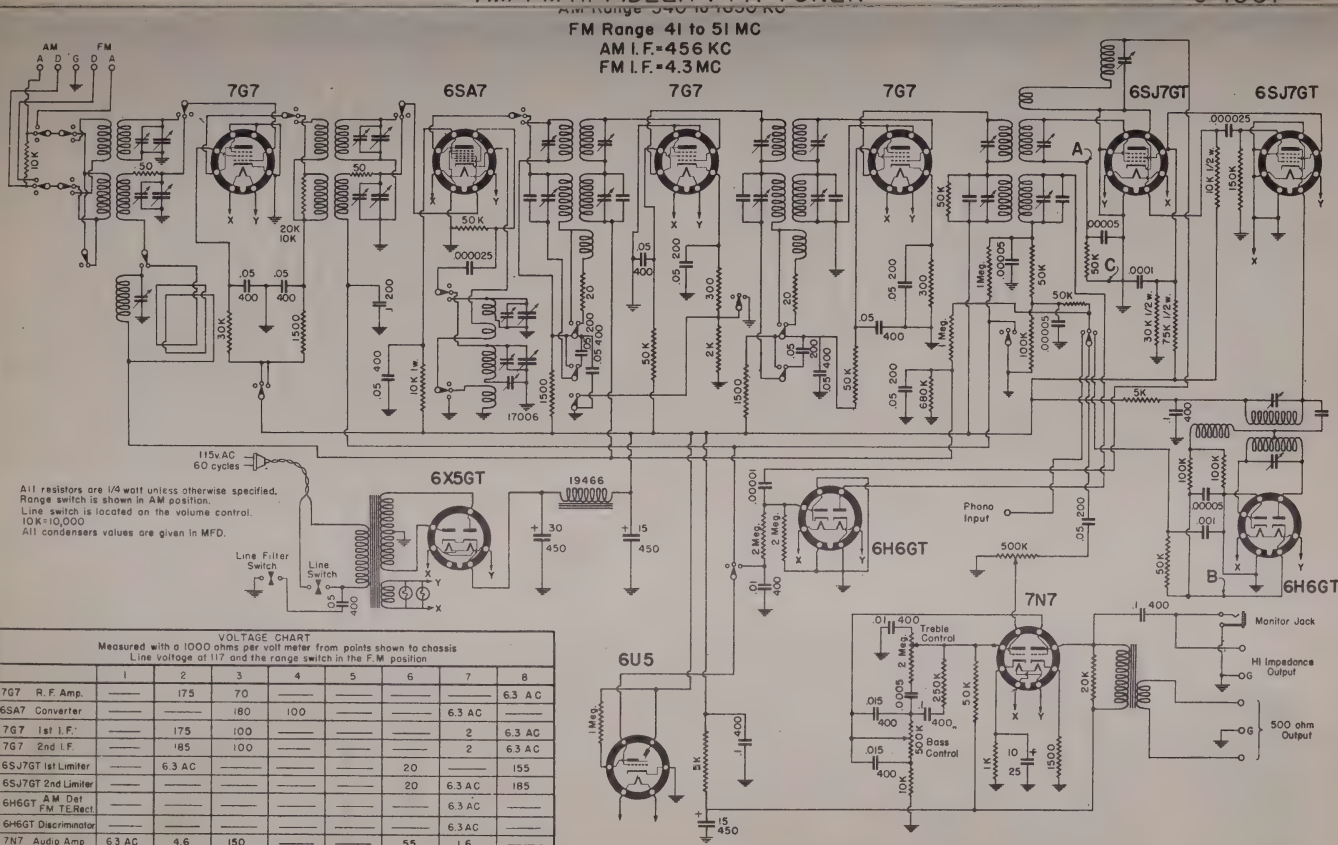


VOLTAGE CHART
Measured with a 1000 ohms per volt meter from points shown to chassis
Line voltage at 117 and the range switch in the F.M position

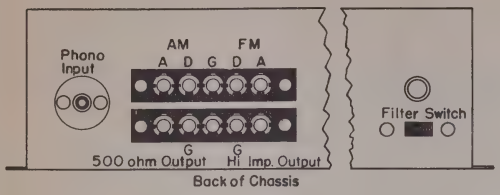
	1	2	3	4	5	6	7	8
7G7 R. F. Amp.	——	175	70	——	——	——	——	6.3 AC
6SA7 Converter	——	——	180	100	——	——	6.3 AC	——
7G7 1st I.F.	——	175	100	——	——	——	2	6.3 AC
7G7 2nd I.F.	——	185	100	——	——	——	2	6.3 AC
6SJ7GT 1st Limiter	——	6.3 AC	——	——	——	20	——	155
6SJ7GT 2nd Limiter	——	——	——	——	——	20	6.3 AC	185
6H6GT AM Det FM T.E.Rect	——	——	——	——	——	——	6.3 AC	——
6H6GT Discriminator	——	——	——	——	——	——	6.3 AC	——
7N7 Audio Amp	6.3 AC	4.6	150	——	——	55	1.6	——
6X5GT Rectifier	——	——	185 AC	——	185 AC	——	6.3 AC	210
6U5 Tuning Eye	Socket pins not accessible for easy measurements							

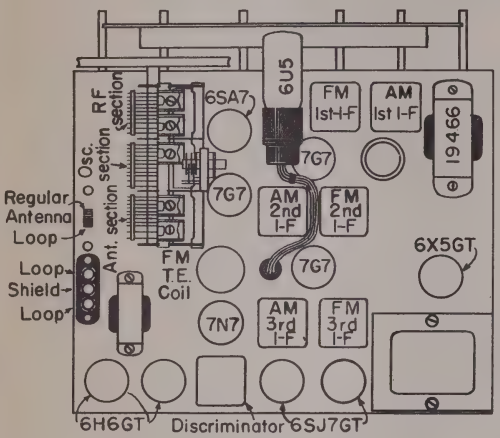
The unit is equipped with provision for phono input or other source of audio so that when used in a sound installation or when installed in a console for home use, the switching for external input to the amplifier is accomplished in the tuner, by turning the band switch to the third position, (extreme counter clockwise position).

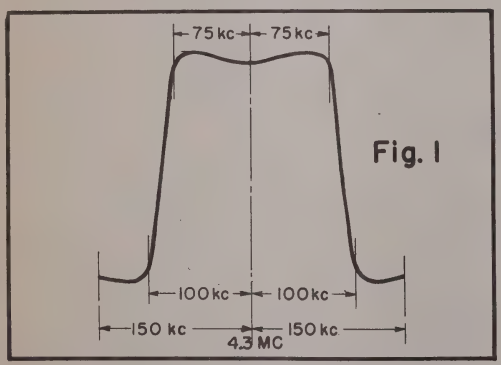
Both high impedance output for feeding directly into the high impedance input of an amplifier, and balanced 500 ohm output for feeding into a transmission line, are provided, as well as a monitor jack on the front panel for feeding a monitor amplifier or headphones.

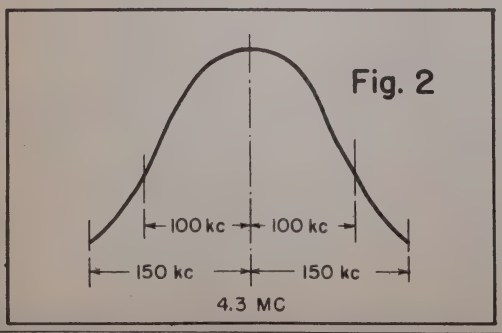
MODEL 9-1067

MEISSNER MFG. CO.









The two tuning ranges cover the standard broadcast band 540 KC to 1630 and the F. M. band 42 to 50 MC. The dial is calibrated directly in kilocycles on the broadcast band. For the F. M. band, the dial is calibrated directly in the call letter number assigned to the F. M. broadcasting station. For instance, W67C, is assigned to a station in Chicago, Ill. that operates on a frequency of 46.7 MC. This station will be received on a dial setting of 67. By placing a 4 in front and adding the decimal point, you will have the frequency in megacycles, on which the station is transmitting.

ANTENNA CONNECTIONS

Two separate sets of antenna connections are provided for the broadcast and F. M. bands. These may be found on the back of the chassis, near the phono input jack (see Fig. 4). A third set of terminals and a switch, for a broadcast loop antenna, are located on the top of the chassis (see Fig 5).

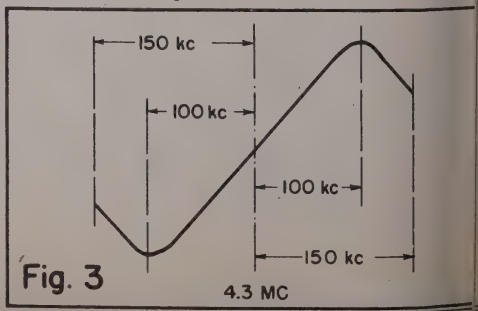
A shielded loop may be used with this unit. If a loop is used the two leads are to be connected to the two outside terminals marked loop in Fig. 5. The shield is to be connected to the center terminal marked shield in Fig. 5. Note: The leads of this loop should not be shortened or lengthened.

Any antenna system having a single wire lead-in for Broadcast reception, is connected to the terminal marked "A" on the Broadcast side of the terminal strip shown in Fig 4.

The terminal marked "D" is then connected to gnd. In like manner, any antenna system having a single wire lead in for F. M. reception is connected to the terminal marked "A" on the F. M. side of the terminal strip, and its corresponding "D" terminal is also connected to gnd. If such an antenna system is to be used for both Broadcast and F. M. reception, the two "A" terminals are connceted together and both "D" terminals are connected to the gnd. terminal.

Any antenna system having a two wire lead-in for broadcast reception such as doublets and noise reducing antennas, has one of the lead-in wires connected to the terminal marked "A" on the Broadcast side of the terminal strip and the other lead-in wire connected to the terminal marked 'D" on the broadcast side of the terminal strip. Any antenna system having a two wire lead-in for F. M. reception is connected in a like manner. The one lead-in wire connected to the "A" terminal on the F. M. side of the terminal strip and the other to the "D" terminal. If such an antenna is used for both Broadcast and F. M. reception, the two "A" terminals are connected together and the two "D" terminals are connected together.

In case no loop is to be used, the loop switch shown in Fig. 5 is set in the regular antenna position (toward the front of the chassis) and left there. When a loop is used the switch is set in the loop position (toward the rear of the chassis). If, at some time when using the loop a stronger signal is desired, this switch may be moved to the regular Antenna position. This switch is operative only on Broadcast reception and its position in no way affects the F. M. reception.



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SERVICE PRECAUTIONS

In replacing parts or making adjustments care should be exercised to see that all connections are made to points from which they were removed and that components and leads occupy their original positions. Lead lengths and ground return paths are quite critical in some parts of the F. M. circuits and trouble will be avoided by adhering strictly to the original placement of parts.

ALIGNMENT PROCEDURE

The minimum of equipment necessary for correctly aligning this tuner is listed below:

(1) A modulated service oscillator or signal generator capable of generating the frquencies 430 to 480 kilocycles, 600 kilocycles, 1400 kilocycles and 46 megacycles.
(2) An audio amplifier.
(3) An output meter.
(4) A 0-200 Microampere meter.
(5) An oscilloscope with vertical and horizontal amplifiers.
(6) A wide band frequency modulated generator or "wobbulator" covering the intermediate frequency of 4.3 megacycles and with either 400 cycle or 60 cycle modulation. It should be capable of producing a deviation frequency of 150 kilocycles. (Total frequency swing of 300 kilocycles).

While this instruction sheet describes the use of a frequency-modulated generator which has 400 cycle audio voltage for application to the horizontal plates of the oscilloscope, it is also possible to use a generator having 60 cycle modulation and to use the 60 cycle sweep which is built into the oscilloscope instead of obtaining the sweep voltage from the generator. If the serviceman has been using such a generator for visual alignment, he will be familiar with his instrument and will be able to adopt it to his alignment.

Although it is possible to align the F. M. I. F. system of the tuner with a generator or "wobbulator" not having as great frequency deviation as 150 kilocycles, it will be difficult to obtain as satisfactory results as with a wide band generator.

A. M. ALIGNMENT

The broadcast alignment of this tuner should be carried out as follows: Turn the range switch to the broadcast position and the fidelity switch to the sharp position. Connect an audio amplifier to the output of the tuner and connect the output meter in the output circuit of the audio amplifier in any conventional manner. Connect the A. M. signal generator between the grid of the 7G7 second I. F. tube and ground using a .05 microfarad condenser in series with the "hot" lead of the generator. Set the signal generator to 456 kilocycles and adjust the input to a value that will give a suitable reading on the output meter. For this adjustment and for all following adjustments of the A. M. channel, the volume control of the tuner should be turned full on. Since the response characteristic of the output transformer is very broad, it will be necessary to take special steps to align it. First, detune the primary circuit by connecting a fixed mica condenser of .003 to .005 microfarads between the plate of the 7G7 second I. F. tube and ground. Now adjust the secondary trimmer of the output I. F. coil for maximum response. (The secondary trimmer is identified by a dot of green paint on the trimmer screw.) Remove the condenser from the plate of the 7G7 second I. F. tube and adjust the primary trimmer for maximum response. No further adjustment of the secondary trimmer should be made.

Connect the signal generator, still set at 456 kilocycles and still using the .05 microfarad dummy, to the signal grid of the 6SA7 Converter tube and adjust the four trimmers of the input and interstage transformers for maximum response. For this operation the fidelity switch should be set in the sharp position.

The response characteristic of the I. F. system should now be checked with the fidelity switch in the broad (clockwise) position. Swing the signal generator frequency over the range of 430 kilocycles to 480 kilocycles and by watching the output meter observe the shape of the response curve. If the alignment has been caarefully performed, the response curve should have two peaks at approximately 446 kilocycles and 464 kilocycles with a slight dip between them, and the peaks should both be of the sam amplitude. If this condition does not exist, the response curve may be corrected (within certain limits) by a very slight readjustment of the trimmers of the output transformer swinging the generator over the range of 430 to 480 kilocycles while making this adjustment to observe the effect on the response curve.

The RF alignment is made at 1400 kilocycles. The selectivity switch should be in the "sharp" position. If a loop antenna is to be used, it should be properly connected and the loop switch thrown to the position for loop operation. Connection should be made to the generator by wrapping a single turn of wire from the generator output around the loop housing. The oscillator, R. F. and antenna trimmers should be adjusted for maximum output. The padding operation is performed at 600 kilocycles. The dial should be rocked across the 600 kilocycle point while adjusting the padder to find the point of greatest response.

Now change the loop switch to the position for external antenna and connect the generator to the broadcast antenna terminal through a .0002 microfarad dummy antenna. The "D" terminal should be grounded.

With the generator and tuner set at 600 kilocycles, adjust the antenna padder condenser, located under the chassis, for maximum output.

If no loop antenna is used the above procedure is modified by setting the antenna padder at ¼ turn from maximum and aligning in the conventional manner.

F-M ALIGNMENT

The F-M alignment is made in three major steps: Namely, I. F. alignment, discriminator alignment and R. F. alignment.

For the first operation, I. F. alignment, connect the output of the frequency-modulated generator between the grid of the 7G7 second I. F. stage and chassis, using a .05 mfd. condenser in series with the high side of the generator output and connecting this condenser to the 7G7 grid. Leave the grid of the 7G7 tube connected. Now connect the synchronizing voltage output from the generator to the input of the horizontal amplifier of the oscilloscope. Note: The ground lead from the generator should always be connected to the chassis near the tube to whose grid the generator is connected to avoid spurious regeneration phenomena which change the shape of the I F. curve.

Now connect the input terminals of the oscilloscope vertical amplifier between chassis and the low potential end of the last I. F. transformer (point "A" in circuit diagram) using a 500,000 ohm resistor in series with the high side. This resistor should be located at the receiver end of the connecting wires and should be connected with a short lead to the point "A".

Having made the set-up, turn on the oscilloscope and the frequency-modulation generator. Turn down the receiver volume control. Set the generator to 4.3 MC and the devi-

ation frequency (if calibrated on the generator) to 150 KC. Turn the vertical gain control just high enough to give almost full-screen deflection of the horizontal pattern. Using just enough output from the generator to give good vertical deflection on the screen, adjust the trimmers of the last I. F. transformer for the greatest gain and to give a pattern that is centered on the screen and is symmetrical. This pattern should be similar to the one shown in Fig. 2.

Now without changing the generator frequency, remove the generator connection from the grid of the 7G7 second I. F. amplifier and place it on the grid of the 7G7 first I. F. amplifier, using the .05 mfd. condenser as before, and changing the position of the ground lead as described above. Again use only enough output from the generator to give good vertical deflection on the screen, and adjust the trimmers of the second I. F. transformer in the same manner as before. The curve shape should remain practically the same as it was before.

Now remove the generator connections (ground as well as "hot") from the 7G7 first I. F. amplifier and place them on the signal grid and ground of the 6SA7, again using the .05 mfd. condenser. Proceed as before, turning down the output from the generator until there is just enough for good vertical deflection on the oscilloscope screen. Adjust the trimmers of the first I. F. transformer for the greatest gain and to give a pattern similar to the one shown in Figure 1.

In all the foregoing adjustments, note that the oscilloscope vertical amplifier gain control has been turned well toward maximum gain, and that a low input from the generator has been used. The reason for this is that, as higher signal-input levels are used, the response curve of the I. F. amplifier stages will change shape. If the symmetry of the response curve is kept good at low input levels, then any dissymmetry occuring at high input levels will be unimportant, since at high input levels, the limiter tubes will level out the response before the signal reaches the discriminator.

Should the I. F. circuits for any reason be badly misaligned, the first 7G7 I. F. stage may oscillate when the input from the generator is placed on the grid of the 7G7 second I. F. tube, making it difficult to get a readable pattern on the oscilloscope screen. Should this condition occur, the remedy is to remove the 7G7 first I. F. tube from its socket until the last I. F. stage has been aligned.

This completes the alignment of the I. F. stages and the alignment of the discriminator comes next.

DISCRIMINATOR ALIGNMENT

Leaving the set-up as it was when the I. F. alignment was completed, adjust the generator frequency until the I. F. response pattern on the oscilloscope screen is centered and is symmetrical.

Now remove the connection to the low-potential side of the last I. F. coil, (point A) which is the lead containing the 500,000 ohm resistor, and move this connection to the 6H6 discriminator cathode marked "B" in the circuit diagram. The pattern on the oscilloscope screen may go off scale and the input from the generator will have to be decreased. If the generator leakage is bad and its output cannot be turned down to a sufficiently low level, the oscilloscope vertical amplifier gain control may be turned down. With the set-up made as described and with the generator deviation-frequency still set at 150 KC, adjust the trimmer on the primary side of the discriminator coil (the red trimmer screw) for greatest vertical deflection on the oscilloscope screen.

Next adjust the trimmer on the secondary side of this coil until a pattern similar to the one shown in Figure 3 is obtained. This adjustment is quite critical and should be made so that the pattern is as near symmetrical as possible. If the portion of the pattern in Figure 3 which appears straight, is not quite straight on the oscilloscope screen, it may be made so by a slight readjustment of the trimmer on the primary side of the coil.

ADJUSTMENT FOR F. M. TUNING INDICATOR

Decrease the modulation of the signal generator until only the straight part of the pattern of Figure 3 appears on the oscilloscope screen and adjust the frequency of the generator to exact resonance with the receiver. Now adjust the trimmer in the top of the tuning indicator coil can for minimum shadow angle on the tuning eye.

ANTENNA, R. F. AND OSCILLATOR

In order to align the R. F. Antenna and Oscillator circuits, an amplitude-modulated signal generator covering the range of 42-50 MC and a O-200 microampere meter may be used. The signal generator need not be modulated.

Connect the meter in series with the ground end of the grid resistor of the first 6SJ7 limiter tube, with the positive side of the meter to ground. This point is marked "C" in the circuit diagram. Now apply the output of the signal generator to the F. M. antenna terminal through a 100 ohm dummy antenna, grounding the "D" terminal. Set the receiver dial and the signal generator to 46 MC and adjust the oscillator trimmer, which is the air trimmer mounted on top of the middle section of the tuning condenser, for maximum deflection on the O-200 microampere meter. If two positions of the oscillator trimmer give almost equal deflection on the meter, select the point with the trimmer farthest in mesh, since the oscillator on this band operates below the signal frequency. Keep the generator output adjusted to such a value that about one quarter of full scale deflection is obtained on the meter. Next adjust the R. F. trimmer, mounted on the front section of the tuning condenser, for maximum deflection of the meter; then perform the same operation for the antenna trimmer, which is mounted on the back section of the tuning condenser. The adjustment of the R F. trimmer affects the oscillator frequency slightly and the tuning condenser should be rocked back and forth when making this adjustment in order to keep the oscillator tuned to the signal frequency. If two points of response are found on the R. F. or antenna trimmers, the point which requires the least amount of capacity in these trimmers should be selected.

As a final check of antenna, R. F. and oscillator adjustment, signals from the generator should be tuned in at various points on the band to see that the sensitivity is equal over the band.

MONITOR CONNECTION

The monitor jack on the front panel is connected to the high impedance output of the tuner and any monitoring device may be plugged in provided it is of high input impedance.

LINE FILTER SWITCH

Because of the fact that some audio power amplifiers are equipped with a line by-pass condenser and some are not, a switch is provided on the rear of the chassis for switching in or out a power line filter in the tuner chassis. After the tuner has been connected to an amplifier, this switch should be set in the position which gives the quietest reception.

TONE CONTROLS

The tone controls are Bass "Boost-Attenuate" and Treble "Boost-Attenuate" types and may be adjusted for the most pleasing results. They may be adjusted for flat response or may be adjusted to compensate the response characteristic of amplifier, speaker, phono pickup, etc.

FIDELITY SWITCH

The fidelity switch controls the width of pass-band in the broadcast I. F. channel and has two positions, "sharp" and "broad"; the "sharp" position being counter-clockwise. Accurate tuning of signals is difficult when the fidelity switch is in the broad position and it is recommended that signals be tuned in with the switch in the "sharp" position, after which it may be moved to "broad".

POWER SUPPLY

110-125 volts, 50-60 cycles.

INTERMEDIATE FREQUENCY

A. M. 456 kilocycles
F. M. 4.3 megacycles

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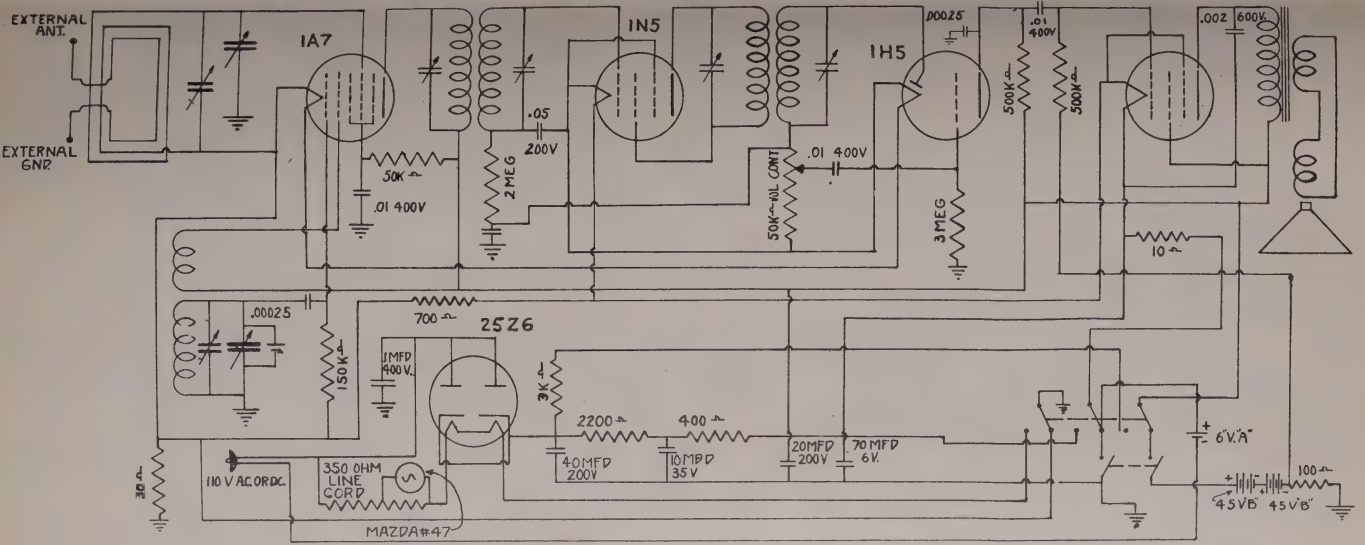

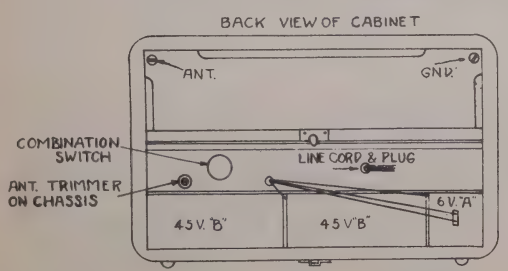

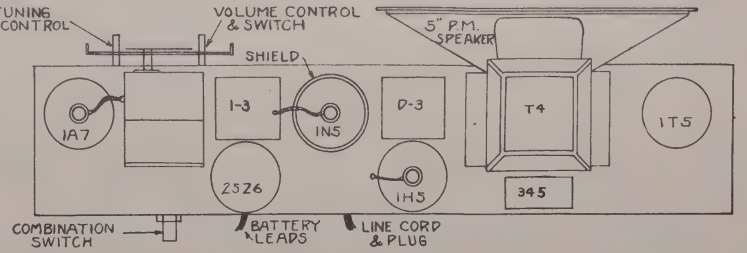

When set is initially equipped with batteries, the antenna trimmer (as shown on back view of cabinet drawing) is properly adjusted at the factory and no further adjustment is necessary. However, in changing batteries, or installing outside antenna, it may be necessary to adjust this antenna trimmer. If so, proceed as follows:

(1) Tune the receiver to a radio station somewhere near 1400 kilocycles, which is about 140 on the dial.

(2) Adjust antenna trimmer with a screw driver very slowly until this station is heard the loudest.

No other adjustments are necessary in this set.

MODEL 12-39

MIDWEST RADIO CORP.

A9	Antenna Strip	C304	.05 Mfd. 400V.	R27	25M. Ohms, ½ W.
B26	Brush Holder	C305	3 Gang Variable	R46	50M	" 1 W.
B27	Brush Clip	C363	Control, Volume	R72	15M	" 1 W.
B28	Brush Contact	C401	Fish Line, Belts	R106	250 Ohm, 2W.
C26	Cable & Plug, A.C.	D3	Dial Background	S319	Spring, Belt Ten.
C145	Commutator Dick	D4	Dial Glass	S387	Speaker, 12 Inch
C146	Commutator Segment	K24	Knob, 1 Inch	S441	Coil Switch, Osc	" " R.F.
C211	3 Gang Trimmer	K25	Knob, 2 Inch	S442	Motor	S443	Switch, Clicker
C286	I.F. Padder	M25	Motor	P9	Panel, Molded	S445	Tone Switch
C234	Osc. Padder	P46	Pilot Light-6-8	S446	Motor Switch
C288	.24 Mfd. 500V	P59	Pointer Slide	173	Power Trans.
C269	.40 Mfd. 350V	R1	200 Ohm, ½ W.	7161	1st I.F. Trans.
C276	.10 Mard Mica	R12	500	"	"	2nd "	"
C277	.25	"	"	R13	1000	7163	1st "	"
C280	.00	"	"	R14	2000	"	2nd "	"
C285	2000	"	"	R15	5000	W51	Window Tuning
C286	3000	"	"	R17	.25 M.	W52	Volume
C287	200	"	"	R18	.50 M.	W53	Motor
C290	60	"	"	R19	1.00 M.	W454	Tone
C301	.01 Mfd. 200 V.	R20	2.00 M.	W55	P. Button
C302	.05	"	"	R21	500 M.	"
C303	.25	"	"	R22	1 Megohm	"
C309	.02	"	400 V.	R23	3	"
C311	.01	"	"	R25	40 M. ohms	"
C313	.25	"	"			

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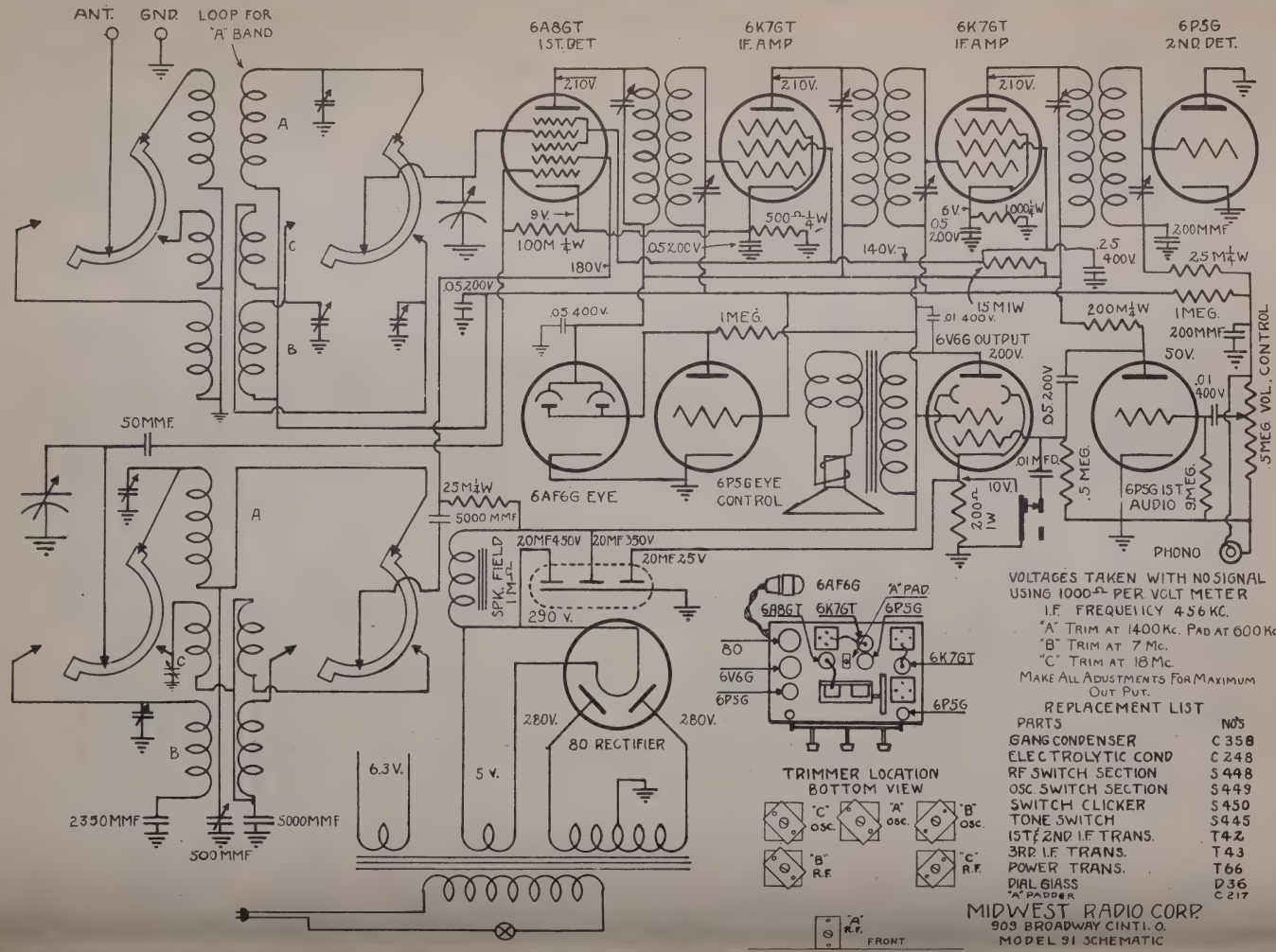
MODEL 15 Tube

MIDWEST RADIO CORP.

MIDWEST RADIO CORP.



VOLTAGES TAKEN WITH NO SIGNAL USING 1000Ω PER VOLT METER

I.F. FREQUENCY 456 KC.

"A" TRIM AT 1400 Kc. PAD AT 600 Kc.

"B" TRIM AT 7 Mc.

"C" TRIM AT 18 Mc.

MAKE ALL ADJUSTMENTS FOR MAXIMUM OUT PUT.

REPLACEMENT LIST

PARTS	NOS
GANG CONDENSER	C 358
ELECTROLYTIC COND	C 248
RF SWITCH SECTION	S 448
OSC. SWITCH SECTION	S 449
SWITCH CLICKER	S 450
TONE SWITCH	S 445
1ST & 2ND I.F. TRANS.	T 42
3RD I.F. TRANS.	T 43
POWER TRANS.	T 66
DIAL GLASS	D 36
"A" PADDER	C 217

MIDWEST RADIO CORP.
909 BROADWAY CINTI. O.
MODEL 91 SCHEMATIC

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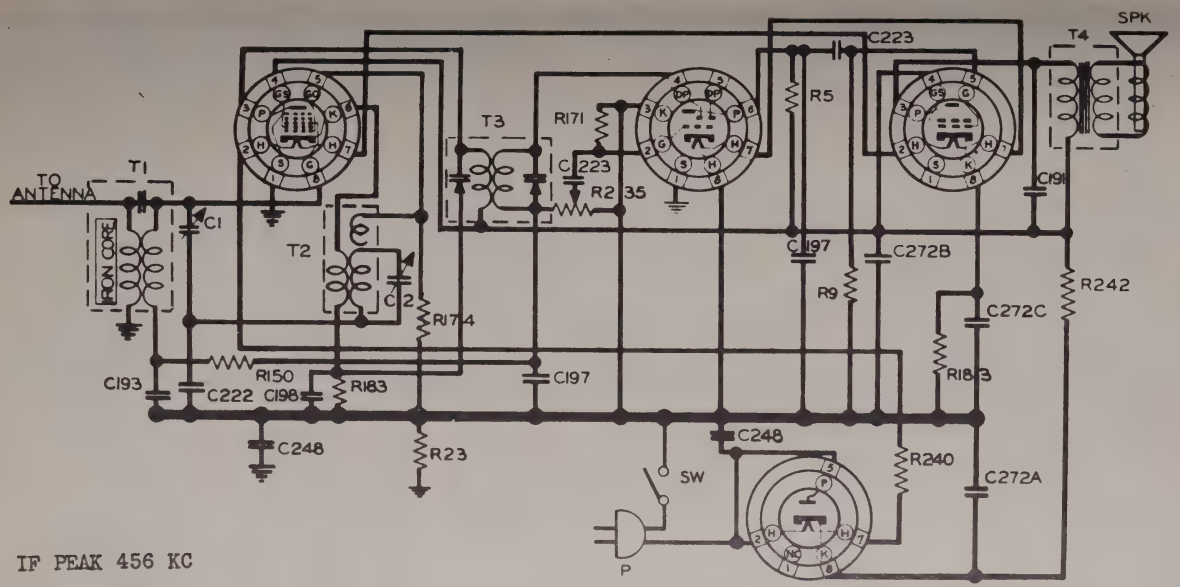


IF PEAK 456 KC

35Z4GT OR 35Z5GT

RESISTORS

R	OHM	W	Part No.
174	20K	1/4	17-14291
9	1M.	1/4	17-2080
171	15M.	1/4	17-14288
5	500K	1/4	17-2070
183	150	1/4	17-14316
235	2M.	V.C.	17-17117
23	250K	1/4	17-3011
240	47	1	17-14397
150	5M.	1/4	17-14242
242	2000	1	17-14399

CONDENSERS

C	Capacity	Volt	Part No.
222	.2	400	17-14317
193	.05	200	17-14274
248	.05	400	17-14366
198	.005	400	17-14279
223	.002	400	17-14318
191	.01	400	17-14272
1	Two Gang }	--------	17-17115
2	Variable }		
272A	40 MFD	150	
272B	20 MFD	150	17-14398
272C	20 MFD	25	
197	.0001	600	17-14278

MISCELLANEOUS UNITS

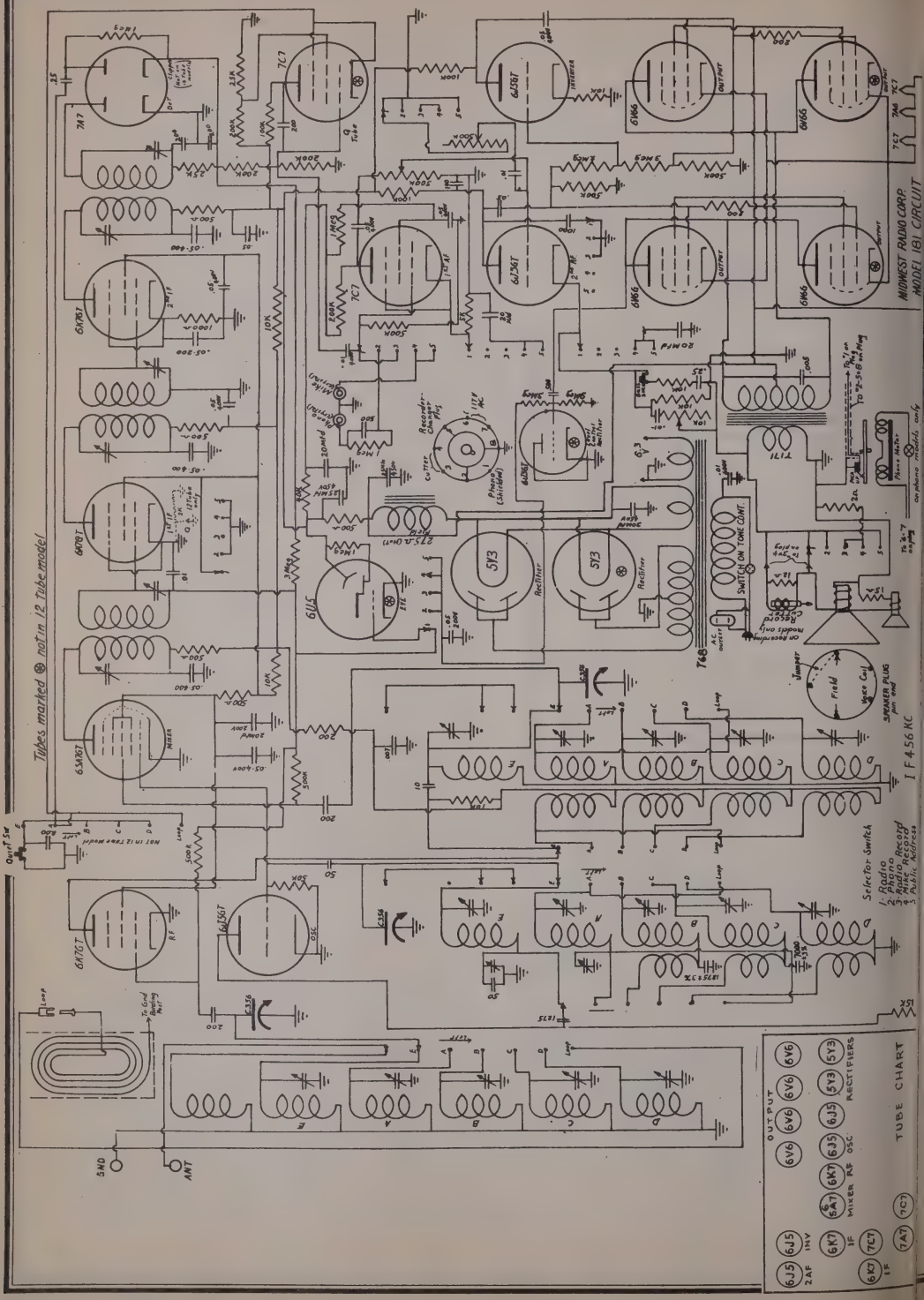
Symbol	Description	Part No.
T1	Antenna Coil	00-17130
T2	Oscillator Coil	00-17119
T3	I.F.Coil	00-17210
T4	Output Trans.	00-17131
SPK.	Speaker	17-17209

FREQUENCY RANGE

1750 to 540 KC

MODEL 181

MIDWEST RADIO CORP



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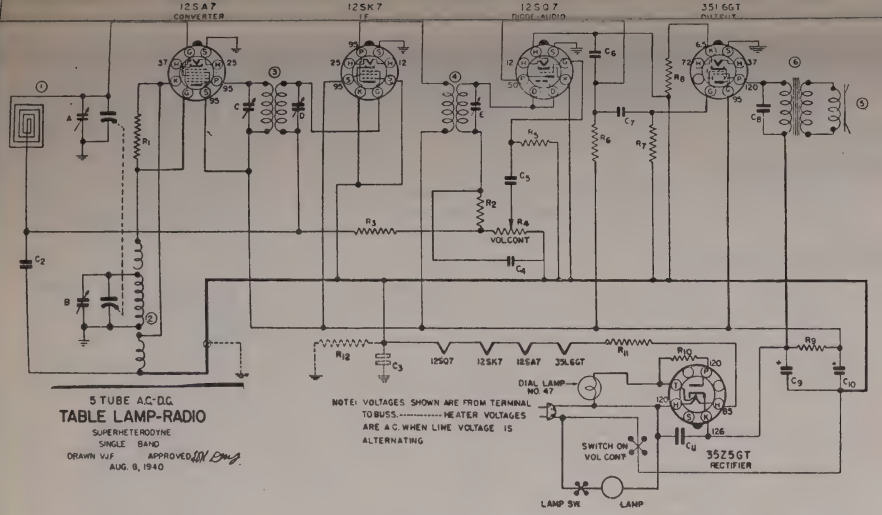
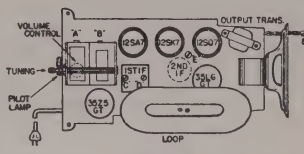


DIAG	PART	DESCRIPTION	DIAG	PART	DESCRIPTION
R1	N-4670	25,000 OHM .5W. 20%	2	N-3298	OSCILLATOR COIL
R2	N-4670	25,000 OHM .5W. 20%	3	N-3263	1 ST. I.F. TRANSFORMER
R3	N-262	1 MEGOHM .5W. 20%	4	N-2890	2 ND. I.F. TRANSFORMER
R4	N-3307	.5 MEGOHM VOL. CONT.	5	N-3553	4" SPEAKER
R5	N-413	6 MEGOHM .5W. 20%	6	N-3562	OUTPUT TRANSFORMER
R6	N-1261	250,000 OHM .5W. 20%			
R7	N-1264	500,000 OHM .5W. 20%			
R8	N-1246	250 OHM .5W. 10%			
R9	N-3341	1,000 OHM .5W. 20%			
R10	N-1742	25 OHM .5W. 10%			
R11	N-1688	90 OHM .5W. 10%		N-3552	2 GANG CONDENSER
R12 *	N-1779	150,000 OHM .5W 10%			
C2	N-3345	.05 MFD. 200V.			
C3 *	N-3080	.22 MFD. 200V.			
C4	N-1374	100 MMFD.	*		R12 AND C3 USED ON KCU ONLY.
C5	N-2712	.004 MFD. 400V.			
C6	N-4447	.0005 MFD. 400V.			BUSS IS GROUNDED ON KC ONLY.
C7	N-1346	.01 MFD. 400V.			
C8	N-344	.01 MFD. 400V.			
C9	N-3566	40 MFD. 150V. ELECT.			
C10		25 MFD. 150V.			
C11	N-1346	.05 MFD. 400V.			



TUBE AND TRIMMER LOCATIONS

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proved not to be the cause.

NOTE: IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

ALIGNMENT PROCEDURE

GENERAL DATA. The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400 and 1720 KC and an output meter to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible to prevent the AVC from operating and giving false readings.

CORRECT ALIGNMENT PROCEDURE. Remove the chassis from the cabinet and set on a bench taking care that no iron or other metal is near the loop. (See section on replacement of tubes). Do not make this setup on a metal bench. The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

I. F. ALIGNMENT. With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (12SA7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all three I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. Connect the test oscillator to a loop transmitter and couple to the loop antenna on the receiver. With the gang condenser set at minimum capacity, set the test oscillator at 1720 K.C. and adjust the oscillator (or 1720 KC trimmer) on gang condenser. Next—set the test oscillator at 1400 KC, and tune in the signal on the gang condenser. Adjust the antenna trimmer (or 1400 KC trimmer) for maximum signal. Next set the test oscillator at 600 KC, and tune in signal on condenser to check alignment of coils.

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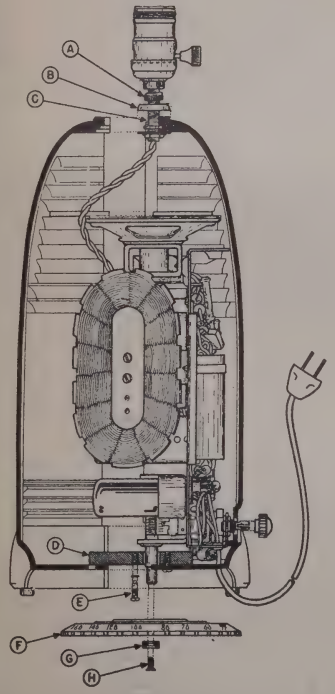

FIGURE 1.

This new Radio-Lamp of yours incorporates the latest developments and refinements that radio engineers have devised. In order to realize the advantages to the fullest extent you must thoroughly understand its operation and use. Therefore it is important that you read the following pages carefully. PLEASE READ THESE INSTRUCTIONS ALL THE WAY THROUGH BEFORE ATTEMPTING TO USE THE RECEIVER.

ASSEMBLY OF LAMP. Screw the small shade on the lamp socket and screw the lamp bulb in the socket. Then place the large shade on the small shade and the assembly is complete.

TYPE OF LAMP BULB REQUIRED. The lamp is designed to use a three light bulb. This type of bulb will give three intensities of light and comes in two sizes. For normal illumination use the 30, 70 and 100 watt size with a medium base. For better illumination use the 50, 100 and 150 watt size with a medium base. Standard 60 or 100 watt bulbs can be used successfully in the lamp, but only one intensity of light will be obtained.

TUBES USED. Five tubes are used. Their type numbers and locations are shown on the tube location diagram inside the base of the lamp. Before attempting to replace tubes see the section on ***replacement of tubes.***

ANTENNA AND GROUND. This radio lamp has a self contained loop antenna and requires no external antenna or ground. On weak stations the signal can be improved by rotating the lamp slightly.

TUNING RANGE

This receiver is designed to operate over the standard broadcast band which extends from 535 to 1720 Kilocycles (KC) (174 to 560 Meters) and includes the popular 1712 KC police channel.

CONNECTING THE RADIO-LAMP

Before connecting the radio-lamp be sure that your house is wired for the voltage and current for which the set is designed. If you are in doubt, call up your local power company for the necessary information. Connecting the set to a supply outlet furnishing the wrong type of current will result in improper operation or damage.

POWER SUPPLY. This receiver is designed to operate on any alternating current supply (AC) ranging from 110 to 120 volts, 50 to 60 cycles; or on any direct current supply (DC) ranging from 110 to 120 volts.

SPECIAL INSTRUCTIONS FOR DC OPERATION. When operating from a DC (direct current) power supply, it may be necessary to reverse the power cord plug in the wall socket before the receiver will function, due to the polarity condition of a direct current supply. If the receiver fails to perform after being turned on one minute, simply reverse the power plug.

SMALL KNOB. (Manual Volume Control and "On-Off" Switch). Turn this knob to the extreme right. The switch will click and the dial will become illuminated with the volume wide open. Wait about a minute for the tubes to become heated. When signal comes in adjust volume as desired.

TUNING DIAL. (Station Selector)—Rotate the dial in the base of the lamp slowly over a narrow range of the dial at a point where the desired station is located, until the station is received with maximum volume; then readjust the volume control to the proper level. **Never** use the station selector to adjust volume as this practice results in distorted tone quality and deficient bass response. **The** Volume Control **only** is to be used for this purpose. For maximum clarity the indicator needle should be adjusted to the center of the area covered by the station being tuned.

CONTROLS AND OPERATION

LAMP SWITCH. The switch located in lamp socket must be turned in a clockwise direction to secure the three intensities of light if a three light bulb is used. If a standard single light bulb is used only one intensity of light will be obtained.

REPLACEMENT OF TUBES

(See Figure 1)

Remove the shades and lamp bulb to prevent damage. Next loosen screw H and slip off washer G and the dial F. Next unscrew E and the screw next to it. (These screws have red heads). At the top of lamp just below the lamp socket, will be found nut A which must be loosened sufficiently to allow collar B to be moved high enough to allow the two halves of the lamp base to be separated.

If tubes are removed from their sockets for test or replacement purposes, make certain that each tube is placed in its proper socket. (See tube layout diagram in the base of the lamp).

Failure to replace the tubes in their proper sockets may result in damage to the tube, or the receiver, or both.

MONTGOMERY-WARD & CO.

Crystal Pickup Cartridge Data

TYPES OF CRYSTAL PICKUP CARTRIDGES USED ON AIRLINE RADIO-PHONOGRAPH COMBINATIONS.

In the past, substitutions have been made for crystal pickup cartridges on the basis of whether one crystal cartridge looked like another type, and whether it would fit in the pickup arm. This type of substitution usually causes trouble either in the operation of the record changer or by damaging the records because of improper needle pressure. (Needle pressure is the term used to describe the amount of pressure exerted upon a record by the point of the needle, and is equal to the weight of the pickup arm as weighed with a penoil scale while the pickup arm is in playing position.)

Since it is impossible to identify the pickup cartridge by the radio manufacturer's part number for this part, the attached list has been prepared to make identification easy and to enable you to replace any defective crystal pickup cartridge with the type which was originally intended to be used in the record player or record changer. Nearly all crystal pickup cartridges have the crystal pickup cartridge manufacturer's part number stamped on them. For instance, the permanent needle type which was used on the Model 912 Radio has a sticker on the cartridge with the number LP-6 stamped on the sticker. The radio manufacturer's part number for this crystal is J-22404, which does not appear on the cartridge in any place. To identify this cartridge would be rather difficult if you did not have a cross reference between the crystal cartridge manufacturer's part number and the radio manufacturer's part number. This list will give you that information and also the information as to what type of cartridge is used on each model radio.

In Columns 1, 2 and 3 are listed the radio model numbers, the part number assigned to the crystal cartridge by the radio manufacturer, and the part number assigned to the crystal cartridge by the crystal cartridge manufacturer. In columns 4, 5 and 6 are listed any information regarding the interchangeability of crystals, the output voltage of the crystal, and the recommended needle pressure at which the crystal cartridge should operate on the type of changer or record player with which it is used.

There are some cases in which two or more crystal cartridges were used on the same record changer or player, and on the same model radio. For example, refer to Model 732 and you will notice that a B-1, L-26 and an X-82CHZ crystal cartridge was used. Under the "Remarks" column, the notation is made that the B-1 is not interchangeable with the L-26 or the X-82CHZ, however, the X-82CHZ and L-26 could be interchanged if necessary. This same thing is true of the Model 906, which, also uses a B-1 type cartridge, an L-26 type cartridge and an X-82CHZ type cartridge.

One of the most important things to remember, when replacing crystal cartridges on record players or record changers, is that the output voltage of the crystal should coincide with the crystal that it is replacing, and if the needle pressure is not correct, changes in spring tension should be made until the pressure is suitable for the type crystal cartridge involved. For instance, some cases have come up where an LP-6 crystal cartridge has been used to replace an L-26 or an X-82CHZ. One of the first things that you will notice, after this type of replacement is made, is a fine black dust collecting on the records. This dust is actually part of the record itself which is being cut away by the sapphire point on the LP-6 cartridge. This cutting action is caused by an incorrect needle pressure, since the X-82CHZ cartridge requires from two to two and one-half ounces of needle pressure and the LP-6 requires only one to one and one-quarter ounces. Of course there are other factors which would cause the LP-6 cartridge to cut into a record, one of the main factors being a chipped sapphire needle point. Crystal cartridges cannot be interchanged indiscriminately, since some of the older type record changers required a needle pressure of two to two and one-half ounces in order to work the ratchet mechanism for tripping the record changer or due to friction in the changer arm.

If a crystal cartridge is used which requires only an ounce to an ounce and a quarter pressure, and the pressure on the needle is reduced to one or one and one-quarter ounces, in many cases the needle will not follow the grooves of the record and will jump grooves. This is caused by too light a needle pressure for that type of changer, providing the mechanism of the changer itself is not binding or jammed. When this happens, the LP-6 cartridge should not be used, as the maximum pressure should not exceed one and one-quarter ounces if any life is to be expected from the records.

Another factor to be considered when substituting crystal pickup cartridges is the amount of force with which the needle hits the record when the changer starts the cycle. That is, the amount of impact when the tone arm drops to the record in the outer groove. Some changers using replaceable needles were not too critical about this impact force; however, with a crystal cartridge using a sapphire needle, chipping might result if the needle comes in contact with the record at too great a force. On some changers it is possible to make adjustments so that the tone arm lowers at a lesser speed, thus decreasing the force of impact, but on other changers no adjustment can be made.

It is of utmost importance to consider all of the information given here before attempting to make substitutions other than those recommended by the record player or changer manufacturer. If you find any record players or record changers which have been altered, you should check to make sure that the substitute crystal cartridge is correct and will not cause trouble for the customer.

RADIO MODEL NO.	CRYSTAL PICKUP PART NO. (RADIO MFGR.)	CRYSTAL PICKUP PART NO. (CHYSTAL MFGR.)	REMARKS	CRYSTAL OUTPUT VOLTAGE	RECOMMENDED NEEDLE PRESSURE
362	114120	L-26A	114120 is complete tone arm	1.4	2¾-23/4 Oz.
398	B-1	B-1	B-1 not interchangeable with	2.5	2-2½ Oz.
	J-22125	L-26	L-26 or X-82CHZ	1.4	2-2½ Oz.
	J-22202	X-82CHZ		1.0-1.25	2-2½ Oz.
399	J-22202	X-82CHZ		1.0-1.25	2-2½ Oz.
499	W21A158	L-40		.60	1¼-1½ Oz.
500	114100*	305	114100 is complete tone arm		
510	28A10	L-22A	28A10 is complete tone arm	1.75	2-3/4 Oz.
515	114194	L-26A	114194 is complete tone arm	1.4	2-3/4 Oz.
523	BE-G-27099	N-1		.7 - .9	1½-1½ Oz.
614	28A25*	PE-212	28A25 is complete tone arm		
615	BE-G-12114	L-26A		1.4	2-2½ Oz.
620	J-22125	L-26A		1.4	2-2½ Oz.
623	28A25*	PE-212	28A25 is complete tone arm		
629	BE-G-12114	L-26		1.4	2-2½ Oz.
717	114120	L-26A	114120 is complete tone arm	1.4	2-3/4 Oz.
719	114120	L-26A	114120 is complete tone arm	1.4	2-3/4 Oz.
728	B	B		2.5	2½-3 Oz.
732	B-1	B-1	B-1 not interchangeable with	2.5	2-2½ Oz.
	SJ-22202	X-82CHZ		1.0-1.25	2-2½ Oz.
	SJ-22125	L-26	L-26 or X82CHZ	1.4	2-2½ Oz.
733	J-22202	X-82CHZ		1.0-1.25	2-2½ Oz.
739-A	SB-27099	N-1		.7 - .9	1¼-1½ Oz.
740-A	0-4426-8	N-1		.7 - .9	1½-1½ Oz.
741	J-22202	X-82CHZ		1.0-1.25	2-2½ Oz.
804	B	B		2.5	2½-3 Oz.
805	B	B		2.5	2½-3 Oz.

RADIO MODEL NO.	CRYSTAL PICK-UP PART NO. (RADIO MFGR.)	CRYSTAL PICK-UP PART NO. (CRYSTAL MFGR.)	REMARKS	CRYSTAL OUTPUT VOLTAGE	RECOMMENDED NEEDLE PRESSURE
808	SJ-22404	LP-6		.85	1-1¼ Oz.
902	B-1	B-1		2.5	-2½ oz.
904	B-1	B-1	B-1 not interchangeable with	2.5	2-2½ Oz.
	J-22125	L-26	L-26 or X82CHZ	1.4	2-2½ Oz.
	J-22202	X82CHZ		1.0-1.25	2-2½ Oz.
906	B-1	B-1	B-1 not interchangeable with	2.5	2-2½ Oz.
	J-22125	L-26	L-26 or X-82CHZ	1.4	2-2½ Oz.
	J-22202	X-82CHZ		1.0-1.25	2-2½ Oz.
908	J-22202	X-82CHZ		1.0-1.25	2-2½ Oz.
909	J-22202	X-82CHZ		1.0-1.25	2-2½ Oz.
912	J-22404	LP-6		.85	1-1¼ Oz.
914	4426-10	LP-6		.85	1-1¼ Oz.
1106	B-1	B-1	B-1 not interchangeable with	2.5	2-2½ Oz.
	J-22125	L-26	L-26 or X-82CHZ	1.4	2-2½ Oz.
	J-22202	X82CHZ		1.0-1.25	2-2½ Oz.
1107	J-22202	X82CHZ		1.0-1.25	2-2½ Oz.
1112	BE-4426-9	N-1		.7 - .9	1¼-1½ Oz.
1113	J22125	L-26		1.4	2-2½ Oz.
1203	SJ-22404	LP-6		.85	1-1¼ oz.
1401	J-22404	LP-6		.85	1-1¼ Oz.
2208	28A10	L-22A	28A10 is complete tone arm	1.75	2-1/4-2-3/4 Oz.

* No information available

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MODEL 04BR-729

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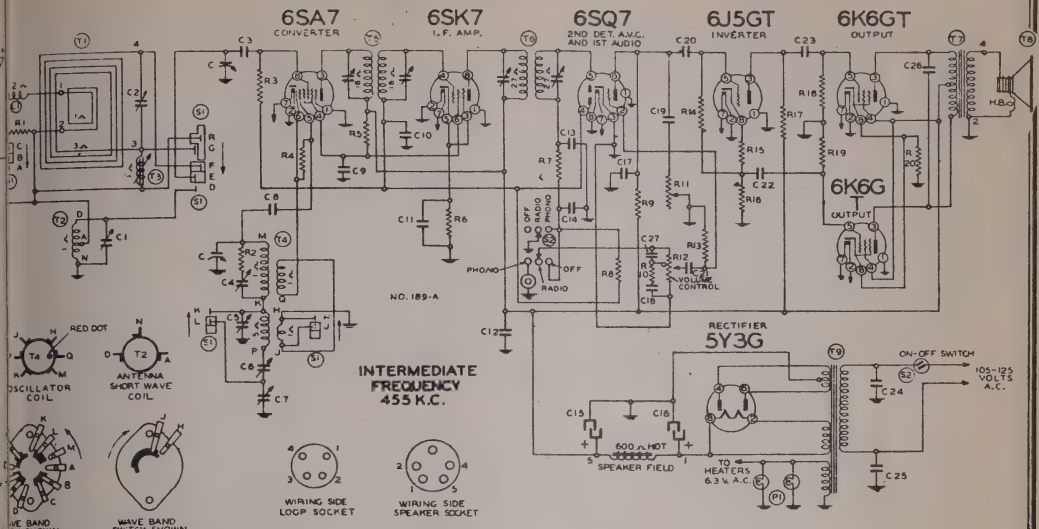
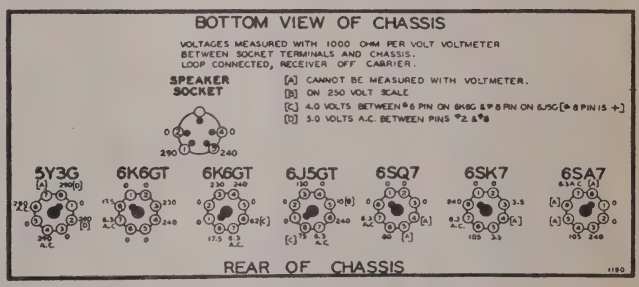
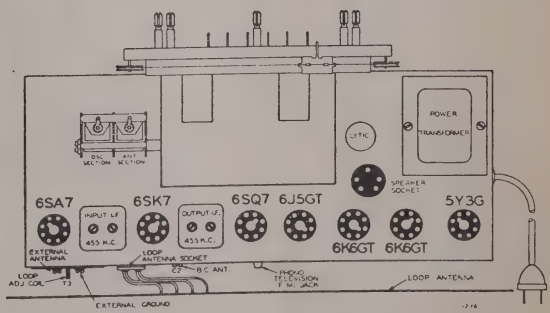



BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS. LOOP CONNECTED, RECEIVER OFF CARRIER.
SPEAKER SOCKET
[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] ON 250 VOLT SCALE
[C] 4.0 VOLTS BETWEEN #6 PIN ON 6K6G & #8 PIN ON 6J5G [#8 PIN IS +]
[D] 5.0 VOLTS A.C. BETWEEN PINS #2 & #8
5Y3G
6K6GT
6K6GT
6J5GT
6SQ7
6SK7
6SA7
REAR OF CHASSIS



Schematic Diagram Ref. No. | Part No. | Description

RESISTORS

R	13064	3500 ohm—½ w.
R	130276	10 ohm—½ w.
R	1304	3 megohm—½ w.
R	130236	30M ohm—½ w.
R	130307	15M ohm—1 w.
R	13083	300 ohm—½ w.
R	13012	50M ohm—½ w.
R	13038	2 megohm—½ w.
R	13011	250M ohm—½ w.
R	130149	15M ohm—½ w.
R	101223	Tone control—1 megohm
R	101224	Volume Control—½ megohm
R	130257	5 megohm—½ w.
R	1303	500M ohm—½ w.
R	130218	5M ohm—½ w.
R	130103	100M ohm—½ w.
R	130103	100M ohm—½ w.
R	1303	500M ohm—½ w.
R	1303	500M ohm—½ w.
R	130320	320 ohm—1 watt

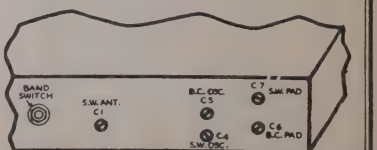
CONDENSERS

C	102133	2 gang variable condenser
C	124116	Short wave antenna trimmer
C	124141	B.C. antenna trimmer
C	1292	.0005 mica
C	124142	Dual adj. trimmer—S.W. osc. trimmer
C	124142	Dual adj. trimmer—B.C. osc. trimmer
C	124140	Dual adj. condenser—B.C. pad
C	124140	Dual adj. condenser—S.W. pad
C	12960	.00015 mica
C	10013	.05 x 400 v.
C	1009	.05 x 200 v.
C	1009	.05 x 200 v.
C	1001	.1 x 400 v.
C	129161	Dual—.0001 mica
C	129161	Dual—.0001 mica
C	119108	16 mfd. x 450 w.v. lytic condenser
C	119108	16 mfd. x 450 w.v. lytic condenser
C	1295	.0001 mica
C	100120	.035 x 200 v.
C	10019	.006 x 600 v.
C	10026	.02 x 400 v.
C	10019	.006 x 600 v.
C	10013	.05 x 400 v.
C	10013	.05 x 400 v.
C	10061	.02 x 600 v.
C	10061	.02 x 600 v.
C	10019	.006 x 600 v.
C	129169	.00025 mica

C4 and C5, C6 and C7, and C13 and C14 are in the same units

PARTS

T1	111220	Loop antenna assembly
T2	111184	Short wave antenna coil
T3	111183	Loop adjustable coil
T4	110154	B.C.—S.W. oscillator coil
T5	108178	Input I.F. coil—455 kc.
T6	108179	Output I.F. coil—455 kc.
T7	105112	Output transformer
T8	114226	6" Dynamic Speaker
T9	104212	Power transformer
L1	12312	R.F. Choke coil
S1	125119	Wave band switch
S2	125120	Radio-phono On-off switch
P1	10794	(2) Pilot light bulbs T-44



TRIMMER VIEW FRONT CHASSIS FLANGE

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Phonograph-Television or FM. Jack

Should you wish to use an external phonograph it should be plugged into the phono-jack shown in the top view—The on-off radio-phono knob on the front panel will then switch from radio to phono operation.

If television or frequency modulation (FM) programs ever become available in your community this radio may still be used in conjunction with the necessary converters.

The jack marked phono-television-FM in the top view will accommodate either the Phono or a television or FM converter.

Pushbutton Tuning

Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the slot on top of each pushbutton.

Next pull one of the pushbuttons all the way out as far as it will come (pull, with fingers on top and bottom of button). Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button hard all the way in to lock the station in place (push directly on front of button). Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock it in place when setting up the station.

To change stations simply repeat the procedure above.

Power Consumption - - - - - 75 Watts

Power Output - - - 3 Watts Undistorted

Sensitivity for 500 Milliwatt Output:
20 Microvolts Average

Selectivity - 45 KC Broad at 1000 Times Signal at 1000 KC

Tuning Frequency Range Broadcast - - 535 to 1600 KC
Shortwave - 5.4 to 18.4 MC

Intermediate Frequency - - - - - - 455 KC

Speaker - - - - - - - 6 in. Electro Dynamic

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio ground to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND (See Note A)	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C4	Short Wave oscillator	Adjust to maximum output
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	Trimmer C1	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	Trimmer C7	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "C")
BROADCAST BAND (See Note A)	1600 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C5	Broadcast oscillator	Adjust to maximum output
	535 Kc.	200 mmf.	Grid of 6SA7	Broadcast	Set Dial at 535 Kc.	Trimmer C6	Broadcast oscillator series pad	Adjust to maximum output
LOOP ALIGNMENT (See Note B)	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	Trimmer C2 (See Top View)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	Trimmer T3 (See Top View)	Iron Core Tracking Coil	Adjust to maximum output

NOTE "A"—The signal generator is connected to the "ANT." and "GND." terminals on the rear of the chassis when aligning the Short Wave Band and to the grid of the 6SA7 tube and ground terminal when setting the Broadcast Band oscillator end frequencies, (1600 and 535 K. C.).

The loop antenna should be connected to the radio when making these adjustments.

NOTE "B"—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected. The signal generator is connected to the "ANT." and "GND."

NOTE "C"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained. Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

MONTGOMERY-WARD & CO.

MODEL 04WG-569B

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MODEL 04WG-569B

MONTGOMERY-WARD & CO.

DRIVE CORD REPLACEMENT

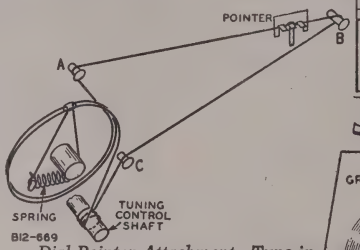
Tie a knot with a small loop at each end of new drive cord. The distance between knots should be 29¼ inches.

Thread one end of drive cord down through hole in groove of drive pulley. Place loop on hook on pulley. Turn gang condenser to completely closed position—See illustration.

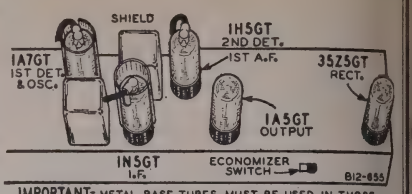
Wind cord one complete turn counter-clockwise (from back of chassis) around drive pulley. Then pass cord over idler studs A, B, & C as shown.

Wind 3½ turns clockwise (from back of chassis) around tuning control shaft. These turns should progress toward chassis.

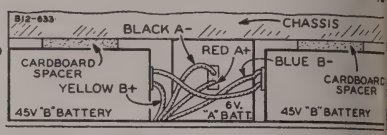
Wind 1¼ turns counter-clockwise (from back of chassis) around drive pulley. These turns should be on right side (from gang condenser side of chassis) of pulley groove and should progress toward dial mounting plate. Thread cord through hole in groove of drive pulley. Hook loop on tension spring. Wind cord around drive pulley shaft—See illustration. Fasten free end of spring to hook on pulley.

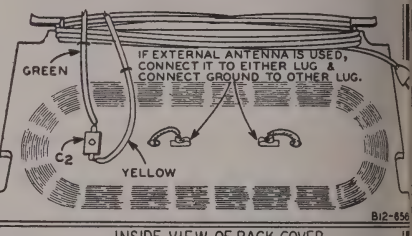


Dial Pointer Attachment—Tune in a signal of known frequency. Set pointer at this frequency mark on the dial scale. Fasten pointer to drive cord—See illustration.



IMPORTANT- METAL BASE TUBES MUST BE USED IN THOSE SOCKETS AT WHICH SHIELDS ARE SHOWN.





INSIDE VIEW OF BACK COVER

SPECIFICATIONS

Input Voltages and Currents—Battery Operation

"A" Battery ..... 6 Volts—50 Ma.
"B" Batteries ..... 90 Volts—9.5 Ma.

Power Consumption (At 117 volts AC Supply) 28 Watts

Power Output

Battery Operation	70 Mw. Undistorted 160 Mw. Maximum
AC Operation	70 Mw. Undistorted 160 Mw. Maximum

Selectivity - 50 KC Broad at 1000 Times Signal

Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - - - - - - 5" P.M. Dynamic

Tuning Frequency Range - - - 540 to 1600 KC

Sensitivity (For .05 Watt Output)

External Antenna - - - - - 50 Microvolts Average

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

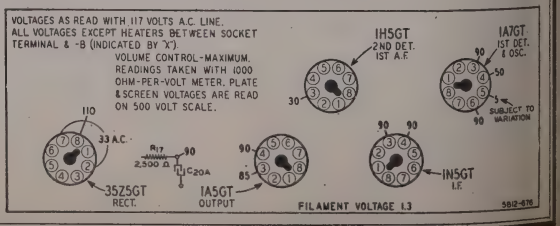
Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antenna—.1 mf.

SIGNAL GENERATOR					
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration below and Illustration of Back—Page 2)
456 KC	Signal Grid of 1st Det. (Top Cap)	Point "X" Prong No. 7 1H5GT—2nd Det.	.1 mf.	Turn Rotor to full open	1st I.F. (C11) & (C12) 2nd I.F. (C13) & (C14)
1600 KC	Signal Grid of 1st Det.	Same as Above	.1 mf.	Turn Rotor to full open	Oscillator (C1)
1400 KC	None— See Note A			Turn Rotor to max. output	Antenna (C2)

NOTE A—Chassis must be in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. The back of the cabinet must be in place. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

CALIBRATION—Tune in an 800 KC signal. If the pointer is not at 800 KC on the dial, set pointer at the 800 KC mark on the dial scale.


VOLTAGES AS READ WITH 117 VOLTS A.C. LINE.
ALL VOLTAGES EXCEPT HEATERS BETWEEN SOCKET TERMINAL & -B (INDICATED BY 'X').
VOLUME CONTROL-MAXIMUM.
READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE.
1H5GT 2ND DET. 1ST A.F.
1A7GT 1ST DET. & OSC.
SUBJECT TO VARIATION
110
33 A.C.
Ri7 2,300 Ω
C20A
35Z5GT RECT.
1A5GT OUTPUT
1N5GT I.F.
FILAMENT VOLTAGE 1.3
5B12-676

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MONTGOMERY-WARD & CO.

MODEL 04WG-727

Tuning Frequency Range
B Range..... 528 to 1550 KC
D Range..... 5750 to 18300 KC
Sensitivity—External Antenna—(For 0.5 Watt output)
B Range..... 25 Microvolts Average
D Range..... 45 Microvolts Average
Power Consumption 55 Watts (At 117 volts 60 cycles)
Power Output - - - - - - - 3.0 Watts Undistorted
4.5 Watts Maximum
Selectivity - 38 KC Broad at 1000 times Signal
Intermediate Frequency - - - - - - - 456 KC
Speaker - - - - - - - - 10" P.M. Dynamic
I.F. 456 KC.
COIL TERMINALS
SWITCH CONTACT LOCATION NUMBERING
VIEW FROM REAR
BAND SWITCH
GANG CONDENSER
TO EXTERNAL ANTENNA
EXTERNAL GROUND
LOOP ANT.
SUBJECT TO VARIATION
TONE CONTROL
VOLUME CONTROL
6K6G OUTPUT
6SQ7 BALANCING EXCITER
6SQ7 2ND DET. & 1ST A.F.
6SA7 1ST DET. & OSC.
6SK7 I.F.
5Y3G RECT.
BOTTOM VIEW OF CHASSIS

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ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minuter.

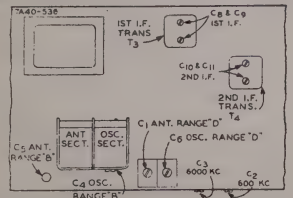
The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.					
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C8) & (C9) 2nd I.F. (C10) & (C11)
RANGE B					
1550 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C4)
1400 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note A	Ant. Range B (C5)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C2) Rock Rotor—See Note B
RANGE D					
18 300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C6)
17,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note B
6000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	6000 KC (C3) Rock Rotor—See Note B
LOOP RANGE B					
1400 KC See Note C	None See Note C		B Range	Turn Rotor to Max. Output	Ant. Range B (C5)



Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Tune in a 1400 KC signal. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Reinstall set in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Place signal generator so that this loop is between 3 and 10 feet from loop in cabinet.

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

Television Sound or Phonograph Connections

On the back panel of the chassis base is a switch and a socket for a single shielded pin tip at which connections are made. The connector on the cable from a television receiver or from a phono pickup can be inserted in the socket. (The cable connector must be a single shielded pin tip type.

If Television programs ever become available in your community, the audio amplifier and speaker of this radio may be used to reproduce Television sound in conjunction with any "Television Picture Receiver and Sound Converter." Phonograph records may also be played through the radio.

When phonograph or television sound reproduction is desired, the knob should be moved to the "Television Sound or Phonograph" position. For radio reception, the knob should be in the "Radio" position.

Procedure for Setting the Station Buttons

Setting a Station Button

Turn the manual tuning knob so that the dial pointer moves toward 1550 KC until the stop is reached.

At the right side of the escutcheon (from the front) will be seen a cap which covers a hole in the escutcheon—See illustration. Pull off this cap.

At the end of the tube in back of the hole in the escutcheon is the locking screw. Using a small handled screwdriver, unlock the mechanism by turning this screw in a counter-clockwise direction several turns.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED.

Select the first station from the list you have prepared, and carefully tune in this station by means of the manual tuning knob.

With one hand, hold the manual tuning knob to prevent it from turning and with the other hand, push one of the station buttons shown in the illustration *all the way in*. It is better to start with button No. 1.

Hold this button all the way in. With the other hand, see whether or not this station is still accurately tuned in by turning the tuning knob a slight amount back and forth. *Be sure to hold the button all the way in.*

Release the button slowly after the station is tuned in.

CAUTION — Do not touch this button again while the mechanism is unlocked as the setting may be altered.

Carefully tune in the second station on your list. Then hold the tuning knob and push the second button slowly and firmly all the way in. Check for accurate tuning.

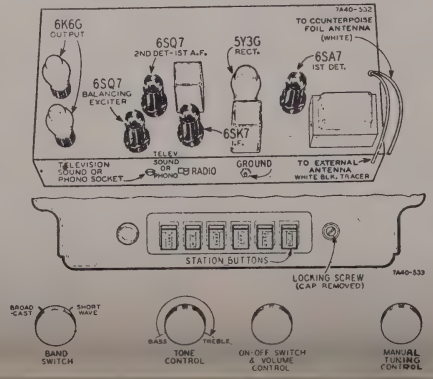
Proceed in the same manner to set any additional stations on your list on the remaining station buttons.

After all the stations are set, it will be necessary to lock the mechanism so that the settings will not change. Turn the manual tuning knob so that the dial pointer moves toward 1550 KC until the stop is reached. Then, with a SMALL HANDLED screwdriver, turn the locking screw in a clockwise direction until it is tight. Tighten the locking screw firmly but not excessively to avoid stripping the threads. Replace the cap over the hole.

Remove the correct station call letter tabs from the sheets supplied by bending the sheet back and forth at the score mark until the tab can be broken off. Press the tab all the way to the bottom of the space provided in the button. Cover the call letter tab with a celluloid tab, pressing this in until it snaps into place.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.

Any button may be used for any station you can receive, although it will be more convenient to set the stations so that the kilocycle numbers decrease from left to right.



Drive Cord Replacement

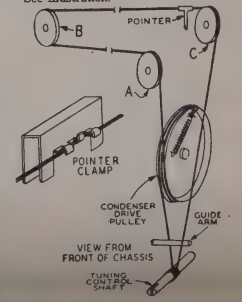
Tie one end of the new drive cord (approximately 70 inches in length) to tension spring. Turn gang condenser to full open position. Thread free end of drive cord up through hole in rim of condenser drive pulley and pull spring flush against pulley rim.

Wind one turn counter-clockwise (from condenser drive pulley side of chassis) around drive pulley. This turn should progress to the left (from front of chassis). Pass cord in back of guide arm—see illustration. Then wind drive cord 3½ turns counter-clockwise (from front of chassis) around tuning control shaft. Turns should progress away from the chassis.

Pass cord around pulleys C, B, and A as shown in illustration. Then wind cord ¼ turn counter-clockwise (from condenser drive pulley side of chassis) around drive pulley. The turn should be at right side (from front of chassis) of pulley groove.

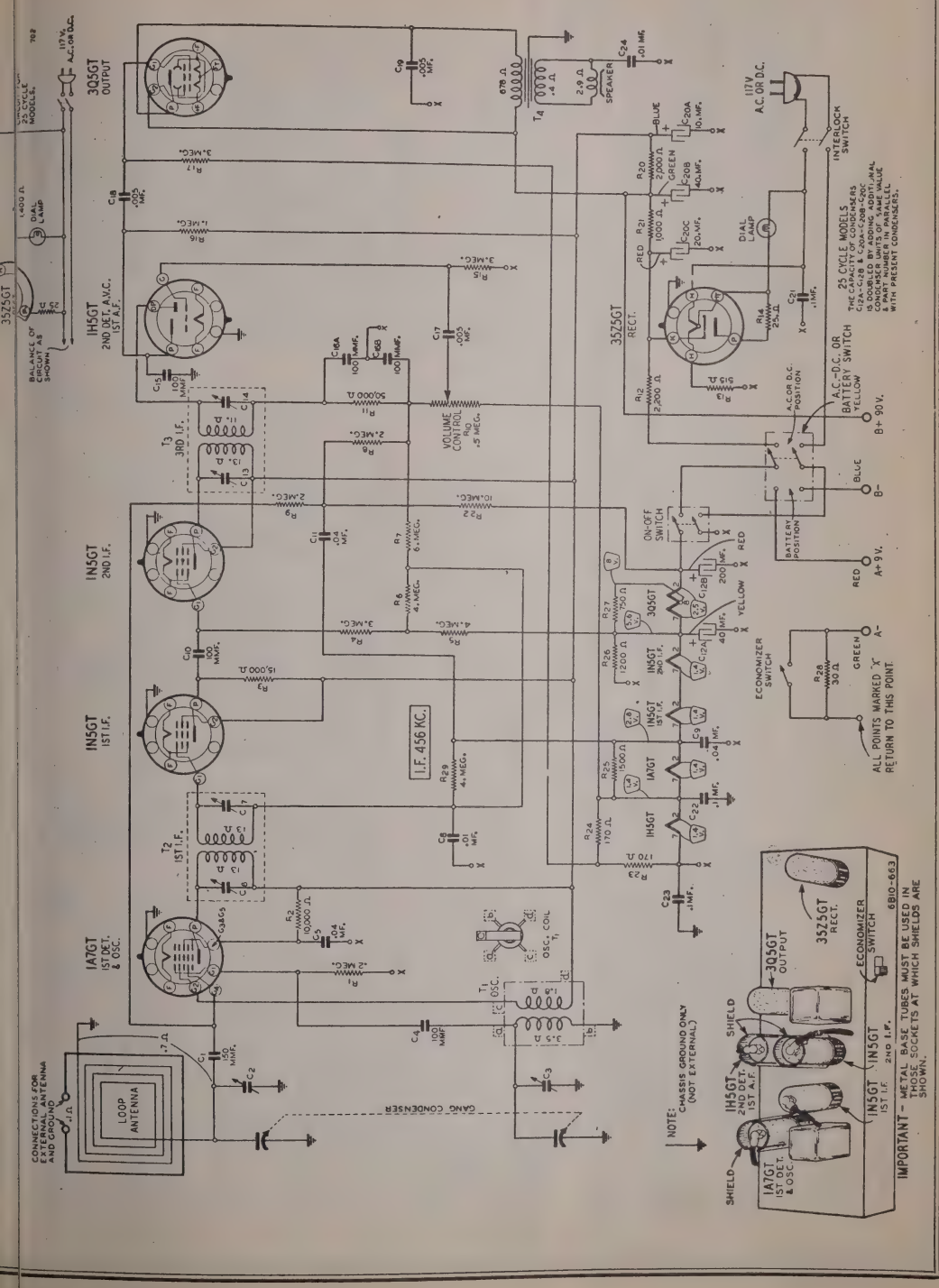
Thread cord through hole in pulley groove and knot securely to spring. Stretch spring and secure free end to hook on drive pulley.

Dial Pointer Attachment—Tune in a signal of known frequency. Set the pointer at this frequency on the dial scale. Secure pointer to cord—See illustration.



MODEL 04WG-2672

MONTGOMERY-WARD & CO.



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ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

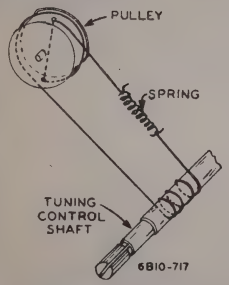
The following equipment is required for aligning:
A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 50 mmf.

SIGNAL GENERATOR					
FREQUENCY SETTING	ANTENNA CONNECTION	GROUND CONNECTION	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration below)
456 KC	External Antenna Clip on Loop	External Ground Clip on Loop	.1 mf.	Turn Rotor to full open	1st I.F. (C6) & (C7) 3rd I.F. (C13) & (C14)
1600 KC	External Antenna Clip	External Ground Clip	.1 mf.	Turn Rotor to full open	Oscillator (C3)
1400 KC	External Antenna Clip See Note A	External Ground Clip	50 mmf.	Turn Rotor to max. output	Antenna (C2)

NOTE A—Re-assemble chassis in cabinet. Close back on cabinet.

CALIBRATION—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 K€ mark on the dial. If it is not, loosen pointer set screw and set the pointer at the 800 KC mark. Retighten set screw.

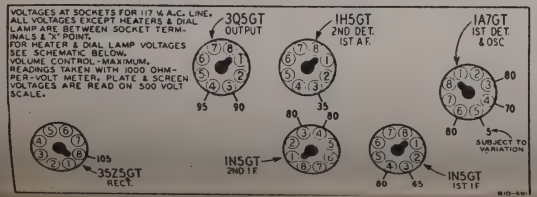
DRIVE CORD REPLACEMENT

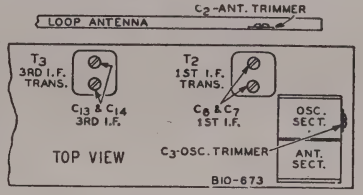


GANG CONDENSER IN CLOSED POSITION

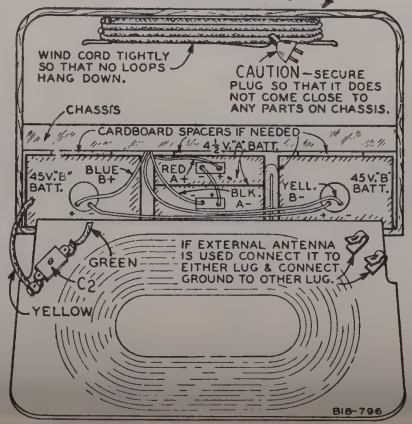
CAUTION

The metal chassis is connected to one side of the line through .20 mfd. Both AC and DC power lines are generally grounded on one side. If the side of the line not connected to the metal chassis through this capacity is grounded and the metal chassis comes in contact with an external ground, this capacity will be connected across the line and there will be an increase in hum.


VOLTAGES AT SOCKETS FOR 117 V. A.C. LINE. ALL VOLTAGES EXCEPT HEATERS & DIAL LAMP ARE BETWEEN SOCKET TERMINALS & "-" POINT. FOR HEATER & DIAL LAMP VOLTAGES SEE SCHEMATIC BELOW. VOLUME CONTROL—MAXIMUM. READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE.
3Q5GT OUTPUT
1H5GT 2ND DET. 1ST A.F.
1A7GT 1ST DET. & OSC
1N5GT 2ND I.F.
1N5GT 1ST I.F.
35Z5GT RECT.
SUBJECT TO VARIATION
B10-691



MODEL 14WG-2672C

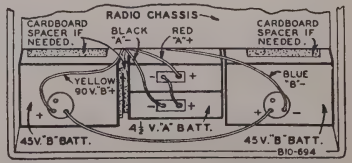


SPECIFICATIONS

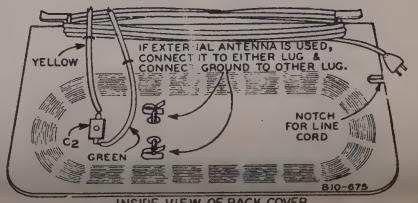
Input Voltages and Currents—Battery Operation
"A" Batteries..... 9 Volts—50 Ma.
"B" Batteries.....90 Volts—11.5 Ma.
Power Consumption (At 117 volts AC Supply) 28 Watts
Power Output
Battery Operation - - - - 150 Mw. Undistorted, 350 Mw. Maximum
AC Operation - - - - - 200 Mw. Undistorted, 400 Mw. Maximum

Selectivity - 50 KC Broad at 1000 Times Signal
Intermediate Frequency - - - - - - 456 KC
Speaker - - - - - - - - - 6" P.M. Dynamic
Tuning Frequency Range - - 540 to 1600 KC
Sensitivity (For .05 Watt Output)
External Antenna - - - 10 Microvolts Average

MODEL 04WG-2672



MODEL 04WG-2672


YELLOW
IF EXTERNAL ANTENNA IS USED, CONNECT IT TO EITHER LUG & CONNECT GROUND TO OTHER LUG.
NOTCH FOR LINE CORD
C2
GREEN
B10-675

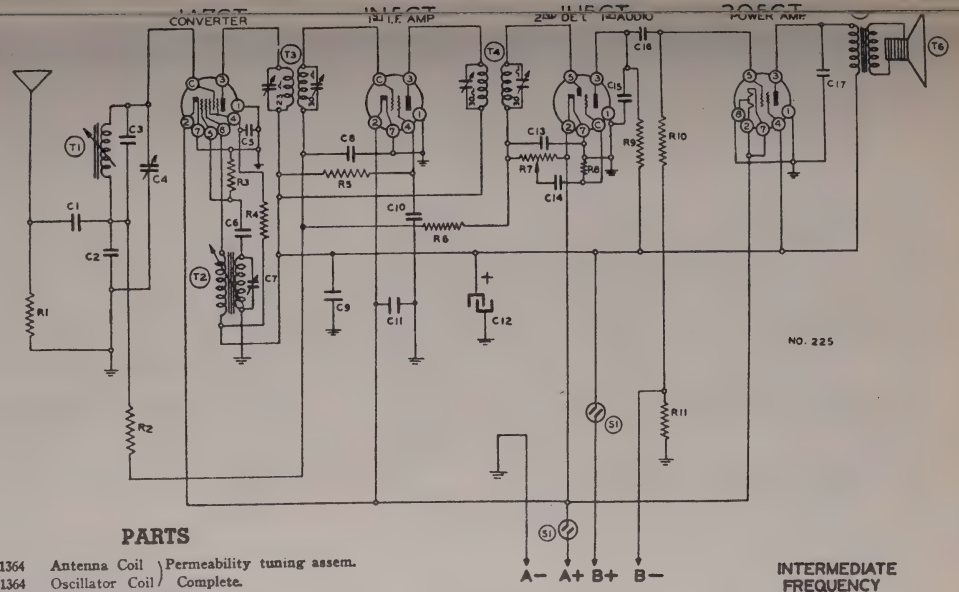
INSIDE VIEW OF BACK COVER

RESISTORS

R1	13017	10M ohm—½ w.
R2	1304	3 megohm—½ w.
R3	1309	200M ohm—½ w.
R4	130194	35M ohm—½ w.
R5	13094	50M ohm—½ w.
R6	1304	3 megohm—½ w.
R7	101250	1 megohm—Volume control and switch—½ w.
R8	130257	5 megohm—½ w.
R9	13019	1 megohm—½ w.
R10	130146	2 megohm—½ w.
R11	13079	400 ohm—½ w.

CONDENSERS

C1	12936	.0003 mica
C2	100112	.001 x 200 v.
C3	129177	.000045—Ceramicon
C4	124165	Antenna trimmer
C5	1009	.05 x 200 v.—Condenser
C6	12912	.00025 mica
C7	124165	Oscillator trimmer
C8	1009	.05 x 200 v. Condenser
C9	1006	.25 x 200 v. Condenser
C10	10020	.1 x 200 v.
C11	10017	.5 x 120 v.
C12	119117B	10 mfd. x 150 v. Lytic
C13	1295	.0001 mica
C14	10012	.003 x 600 v. Condenser
C15	1295	.0001 mica
C16	10026	.02 x 400 v. Condenser
C17	1007	.005 x 600 v.
		C4 and C7 are in same unit.

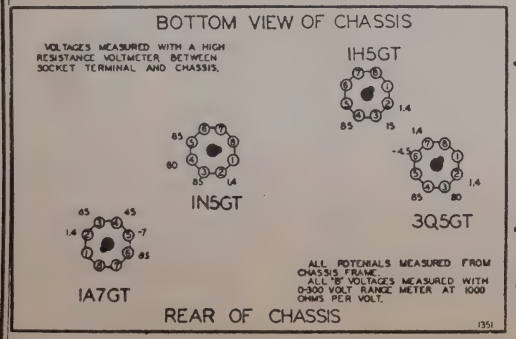


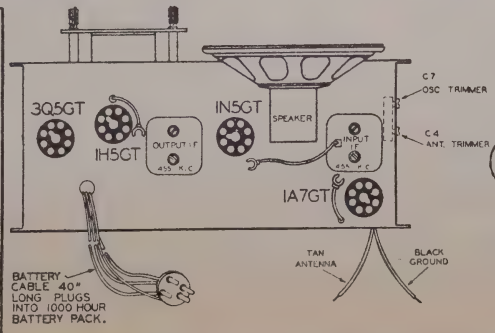
PARTS

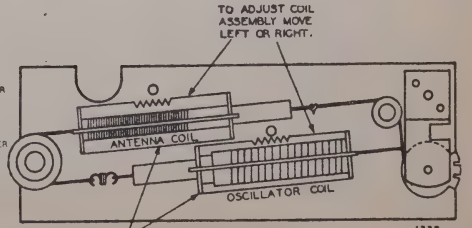
T1	1364	Antenna Coil) Permeability tuning assem.
T2	1364	Oscillator Coil) Complete.
T3	108202	Input I. F. Coil 455 kc.
T4	108153B	Output I. F. Coil 455 kc.
T5	10591B	Output transformer
T6	114238	5" P.M. speaker
S1		Switch-on Volume control

INTERMEDIATE FREQUENCY 455 K.C.

February 1941


BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH A HIGH RESISTANCE VOLTMETER BETWEEN SOCKET TERMINAL AND CHASSIS.
1H5GT
IN5GT
3Q5GT
1A7GT
ALL POTENIALS MEASURED FROM CHASSIS FRAME.
ALL "B" VOLTAGES MEASURED WITH 0-300 VOLT RANGE METER AT 1000 OHMS PER VOLT.
REAR OF CHASSIS
1351





NOTE: THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE MOVE COIL ASSEMBLY VERY SLOWLY

COIL ASSEMBLY VIEW

MODELS 14BK-474, 14BR-1474

©John F. Rider

ALIGNMENT PROCEDURE

MODEL 14BR-474

MODEL 14BR-474

The following equipment is required for aligning:

Dummy antenna .1mfd. and 200 mmf.

Vol. control- Max.all adjs.

Conn. grd. lead of radio chassis to grd. post of signal generator.

FOR OTHER DATA SEE INDEX

Power Consumption - - - A—.250 Amp. B .014 Amps.
Power Output - - - - - - - 160 Milliwatts Undistorted
Sensitivity for 50 Milliwatt Output: 45 Microvolts Average
Selectivity - 48 KC at 1000 Times Signal at 1000 KC
Tuning Frequency Range - - - - - 540 to 1700 KC

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
455 Kc. I. F.	455 Kc.	.1 MFD.	Connect to Grid of 1A7	Iron Cores All the way out	Two trimmers on top of output I. F. can	Output I. F.	maximum output
	455 Kc.	.1 MFD.	Connect to Grid of 1A7	Iron Cores All the way out	Two trimmers on top of input I. F. can	Input I. F.	maximum output
BROAD-CAST BAND	1700 Kc.	.1 MFD.	Connect to Grid of 1A7	Iron Cores All the way out	Trimmer (C7) (See chassis view)	Oscillator	maximum output
	1700 Kc.	200 MMF.	Connect to Antenna Clip	Iron Cores All the way out	Trimmer (C4) (See chassis view)	Antenna	maximum output
	1400 Kc.	200 MMF.	Connect to Antenna Clip	Turn Dial to 1400 Kc.	Adjust position of antenna coil (See coil assembly view)	Antenna Coil Adjustment	maximum output (See Note "A")
	1700 Kc.	200 MMF.	Connect to Antenna Clip	Turn Dial to 1700 Kc.	Adjust trimmer (C4) (See chassis view)	Antenna	Check for tracking (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C4) adjustment again at 1700 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1700 Kc.

MODEL 14BR-695

Power Consumption - - - - - - 35 Watts
Power Output - - - 900 Milliwatts Undistorted
Sensitivity for 50 Milliwatt Output - 15 Microvolts Average
Selectivity - 46 KC Broad at 1000 Times Signal at 1000 KC

Tuning Frequency Range
Broadcast - - - 540 to 1600 KC
Shortwave - - - 5.6 to 18.3 MC
Intermediate Frequency - - - - - - 455 KC
Speaker - - - - - - - - 5 in. P.M. Dynamic

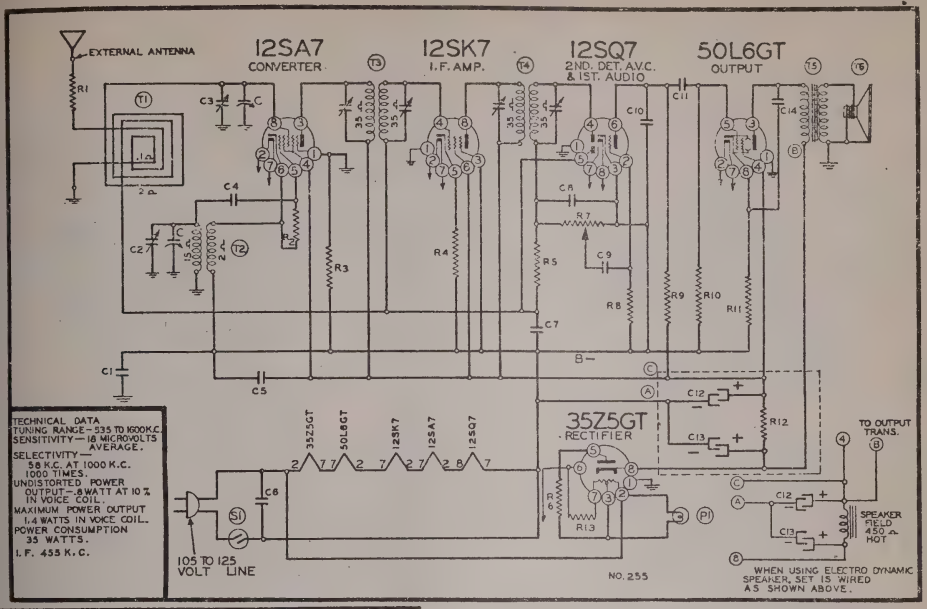
BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 12SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Top View)	Input I. F.	Adjust to maximum output
SHORT WAVE BAND	17 Mc.	400 Ohms	External Antenna and B—	Short Wave	Set Dial at 17 Mc.	Trimmer C8	Short Wave oscillator	Adjust to signal
	17 Mc.	400 Ohms	External Antenna and B—	Short Wave	Set Dial at 17 Mc.	Trimmer C4	Short Wave antenna	Adjust to maximum output
	6 Mc.	400 Ohms	External Antenna and B—	Short Wave	Set Dial at 6 Mc.	Trimmer C12	Short Wave oscillator series pad	Adjust to maximum rock dial. (See note "A")
BROAD-CAST BAND	1600 Kc.	.1 mmf.	Grid of 12SA7	Broadcast	Rotor full open (Plates out of mesh)	Trimmer C9	Broadcast oscillator	Adjust to signal
	1400 Kc.	200 mmf.	External Antenna and B—	Broadcast	Set Dial at 1400 K. C.	Trimmer C2 (See Top View)	Broadcast antenna	Adjust to maximum output
	600 Kc.	200 mmf.	External Antenna and B—	Broadcast	Set Dial at 600 K. C.	Trimmer C11 (See Top View)	Broadcast Series Pad	Adjust to maximum output (See Note "A")

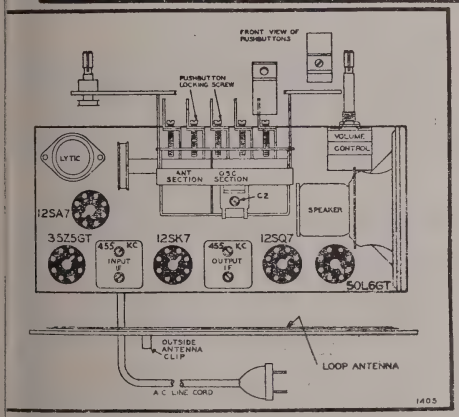
The loop antenna should be connected to the radio when making all adjustments—Loop alignment is made with the chassis mounted in the cabinet and the loop antenna connected.

NOTE "A". Turn the dial back and forth slightly to peak adjustment. Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

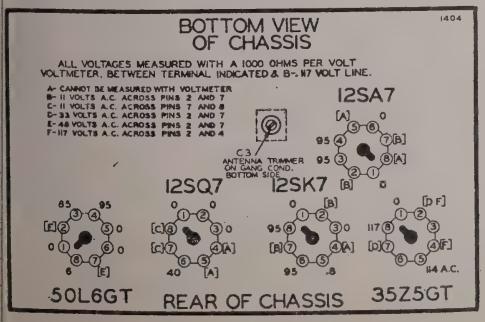
MONTGOMERY-WARD & CO.

MODELS 14BR-530A, 14BR-531A





Chassis View, showing Tube Location and the Outside Antenna Clip.


BOTTOM VIEW OF CHASSIS
1404
ALL VOLTAGES MEASURED WITH A 1000 OHMS PER VOLT VOLTMETER, BETWEEN TERMINAL INDICATED & B-. N7 VOLT LINE.
A- CANNOT BE MEASURED WITH VOLTMETER
B- 11 VOLTS A.C. ACROSS PINS 2 AND 7
C- 11 VOLTS A.C. ACROSS PINS 7 AND 8
D- 33 VOLTS A.C. ACROSS PINS 2 AND 7
E- 48 VOLTS A.C. ACROSS PINS 2 AND 7
F- 117 VOLTS A.C. ACROSS PINS 2 AND 4
C.3 ANTENNA TRIMMER ON GANG. COND. BOTTOM SIDE
12SA7
12SQ7
12SK7
50L6GT
REAR OF CHASSIS
35Z5GT
114 A.C.

Voltage Chart

SETTING THE PUSHBUTTONS

Make a list of your 5 favorite stations—push out the call letters of these stations from the call letter sheets supplied. Next insert a long slim screw driver into the hole in front of one of the pushbuttons and unscrew the pushbutton locking screw (to the left) several turns. Now with the screw driver still engaged in the locking screw slot push it all the way in. Hold it in this position and tune in the station you want with the tuning knob. Now tighten up the pushbutton locking screw by turning it to the right. Tighten firmly. Continue setting each button in the same way. When you have set your stations insert the call letter of each station in the front of the proper button and put one of the celluloid tabs over the station call letter.

To change stations simply repeat the above procedure.

If you are unable to set a station on any particular button it is probably because the pushbutton locking screw has not been unloosened (turned to the left).

ANTENNA

For best results, however, an outside antenna approximately 50 to 75 feet long including lead-in is recommended. It should be erected as high as possible and as far from surrounding objects as practical. For minimum interference it should be at right angles to street car lines, incoming power lines and other electrical apparatus which may be in the vicinity. A ground is not required.

Periodic inspection of the antenna system is recommended to be sure that all connections are clean and tight, and that the antenna is well insulated from the ground at all points.

MODELS 14BR-530A,
14BR-531A

MONTGOMERY-WARD & CO.

REPLACEMENT PARTS LIST

In ordering parts refer to model number on chassis label.

Use Only Genuine Factory Replacement Parts.

Part No.	Schematic Diagram Reference	Description	No. Used In Set	Selling Price Each
		CONDENSERS		
BE10026	C14	.02 x 400 Volt Tubular Condenser	1	.12
BE100106	C11	.004 x 600 Volt Tubular Condenser	1	.12
BE1009	C5, C7	.05 x 200 Volt Tubular Condenser	2	.12
BE100110	C1	.2 x 400 Volt Tubular Condenser	1	.12
BE1001	C6	.1 x 400 Volt Tubular Condenser	1	.12
BE10025	C9	.002 x 600 Volt Tubular Condenser	1	.12
BE11992	C12, C13	Electrolytic Filter Condenser. 50 to 60 Cycles. 20 Mfd.-40 Mfd. x 150 Volts. NOTE: BE11992 can be used on 25 to 60 cycles if set uses Electrodynamic Speaker.	1	.74
BE11993	C12, C13	Electrolytic Filter Condenser. 25 Cycles. 40 Mfd.-60 Mfd. x 150 Volts		1.24
BE1295	C8	.0001 Mica Type Condenser—20%	1	.12
BE12912	C10	.00025 Mica Type Condenser—20%	1	.12
BE12921	C4	.0002 Mica Type Condenser—20%	1	.12
		RESISTORS		
BE13026	R1	1M Ohm—½ Watt Resistor—20%	1	.10
BE1303	R9	500M Ohm—½ Watt Resistor—20%	1	.10
BE130166	R11	150 Ohm—½ Watt Resistor—10%	1	.10
BE1309	R3	200M Ohm—½ Watt Resistor—20%	1	.10
BE130257	R8	5 Megohm—½ Watt Resistor—25%	1	.10
BE1304	R5	3 Megohm—½ Watt Resistor—20%	1	.10
BE130174	R4	50 Ohm—½ Watt Resistor—10%	1	.10
BE13094	R2	50M Ohm—½ Watt Resistor—10%	1	.10
BE130287	R12	1200 Ohm—1 Watt Resistor—10%	1	.10
BE130215	R6	25 Ohm—½ Watt Resistor—10%	1	.10
BE13037	R10	750M Ohm—½ Watt Resistor—20%	1	.10
BE130293	R13	30 Ohm—1 Watt Resistor—20%	1	.10
		COILS		
BE108140K	T3	Input I.F. Coil Complete in Can	1	.62
BE108141F	T4	Output I.F. Coil Complete in Can	1	.62
BE110145	T2	Oscillator Coil	1	.36
BE111252C	T1	Loop Antenna Only (Less Back)	1	.80
BE128793		Back Only for Loop	1	
		SPEAKER		
BE114256	T6	Five Inch Electrodynamic Speaker (Less Output Transformer)	1	2.50
BE114248	T6	Five Inch P.M. Dynamic Speaker (Less Output Transformer)	1	2.50
BE105108B	T5	Output Transformer for 114248 Speaker	1	.78

Part No.	Schematic Diagram Reference	Description	No. Used In Set	Selling Price Each
		MISCELLANEOUS		
BE101265	R7, S1	Volume Control and Switch (1 Megohm)	1	.62
BE102142B	C, C2, C3	Two Gang Variable Condenser with 5 Button Automatic Tuner Assembly	1	3.80
BE10798		Line Cord and Plug	1	.30
BE121210		Eight Prong Octal Socket	5	.10
BE107249	P1	6-8 Volt Pilot Lite Bulb. Type T-47	1	.10
BE10758		Socket Assembly for Pilot Lite	1	.10
BE132264		No. 8-18 x ¼ Chassis Mounting Screws	3	.02
BE134123		Rubber Bumper for Bottom of Cabinet	4	.02
BE128655-36		Bakelite Cabinet—Walnut	1	2.40
BE128655-9		Bakelite Cabinet—Ivory Color	1	3.00
		DIAL AND TUNING PARTS		
BE112945B		Dial Plate	1	.12
BE1121022		Dial Scale	1	.24
BE112964		Pointer	1	.06
BE112969		Crystal for Dial	1	.28
BE131211		Snap-in Rivet to Fasten Dial Scale	2	.02
BE120375		String for Dial	Yd.	.12
BE120372		Coiled Tension Spring for Dial String	1	.02
BE112959		Pulley for Dial	1	.06
BE117910		Pointer Shaft	1	.06
BE117906		Tuning Shaft	1	.14
BE128699-36		Pushbutton—Walnut—Left	2	.08
BE128700-36		Pushbutton—Walnut—Right	3	.08
BE112973		Set of Station Call Letters	1	.12
BE112979		Set of Celluloid Tabs 1	Set.	.06
BE128686-37		Knob—Walnut—"Volume"	1	.12
BE128687-37		Knob—Walnut—"Tuning"	1	.12
BE128686-8		Knob—Ivory—"Volume"	1	.12
BE128687-8		Knob—Ivory—"Tuning"	1	.12
BE131383		Screw Driver	1	.06

NOTICE—There is a model number label on the chassis

This model number identifies the radio as to year, manufacturer, chassis and issue number or letter. When ordering parts or writing, be sure to mention the complete model number.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B—of radio chassis to ground post of signal generator through .1 Mfd. condenser.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted to Maximum
I. F.	455 Kc.	.1 MFD.	Grid of 12SK7 I. F.	Rotor full open (Plates out of mesh)	Two trimmers on top of Output I. F.
	455 Kc.	.1 MFD.	Grid of 12SA7 Mixer	Rotor full open (Plates out of mesh)	Two trimmers on top of Input I. F.
BROAD-CAST BAND	1600 Kc.	.1 mmf.	Grid of 12SA7	Rotor full open (Plates out of mesh)	B.C. Osc. trimmer C2 on Gang
	1400 Kc.	200 mmf.	External Antenna and B—	Set Dial at 1400 K. C.	B.C. Ant. trimmer C3 under Gang

The loop antenna should be connected to the radio and in its proper position whenmaking all adjustments.

5 TUBE AC-DC

PUSHBUTTON TUNING

NOVEMBER 1941

DIAL PILOT LIGHT

If at any time the dial pilot lite should burn out, replace it as soon as you conveniently can.

Prolonged use of the radio with the pilot lite not working may shorten the life of the 35Z5GT rectifier tube.

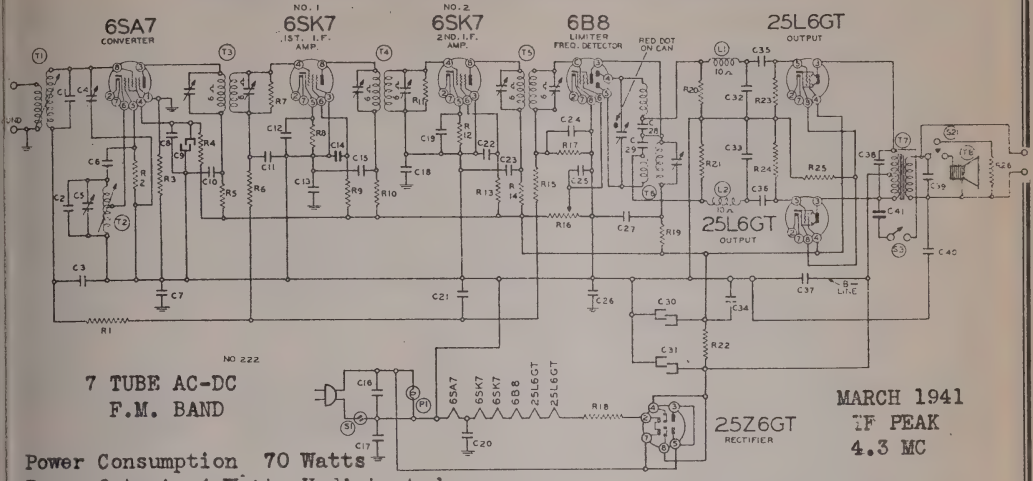
MODEL 14BR-530A
MODEL 14BR-531A

©John F. Rider

MODEL 14BR-613A

MONTGOMERY-WARD & CO.

FREQUENCY MODULATION RECEIVER AND CONVERTER



7 TUBE AC-DC
F.M. BAND

MARCH 1941

IF PEAK
4.3 MC

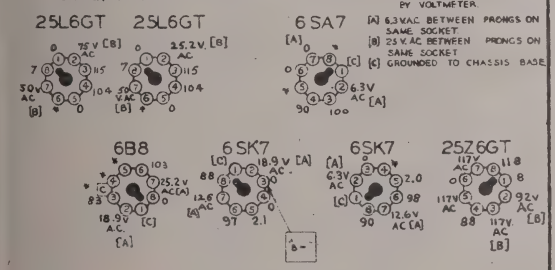
Power Consumption 70 Watts
Power Output 4 Watts Undistorted
Quieting Sensitivity: 30 Microvolts

BOTTOM VIEW OF CHASSIS

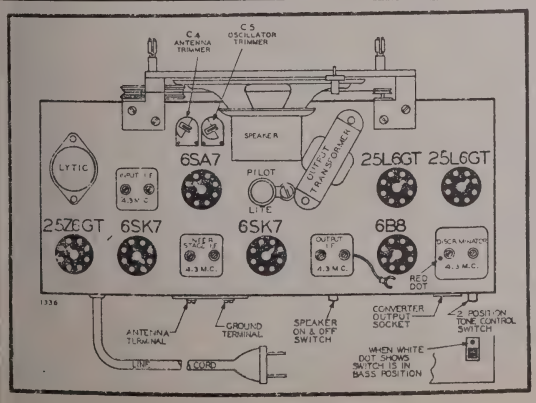
VOLTAGES MEASURED WITH A HIGH RESISTANCE VOLTMETER BETWEEN SOCKET TERMINALS AND B— LINE. VOLUME CONTROL IN MAX. POSITION AND ANTENNA TERMINAL SHORTED TO GROUND. SPEAKER SWITCH IN "OFF" POSITION.

* CANNOT BE MEASURED BY VOLTMETER.

[A] 6.3 VAC BETWEEN PRONGS ON SAME SOCKET.
[B] 25 V. AC BETWEEN PRONGS ON SAME SOCKET.
[C] GROUNDED TO CHASSIS BASE.

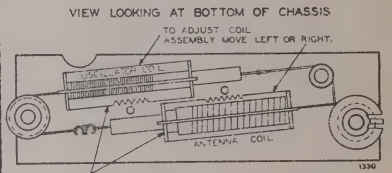


REAR OF CHASSIS



CHASSIS TOP VIEW

VIEW LOOKING AT BOTTOM OF CHASSIS



NOTE "A" THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE MOVE THE COIL ASSEMBLY VERY SLOWLY.

COIL ASSEMBLY VIEW

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control at minimum, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on the voltage chart are measured with 117 volt 60 cycle A.C. line.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

© John F. Rider

©John F. Rider

ALIGNMENT PROCEDURE

CAUTION: A—D.C. reading vacuum tube voltmeter must be used to make some of the following adjustments.

- Volume control—Minimum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Vacuum tube voltmeter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 400 ohms.

Speaker - - 5 in. P.M. Speaker

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Dial Pointer Setting	Trimmers Adjusted in Order Shown	Trimmer Function	Adjustment
I. F.	4.3 Mc.	.1 MFD.	Grid of 6SK7 No. 2	45 Mc.	Two trimmers on top of T5	Limiter I. F.	Adjust to maximum voltage (See Note "A")
	4.3 Mc.	.1 MFD.	Grid of 6SA7	45 Mc.	Two trimmers on top of T3	Input I. F.	Adjust to maximum voltage (See Notes "A" and "B")
	4.3 Mc.	.1 MFD.	Grid of 6SK7 No. 1	45 Mc.	Two trimmers on top of T4	2nd I. F.	Adjust to maximum voltage (See Notes "A" and "C")
	4.3 Mc.	.1 MFD.	Grid of 6B8	45 Mc.	Trimmer with red dot on top of T6	Disc. I. F.	Adjust to zero signal (See Note "D")
	4225 Kc. and 4375 Kc.	.1 MFD.	Grid of 6B8	45 Mc.	Trimmer without red dot on top of T6	Disc. I. F.	See Notes "D" and "E"
R. F.	50.5 Mc.	400 Ohms	Antenna Lead	50.5 Mc.	C5 C4	Osc. Ant.	Adjust to maximum voltage (See Note "A")

NOTE "A". Connect a D.C. reading vacuum tube voltmeter in parallel with C24. Use only enough signal to obtain a medium scale deflection. Use an unmodulated signal.

NOTE "B". Before aligning this stage one trimmer of T4 must be adjusted to maximum capacity and the other adjusted to minimum capacity.

NOTE "C". Do not realign or "Go Over" the I.F. adjustments after the above procedure has been followed or unsymmetrical wave shape will result.

NOTE "D". Connect an output meter across the speaker voice coil. Use a modulated signal.

NOTE "E". Adjust trimmer so that the same output reading will be obtained with the signal generator set at both 4225 K.C. and 4375 K.C. each side of the I.F. frequency. Check adjustment of trimmer with red dot after this adjustment.

REPLACEMENT PARTS LIST

Part No.	Schematic Diagram Reference	Description	No. Used In Set
CONDENSERS			
BE10026	C41	.02 x 400 Volt Tubular Condenser	1
BE1001	C16	.1 x 400 Volt Tubular Condenser	1
BE10078	C3, C8, C10, C11, C12, C14, C15, C19, C22, C23, C27, C34, C35, C36, C39, C40	.01 x 200 Volt Tubular Condenser	16
BE10093	C7, C13, C17, C18, C20, C26, C27	.05 x 200 Volt Tubular Condenser	7
BE10020	C21, C25	.1 x 200 Volt Tubular Condenser	2
BE10011	C38	.01 x 400 Volt Tubular Condenser	1
BE119121	C31, C30	Electrolytic Filter Condenser 40 Mfd. x 150 Volts—60 Mfd. x 150 Volts	1
BE119122	C9	Electrolytic Filter Condenser 10 Mfd. x 150 Volts	1
BE124164	C4, C5	Ant. and Osc. Adjustable Trimmer Condensers	2
BE12921	C28, C29	.0002 Mica Type Condenser—20%	2
BE1295	C6, C24, C32, C33	.0001 Mica Type Condenser—20%	4
BE129173	C2	.000035 Ceramicon Condenser—5%	1
BE129174	C1	.00001 Ceramicon Condenser—5%	1
RESISTORS			
BE1301	R2	25M Ohm—½ Watt Resistor—20%	1
BE13020	R1, R6	100M Ohm—½ Watt Resistor—20%	2
BE13023	R4, R5, R9, R10, R13, R14, R19	2M Ohm—½ Watt Resistor—20%	7
BE13019	R15	1 Megohm—½ Watt Resistor—20%	1
BE130100	R3	150M Ohm—½ Watt Resistor—20%	1
BE130239	R8, R12	250 Ohm—½ Watt Resistor—20%	2
BE130102	R20, R21, R23, R24	500M Ohm—½ Watt Resistor—10%	4
BE130338	R11	175M Ohm—½ Watt Resistor—5%	1
BE130341	R17	200M Ohm—½ Watt Resistor—5%	1
BE130337	R7	110M Ohm—½ Watt Resistor—5%	1
BE130336	R25	75 Ohm—1 Watt Resistor—10%	1
BE130335	R22	350 Ohm—1 Watt Resistor—20%	1
BE10664	R18	60 Ohm—6 Watt Wire Wound Resistor—10%	1
BE10665	R26	3 Ohm—1 Watt Wire Wound Resistor—10%	1
COILS			
BE108189	T3	Input I.F. Coil Complete in Can 4.3 Mc.	1
BE108190	T4	2nd I.F. Coil Complete in Can 4.3 Mc.	1
BE108191	T5	Limiter I.F. Coil Complete in Can 4.3 Mc.	1
BE108192	T6	Discriminator I.F. Coil Complete in Can 4.3 Mc.	1
BE1365	T1, T2	Ant. and Osc. Coil Permeability Tuning Unit Complete	1
BE12312	L1, L2	R.F. Choke Coil	2
SOCKETS			
BE121211		Eight Prong Wafer Octal Socket—"6SA7"	1
BE121313		Eight Prong Wafer Octal Socket—"6B8"	1
BE121314		Eight Prong Wafer Octal Socket—"25L6"	2
BE121315		Eight Prong Wafer Octal Socket—"25Z6"	1
BE121298		Eight Prong Wafer Octal Socket—"6SK7"—With Shield for Tube Guide Pin	2
BE121216		Bakelite Socket Base for Filter Condenser	1
SPEAKER			
BE114235	T8	Five Inch P.M. Dynamic Speaker—Less Output Transformer	1
BE105126	T7	Output Transformer for Speaker	1

Tuning Frequency Range - - 42 to 50 MC

Intermediate Frequency - - - 4.3 MC

MISCELLANEOUS

BE101247	R16, S1	Volume Control and Switch	1
BE1075		Line Cord and Plug	1
BE107288		Socket Assembly for Pilot Lite	1
BE107290	P1	Pilot Lite Bulb 110 V. 7.5 Watts	1
BE12561	S2	Speaker Switch	1
BE13262		No. 10—32 x ¾ Inch Chassis Mounting Bolts	4
BE128230-1		Bakelite Knob—"Volume"	1
BE128233-1		Bakelite Knob—"Tuning"	1
BE107357		Convertor Connection Cable Assembly	1
BE12588B	S3	Tone Control Switch	1

DIAL PARTS

BE112875	Glass Crystal for Dial	1
BE115674	Dial Bracket with Pulley	2
BE112905	Dial Scale	1
BE131211	Snap-in Rivets to Fasten Dial Scale	4
BE112683	Drive Pulley with Bushing	1
BE1209	String for Dial	3' Yd.
BE120285	Coiled Tension Spring for Dial String	1
BE112680E	Pointer	1

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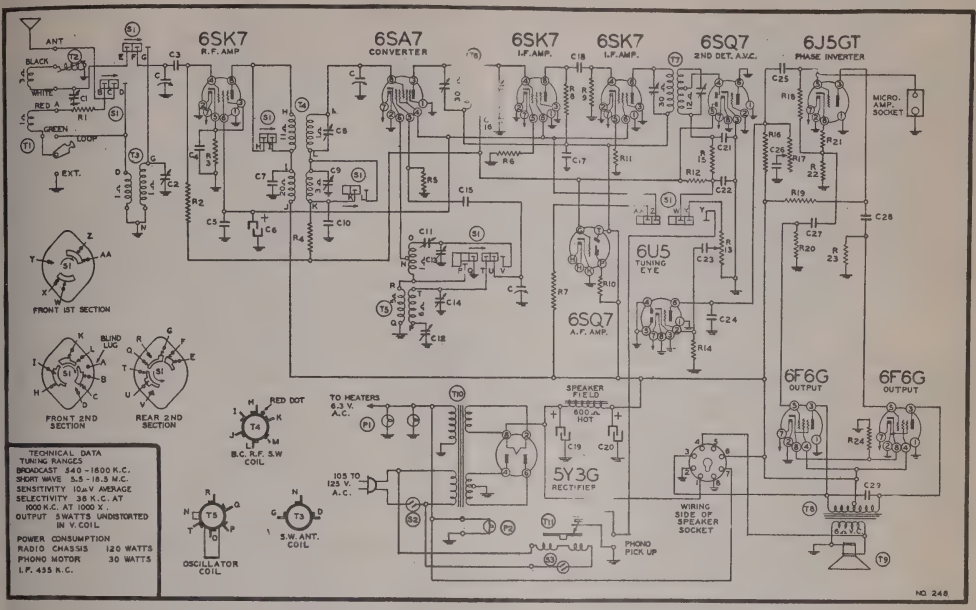
MONTGOMERY-WARD & CO.



TECHNICAL DATA
TUNING RANGES
BROADCAST 540 - 1600 K.C.
SHORT WAVE 5.5 - 18.5 M.C.
SENSITIVITY 10μV AVERAGE
SELECTIVITY 36 K.C. AT 1000 K.C. AT 1000 K.
OUTPUT 5 WATTS UNDISTORTED IN V. COIL

POWER CONSUMPTION
RADIO CHASSIS 120 WATTS
PHONO MOTOR 30 WATTS
I.F. 455 K.C.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect dummy antenna value in series with generator output lead.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Maximum (in Order Shown)
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top Output I. F.
	455 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top Input I. F.
SHORT WAVE BAND	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	C13, S.W. Osc.
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	C8, S.W. R.F., C2 S.W. Antenna
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	C11 S.W. Osc. Series Pad See Note "A"
BROAD-CAST BAND	1580 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Rotor full open (Plates out of mesh)	C14 B.C. Osc.
	540 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Set Dial at 540 Kc. (Plates in Mesh)	C12 B.C. Osc. Series Pad
	1400 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Set Dial at 1400 Kc.	C9 B.C. R.F.
LOOP ALIGN-MENT	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	C1 B.C. Ant.
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	T2 Iron Core Tracking Coil

NOTE "A"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

After each band is completed, repeat the procedure as a final check.

FOR OAK RC-1 RECORD CHANGER
SEE RIDER'S
"AUTOMATIC RECORD CHANGERS AND RECORDERS"

MODEL 14BR-1112A

MONTGOMERY-WARD & CO.

REPLACEMENT PARTS LIST

In ordering parts refer to model number on chassis label

Part No.	Schematic Diagram Reference	Description	No. Used In Set	Selling Price Each
CONDENSERS				
BE102152	C	Three Gang Variable Condenser	1	3.00
BE10020	C4	.1 x 200 Volt Tubular Condenser	1	.10
BE10026	C10, C16, C25	.02 x 400 Volt Tubular Condenser	3	.10
BE10025	C23	.002 x 600 Volt Tubular Condenser	1	.10
BE1009	C27	.05 x 200 Volt Tubular Condenser	1	.10
BE10013	C28	.05 x 400 Volt Tubular Condenser	1	.10
BE10011	C26	.01 x 400 Volt Tubular Condenser	1	.10
BE10071	C29	.004 x 600 Volt Tubular Condenser	1	.10
BE100117	C5, C17	.25 x 400 Volt Tubular Condenser	2	.20
BE119124	C6, C19, C20	Electrolytic Filter Condenser—10 Mfd. x 350 V.; 25 Mfd. x 450 V.; 25 Mfd. x 450 V.	1	.90
BE124180	C2	S.W. Antenna Trimmer	1	.44
BE124179	C8, C9	S.W. and B.C. R.F. Trimmer—Dual	1	.36
BE124181	C13, C14	S.W. and B.C. Osc. Trimmer—Dual	1	.24
BE124182	C1	B.C. Antenna Trimmer	1	.12
BE129157	C12	.000525 Compression Cond.—B.C. Pad	1	.22
BE1292	C3, C18	.0005 Mica Type Condenser—20%	2	.12
BE129160	C7	.0004 Mica Type Condenser—20%	1	.12
BE12939	C15	.00005 Mica Type Condenser—20%	1	.12
BE1295	C21, C22	.0001 Mica Type Condenser—20%	2	.12
BE129156	C11	.0024 Compression Mica Condenser	1	.30
BE12912	C24	.00025 Mica Type Condenser—20%	1	.12
RESISTORS				
BE101270	R13, S2	Volume Control and Switch (500M Ohms)	1	.62
BE101271	R17	Tone Control (1 Megohm)	1	.50
BE13019	R2, R18	1 Megohm—½ Watt Resistor—20%	2	.10
BE1305	R4	300M Ohm—½ Watt Resistor—20%	1	.12
BE130208	R5	40M Ohm—½ Watt Resistor—20%	1	.10
BE13054	R6, R11	500 Ohm—½ Watt Resistor—20%	2	.10
BE130263	R8	12M Ohm—½ Watt Resistor—20%	1	.10
BE13020	R9, R19, R22	100M Ohm—½ Watt Resistor—20%	3	.10
BE130304	R7	12M Ohm—2 Watt Resistor—10%	1	.10
BE13012	R15	50M Ohm—½ Watt Resistor—20%	1	.10
BE130170	R12	3 Megohm—½ Watt Resistor—25%	1	.10
BE130225	R14	15 Megohm—½ Watt Resistor—30%	1	.10
BE13043	R21	2500 Ohm—½ Watt Resistor—20%	1	.10
BE1303	R20, R23	500M Ohm—½ Watt Resistor—20%	2	.10
BE13011	R16	250M Ohm—½ Watt Resistor—20%	1	.10
BE130311	R24	300 Ohm—1 Watt Resistor—20%	1	.10
BE13099	R3	300 Ohm—½ Watt Resistor—20%	1	.10
BE13024	R1	400 Ohm—½ Watt Resistor—20%	1	.10
	R10	1 Megohm—In Eye Socket	1	.10
COILS				
BE108169J	T6	Input I.F. Coil Complete in Can	1	.76
BE108130C	T7	Output I.F. Coil Complete in Can	1	.76
BE10957	T4	B.C.—S.W. R.F. Coil Complete in Can	1	.70
BE110149	T5	B.C.—S.W. Oscillator Coil	1	.50
BE111176	T3	S.W. Antenna Coil	1	.30
BE111153	T2	Loop Adjusting Coil With Iron Slug	1	.30
BE111257	T1	Loop Antenna Assembly	1	1.20
SPEAKER				
BE114261	T9	Ten Inch Electrodynamic Speaker (Less Output Transformer)	1	4.00

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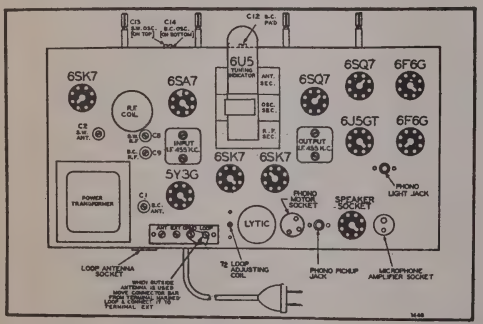
PRICES SUBJECT TO CHANGE WITHOUT NOTICE



CHASSIS VIEW

ANTENNA AND GROUND TERMINALS

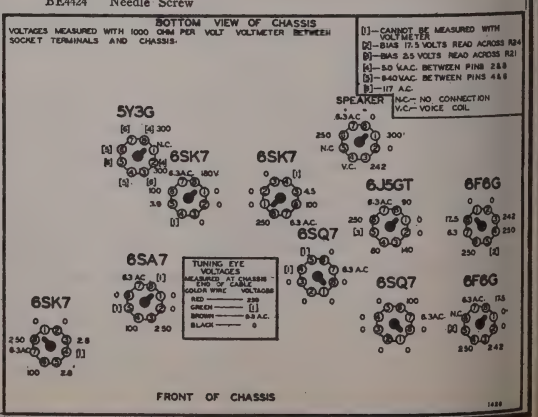
When using an external antenna and ground, move the metal strap (connector bar) from terminal marked LOOP and connect it to terminal marked EXT.

The antenna and ground wires should then be connected to the terminals marked "Ant."—"Gnd."

Part No.	Schematic Diagram Reference	Description	No. Used In Set	Selling Price Each
TRANSFORMERS				
BE10554F	T8	Output Transformer for Speaker	1	1.00
BE104202C	T10	Power Transformer. 50 to 60 Cycles 105-125 Volt Primary	1	3.00
BE104203C		Power Transformer 25 to 60 Cycles 105-125 Volt Primary		
BANDSWITCH				
BE125179	S1	Band switch Complete	1	.90
MISCELLANEOUS				
BE107266		Line Cord and Plug	1	.30
BE13489		Rubber Cushions to Float Chassis	4	.06
BE121308		Eight Prong Octal Molded Socket for Speaker	1	.10
BE121210		Eight Prong Octal Molded Socket	10	.10
BE107169		Socket and Cable Assembly for Tuning Eye	1	.50
BE10794	P1	6-8 Volt Pilot Lite Bulb Type T-44	2	.10
BE107387C		Socket Assembly for Pilot Lite	2	.10
BE11757A		Bracket for Tuning Eye	1	.08
BE11757B		Clamp for Tuning Eye	1	.08
BE11757C		Wing Bolt for Above	1	.04
DIAL AND TUNING PARTS				
BE112992		Dial Scale	1	.48
BE112530		Clips to Fasten Dial Scale 4	Dz.	.06
BE112967-38		Escutcheon for Dial	1	.70
BE112966		Light Rod for Dial	1	.36
BE112957		Pointer	1	.14
BE128686B-38		Knob—"Volume"	1	.12
BE128687-38		Knob—"Tuning"	1	.12
BE128688B-38		Knob—"Tone"	1	.12
BE128683-38		Knob—"Band"	1	.12
BE117918		Tuning Shaft	1	.06
BE115688		Bracket for Tuning Shaft	1	.06
BE131142		"C" Washer for Tuning Shaft 2	Dz.	.08
BE112826		Pulley with Bushing	1	.16
BE1209		String for Dial	Yd.	.12
BE120197		Coiled Tension Spring for Dial String	1	.04
BE115759		Dial Plate Assembly Complete with Pulleys and Brackets	1	.30
RECORD CHANGER COMPARTMENT				
BE104267		Automatic Record Changer Complete. 115 Volts A.C. 60 Cycles	1	
BE104276		Automatic Record Changer Complete. 115 Volts A.C. 25 Cycles		
BE104277		Automatic Record Changer Complete. 115 Volts A.C. 50 Cycles		
BE10794	P2	Indicator Light Bulb	1	.10
BE107388		Socket Assembly for Pilot Lite	1	.26
BE1121007		Amber Jewel Indicator	1	.12

RECORD CHANGER PARTS LIST

BE4316	Motor, 60 Cycle 115 Volt
BE4422	Motor Mounting Kit consists of rubber grommets, screws, sleeves, washers, and nuts
BE4233	Motor Mounting Grommet
BE3231	Motor On-Off Switch
BE4406	Line Cord and Plug
BE4425	Rubber Idler Wheel with Spring Clip
BE0-4324	Idler Wheel Tension Spring
BE0-4319	Turntable
BE4423	Upper and Lower Shelf Blade Assembly
BE4426	Pickup Cartridge (N1 or L40) with screws
BE4428	Pickup Arm Assembly complete less cartridge
BE4292	Rubber Pickup Rest Bumper
BE4262	Reject Return Spring
BE4427	Reject, 10"-12", or Auto-Man Buttons with screws
BE4424	Needle Screw



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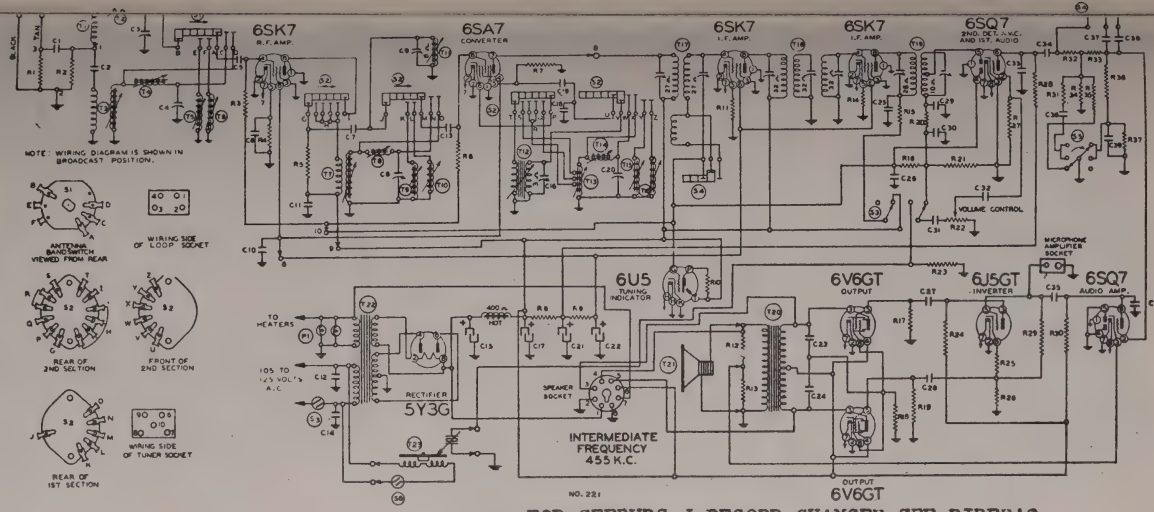


FOR SEEBURG J RECORD CHANGER, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS"

Code No.	Part No.	Description
		RESISTORS
R1	130232	25M ohm—½ w.
R2	130232	25M ohm—½ w.
R3	13019	1 megohm—½ w.
R4	130239	250 ohm—½ w.
R5	130218	5M ohm—½ w.
R6	13019	1 megohm—½ w.
R7	130232	25M ohm—½ w.
R8	130318	6M ohm—2 w.
R9	130319	10M ohm—2 w.
R10		1 megohm in tuning indicator cable
R11	13016	900 ohm—½ w.
R12	13082	10M ohm—½ w.
R13	130235	1500 ohm—½ w.
R14	130192	2M ohm—½ w.
R15	130192	2M ohm—½ w.
R16	13019	1 megohm—½ w.
R17	1303	500M ohm—½ w.
R18	130317	250 ohm—2 w.
R19	1303	500M ohm—½ w.
R20	13094	50M ohm—½ w.
R21	130316	120M ohm—½ w.
R22	101229	500M ohm volume control
R23	1303	500M ohm—½ w.
R24	13094	50M ohm—½ w.
R25	130218	5M ohm—½ w.
R26	13094	50M ohm—½ w.
R27	130257	5 Megohm—½ w.
R28	130172	250M ohm—½ w.
R29	1303	500M ohm—½ w.
R30	130172	250M ohm—½ w.
R31	130232	25M ohm—½ w.
R32	13080	150M ohm—½ w.
R33	130309	350M ohm—½ w.
R34	130172	250M ohm—½ w.
R35	13066	75M ohm—½ w.
R36	13080	150M ohm—½ w.
		CONDENSERS
C1	1292	.0005 mica
C2	10047	.002 x 600 v.
C3	124143	B.C. antenna trimmer
C4	124143	9 mc. antenna trimmer
C5	1292	.0005 mica
C6	10020	.1 x 200 v. tubular
C7	129168	.00001 mica
C8	124138	9 mc. R.F. trimmer
C9	124139	B.C. R.F. trimmer
C10	10074	.1 x 400 v.
C11	10074	.1 x 400 v.
C12	10061	.02 x 600 v.
C13	1292	.0005 mica
C14	10061	.02 x 600 v.
C15	119112	30.0 mfd. lytic
C16	124144	B.C. oscillator trimmer
C17	119112	30.0 mfd. lytic x 450 w.v.
C18	129167	.0002 silver mica
C19	129165	.00005 mica
C20	124145	9 mc. oscillator trimmer
C21	119112	10.0 mfd. lytic
C22	11969	.16 mfd. x 350 w.v.
C23	10065	.015 x 600 v.
C24	10065	.015 x 600 v.
C25	1001	.1 x 400 v.
C26	10020	.1 x 200 v.
C27	10013	.05 x 400 v.
C28	1009	.5 x 200 v.
C29	1295	.0001 mica
C30	1295	.0001 mica
C31	10020	.1 x 200 v.
C32	10019	.006 x 600 v.
C33	12912	.00025 mica
C34	1001	.1 x 400 v.
C35	10013	.05 x 400 v.
C36	100118	.008 x 600 v.
C37	12938	.00005 mica
C38	129166	.000125 mica
C39	10037	.003 x 600 v.
C40	12912	.00025 mica

C3 and C4 in same unit

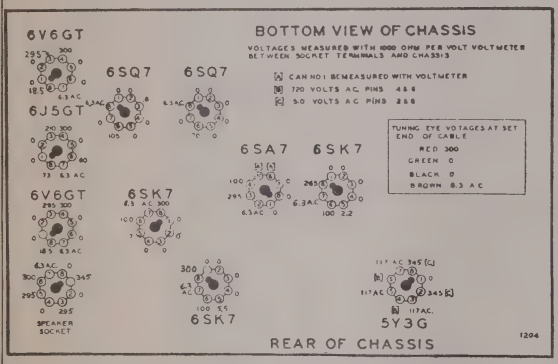
C15, C17 and C21 in same unit

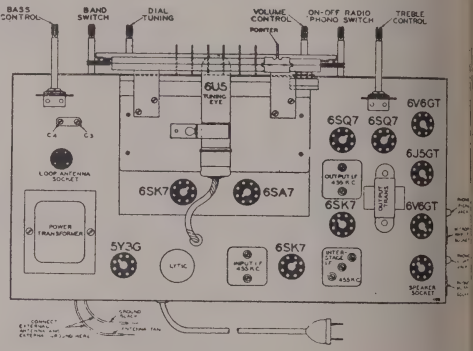
		PARTS
T1	111237	Loop antenna assembly
T2	111195	B.C. antenna coil
T3	111190	9 mc. antenna coil
T4	111189	6 mc. antenna coil
T5	111191	12 mc. antenna coil
T6	111192	15 mc. antenna coil
T7	10959	9 mc. R.F. coil
T8	10958	6 mc. R.F. coil
T9	10960	12 mc. R.F. coil
T10	10961	15 mc. R.F. coil
T11	10962	B.C. R.F. coil
T12	110161	B.C. oscillator coil
T13	110157	9 mc. oscillator coil
T14	110156	6 mc. oscillator coil
T15	110158	12 mc. oscillator coil
T16	110159	15 mc. oscillator coil
T17	108181	Input I.F. coil—455 kc.
T18	108155B	Interstage I.F. coil
T19	108182	Output I.F. coil—455 kc.
T20	105115	Output Transformer
T21	114209	12" dynamic speaker
T22	104217	Power transformer—50/60 cycles
	104218	Power transformer—25 cycle
T23	104258	Automatic record changer, Seeburg 50 cycle completed with turntable
	104257	Automatic record changer, complete—25 cycle Seeburg—with turntable
	104252	Automatic record changer—Seeburg—60 cycle complete with turntable
S1	125154	Antenna bandswitch
S2	125122	R.F.—oscillator bandswitch
S3	125150	On-off radio phono switch
S4	125151	Treble switch
S5	125152	Bass switch
S6		Switch on record changer
P1	10794	2 6-8 volts pilot light T44

MODEL 14BR-1113

MONTGOMERY-WARD & CO.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted in Order Shown	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Output I. F.	Adjust to Maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	Two Trimmers on Top	Input I. F.	Adjust to Maximum output
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C20 (See Trimmer View) C8 (See Trimmer on Top) C4	Osc. R. F. Ant.	Adjust to Maximum output
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14 (See Trimmer View) T8 (See Trimmer View) T4	Osc. R. F. Ant.	Adjust to Maximum output
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15 (See Trimmer View) T9 (See Trimmer View) T5	Osc. R. F. Ant.	Adjust to Maximum output
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16 (See Trimmer View) T10 (See Trimmer View) T6	Osc. R. F. Ant.	Adjust to Maximum output
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C16 (See Trimmer View) C9 (See Trimmer on Top) C3	Osc. R. F. Ant.	Adjust to Maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11 Rotate Core T2 (See Iron Core Adjustment View)	R. F. Ant.	Adjust to Maximum output





Power Consumption
Radio Only - - - - 120 Watts

Power Output - - - 10 Watts
Undistorted

Sensitivity for 500 Milliwatt Output: - 10 Microvolts Average

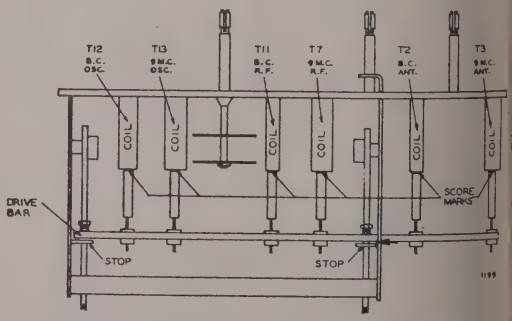
Selectivity - 27 KC Broad at 1000 Times Signal at 1000 KC

Tuning Frequency Range Broadcast Band - - 540 to 1600 KC

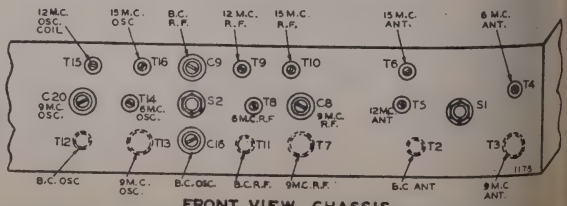
49M Band - 5.9 to 6.1 MC
31M Band - 9.1 to 10 MC
25M Band -11.4 to 12.1 MC
19M Band -14.9 to 15.4 MC

Intermediate Frequency - - - 455 KC

Speaker - - 12 in. Electro Dynamic



IRON CORE ADJUSTMENT VIEW



FRONT VIEW CHASSIS

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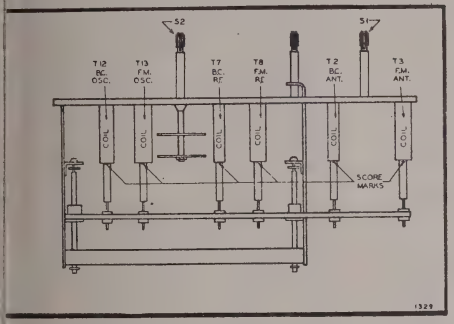
ALIGNING INSTRUCTIONS

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltage, defective tubes, condensers and resistors. In order to properly align this radio, the chassis should be removed from the cabinet. Although the short wave bands on this radio are of the band spread type the Alignment Procedure is not difficult. However because each short wave scale covers only a small portion of the short wave spectrum you must do the work carefully and your oscillator must be accurate.

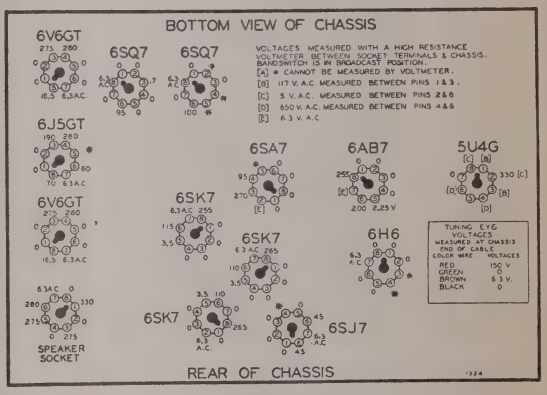
Do not realign the band spread scales unless you are positive they are out of adjustment. When adjustment is necessary proceed as follows.

Rotate each iron core until the fine score marks are even with the edge of the coil forms.

You are now ready to continue with the trimmer adjustments as shown on the alignment chart.



IRON CORE ADJUSTMENT VIEW



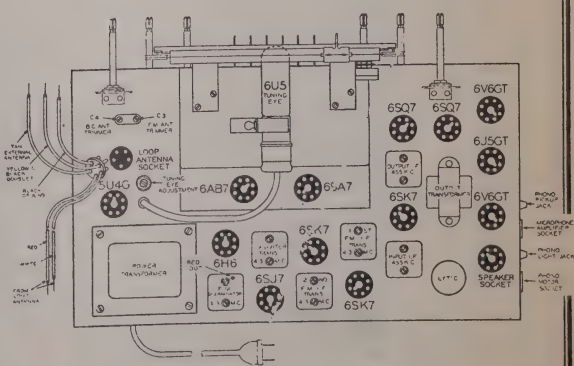
VOLTAGE CHART

SETTING PUSHBUTTONS

Make a list of your 6 favorite stations. Push out the call letters of these stations from the call letter sheets supplied. Insert a call letter in the slot on top of each pushbutton.

Next pull one of the pushbuttons all the way out as far as it will come (pull, with fingers on top and bottom of button). Now tune in the station you want with the tuning knob—Tune back and forth until the station is clear and distinct. Now push the button hard all the way in to lock the station in place. (push directly on front of button) Continue setting each pushbutton in the same way. Pressing the proper button will now tune the station you want. If it does not do so you did not push the button hard enough to lock in place when setting up the station.

To change stations simply repeat the procedure above.



CHASSIS TOP VIEW

FOR SEEBURG MODEL B AUTOMATIC RECORD CHANGER, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".

MODEL 14BR-1400A
MODEL 24BR-1401B

MONTGOMERY-WARD & CO.

MODEL 42BR-1401B REPLACEMENT PARTS LIST

In ordering parts refer to model number on chassis label

Use Only Genuine Factory Replacement Parts

MAIN CHASSIS PARTS LIST

Part No.	Schematic Diagram Reference	Description	No. Selling Used In Set	Price Each
		CONDENSERS		
BE1001	C39, C50	.1 x 400 Volt Tubular Condenser	2	.12
BE1009	C27, C48, C60	.05 x 200 Volt Tubular Condenser	3	.12
BE10011	C11, C13, C21, C22, C32	.01 x 400 Volt Tubular Condenser	5	.12
BE10013	C61, C63	.05 x 400 Volt Tubular Condenser	2	.12
BE10012	C58	.003 x 600 Volt Tubular Condenser	1	.12
BE10019	C46	.006 x 600 Volt Tubular Condenser	1	.12
BE10020	C26, C36, C43, C47	.1 x 200 Volt Tubular Condenser	4	.12
BE10061	C37, C38	.02 x 600 Volt Bakelite Condenser	2	.16
BE10065	C59, C64	.015 x 600 Volt Tubular Condenser	2	.12
BE10078	C6, C16	.01 x 200 Volt Tubular Condenser	2	.12
BE100118	C51	.008 x 600 Volt Tubular Condenser	1	.12
BE100123	C34, C35	.02 x 200 Volt Tubular Condenser	2	.12
BE11973B	C54	16 Mfd. x 400 Volt Electrolytic filter Cond.	1	.60
BE11969	C12	16 Mfd. Electrolytic Filter Condenser 350 Volts	1	.74
BE119112	C49, C52, C53	30 Mfd.—30 Mfd.—10 Mfd.—450 Volts Electrolytic Filter Condenser	1	1.30
BE1292	C1	.0005 Mica Type Condenser—20%	1	.12
BE1295	C33, C41, C44	.0001 Mica Type Condenser—20%	3	.12
BE12912	C45, C62	.00025 Mica Type Condenser—20%	2	.12
BE12938	C24, C55	.00005 Mica Type Condenser—10%	2	.12
BE129166	C56	.000125 Mica Type Condenser—10%	1	.12
BE129161	C40, C42	.0001 Dual Mica Type Condenser—10%	1	.14
		RESISTORS		
BE13026	R23	1M Ohm—½ Watt Resistor—20%	1	.10
BE130163	R28, R29	400M Ohm—½ Watt Resistor—10%	2	.10
BE1304	R37	3 Megohm—½ Watt Resistor—20%	1	.10
BE13023	R6, R10, R13, R14, R22, R27	2M Ohm—½ Watt Resistor—20%	6	.10
BE130291	R24	50M Ohm—1 Watt Resistor—10%	1	.10
BE1303	R49, R54, R58	500M Ohm—½ Watt Resistor—20%	3	.10
BE130149	R18	15M Ohm—½ Watt Resistor—20%	1	.10
BE13019	R17, R31, R33, R35	1 Megohm—½ Watt Resistor—20%	4	.10
BE13020	R20	100I Ohm—½ Watt Resistor—20%	1	.10
BE130232	R1, R2, R39	25M Ohm—½ Watt Resistor—10%	3	.10
BE130319	R45	10M Ohm—2 Watt Resistor—10%	1	.10
BE130199	R46	1500 Ohm—1 Watt Resistor—10%	1	.10
BE130172	R16, R25, R38, R32, R41, R56	250M Ohm—½ Watt Resistor—10%	6	.10
BE130235	R61	1500 Ohm—½ Watt Resistor—10%	1	.10
BE13082	R60	10M Ohm—½ Watt Resistor—10%	1	.10
BE130317	R53	250 Ohm—2 Watt Resistor—10%	1	.10
BE13081	R26	250 Ohm—½ Watt Resistor—20%	1	.10
BE130218	R55	5M Ohm—½ Watt Resistor—10%	1	.10
BE13094	R30, R52, R57	50M Ohm—½ Watt Resistor—10%	3	.10
BE130146	R48	2 Megohm—½ Watt Resistor—10%	1	.10
BE130342	R11	350M Ohm—½ Watt Resistor—5%	1	.10
BE13080	R40, R47	150M Ohm—½ Watt Resistor—10%	2	.10
BE130339	R5, R12	350 Ohm—½ Watt Resistor—20%	2	.10
BE130309	R42	350M Ohm—½ Watt Resistor—10%	1	.10
BE13066	R43	75M Ohm—½ Watt Resistor—10%	1	.10
BE130172	R34	250M Ohm—½ Watt Resistor—10%	1	.10
		COILS		
BE108177D	T17	Input I.F. Coil Complete in Can—455 Kc.	1	.76
BE108176B	T18	Output I.F. Coil Complete in Can—455 Kc.	1	.76
BE108197	T19	First F.M. I.F. Coil Complete in Can—4.3 Mc.	1	.86
BE108198	T20	Second F.M. I.F. Coil Complete in Can—4.3 Mc.	1	.86
BE108197B	T21	Limiter F.M., I.F. Coil Complete in Can 4.3 Mc.	1	.86
BE108199	T22	Discriminator F.M. I.F. Coil Complete in Can—4.3 Mc.	1	.86
BE111267	T1	Loop Antenna Assembly	1	1.90
		TRANSFORMERS		
BE104262	T23	Power Transformer 50 to 60 Cycles 105-125 Volt Primary	1	4.80
BE105115	T24	Output Transformer for Speaker	1	1.00
		SPEAKER		
BE114237	T25	Twelve Inch Electrodynamic Speaker—Less Output Transformer	1	6.90
BE105115	T24	Output Transformer for Speaker	1	1.00
		MISCELLANEOUS		
BE101249	R36	Volume Control—1 Megohm	1	.50
BE101248	R44	Control for Tuning Eye 25M Ohms	1	.40
BE125125	S5	Phono-On-Off Switch	1	.70
BE125123	S4	Tone Switch—Base	1	.50
BE125149	S3	Tone Switch—Treble	1	.50
BE11622	B1	Bias Cell—1.25 Volt Potential	1	.16
BE11627		Clip for Bias Cell	1	.10
BE107359	R51	Tuning Eye Socket and Cable Assembly 1 Meg. Resistor in Socket	1	.38
BE10794	P1	Pilot Lite Bulb—6 Volt—Type T-44	2	.10
BE107329		Pilot Lite Socket Assembly—Right	1	.08
BE107330		Pilot Lite Socket Assembly—Left	1	.08
BE107259		Shield for Pilot Lites	2	.02
BE1075		Line Cord and Plug	1	.30
BE115589		Link for Band Switches	1	.10
BE11712		Switch Arm—With Bushing and Set Screws	2	.08
BE13130		Spring Washer for Above	2	.02
BE112782-35		Escutcheon—Complete With Crystal	1	1.70
BE112810		Crystal Only for Escutcheon	1	.32
BE128506-28		Tenite Knob—Plain	4	.12
BE128520-28		Tenite Knob—"Volume"	1	.12
BE128521-28		Tenite Knob—"Tuning"	1	.12
BE115676		Compensator Slug—For Slot in Band Switch Shaft Only	1	
BE128504-29		Transparent Pushbuttons for Lever Sleeves	6	.08
BE128505-28		Bakelite Pushbutton Sleeves for Levers	6	.10
BE112808		Set of Station Call Letters	1	.20

TUNER CHASSIS PARTS LIST

Part No.	Schematic Diagram Reference	Description	No. Selling Used In Set	Price Each
		CONDENSERS		
BE1001	C9	.1 x 400 Volt Tubular Condenser	1	.12
BE10020	C8	.1 x 200 Volt Tubular Condenser	1	.12
BE10026	C14	.02 x 400 Volt Tubular Condenser	1	.12
BE10047	C2	.002 x 600 Volt Tubular Condenser	1	.12
BE10074	C10, C31	.1 x 400 Volt Tubular Condenser—With Bracket	2	.20
BE124162	C19	F.M. Band R.F. Trimmer	1	.12
BE124139	C18	B.C. Band R.F. Trimmer	1	.16
BE124161	C25	B.C. Band Osc. Trimmer	1	.12
BE124145	C30	F.M. Band Osc. Trimmer	1	.24
BE124163	C3, C4	F.M. and B.C. Dual Antenna Trimmer	1	.24
BE1292	C7, C23	.0005 Mica Type Condenser —20%	2	.12
BE11969	C57	16 Mfd. Electrolytic Condenser—350 Volts	1	.74
BE1295	C29	.0001 Mica Type Condenser—20%	1	.12
BE129167	C5, C17	.0002 Silver Mica Type Condenser—3%	2	.16
BE129168	C15	.00001 Mica Type Condenser—20%	1	.12
BE129175	C28	.000135 Silver Mica Type Condenser—3%	1	.16
BE129182	C20	.000008 Liquid Dielectric Condenser	1	.24
		RESISTORS		
BE13019	R3, R15	1 Megohm—½ Watt Resistor—20%	2	.10
BE13023	R9, R21	2M Ohm—½ Watt Resistor—20%	2	.10
BE13076	R7	30M Ohm—½ Watt Resistor—20%	1	.10
BE130215	R59	25 Ohm—½ Watt Resistor—10%	1	.10
BE130232	R19	25M Ohm—½ Watt Resistor—10%	1	.10
BE130235	R8	1500 Ohm—½ Watt Resistor—10%	1	.10
BE13084	R4	200 Ohm—½ Watt Resistor—10%	1	.10
		MISCELLANEOUS		
BE120373		Spring Clip Washer for Coils	9	.02
BE131316B		"C" Washer for Coils	3	.02
BE125148	S1	Antenna Band Switch	1	.60
BE125147	S2	R.F.—Osc.—Audio Switch	1	1.00
BE11757A		Bracket for Tuning Eye	1	.08
BE11757B		Clamp for Tuning Eye	1	.08
BE11757C		Wing Bolt for Bracket and Clamp	1	.04
BE112907		Dial Scale	1	.86
		COILS		
BE10962	T7	B.C. R.F. Coil—With Slug		.70
BE10964	T9	9 Mc. R.F. Coil—With Adjusting Slug		.56
BE10966	T10	12 Mc. R.F. Coil—With Adjusting Slug		.20
BE10965	T11	15 Mc. R.F. Coil—With Adjusting Slug		.16
BE10967	T8	F.M. Band R.F. Coil—With Slug		.70
BE110161	T12	B.C. Osc. Coil		.64
BE110175	T14	9 Mc. Osc. Coil		.64
BE110177	T15	12Mc. Osc. Coil		.20
BE110176	T16	15 Mc. Osc. Coil		.16
BE110178	T13	F.M. Band Osc. Coil		.70
BE111195	T2	B.C. Ant. Coil		.70
BE111233	T4	9 Mc. Ant. Coil		.56
BE111234	T5	12 Mc. Ant. Coil		.20
BE111235	T6	15 Mc. Ant. Coil		.16
BE111232	T3	F.M. Band Ant. Coil		.70
		TUNER MECHANICAL PARTS		
BE115680		Right Drive Link—With Studs	1	.06
BE115680B		Left Drive Link—With Studs	1	.06
BE115682		Connecting Link for Both Right and Left Drive Links	2	.02
BE120393		Spring for Intermediate Link	1	.06
BE120394		Spring for Arms	3	.02
BE115582		Slug Tuning Bar	1	.12
BE117944		Drive Rod—With Ball on End	2	.10
BE115683		Ball Retainer Spring	2	.02
BE134136		Rubber Bushings for Tuning Bar	2	.02
BE131251		"C" Washer for Drive Rod	4	.03 Dz.
BE120392		Spring Washer for Drive Rod	2	.04 Dz.
BE134134		Core Mounting Grommet—With Insert	6	.02
BE115611		Pointer Bar	1	.08
BE115685		Retainer Spring for Cam Locking Spring	6	.02
BE120214		Pointer String—Silk Line	12	Yd.
BE115572		Pushrod Carriage—With Cam	6	.16
BE115573		Pushrod for tuner	6	.12
BE115569		Cam Locking Spring	6	.02
BE120366		Coiled Return Spring for Pushrods	6	.02
BE112801		Drive Pulley (With Bushing)	1	.16
BE112865		Pointer	1	.14
BE120372		Coiled Tension Spring for Pointer String	1	.02
BE117788		Tuning Shaft	1	.12
BE117798		Pinion Gear	1	.12
BE131210		"C" Washer for Tuning Shaft	1	.04 Dz.
BE115564		Treadle Bar Complete with Link Arms, Trunnions, and Gear Segment	1	.48

42BR-1401B ONLY

		RECORD CHANGER SECTION	
104300		Record Changer—Seeburg "B"—With LP6 Sapphire Needle Crystal Cartridge	
J22404		LP6 Sapphire Point Crystal Cartridge Only —Less Pickup Arm	5.76
10794		Indicator Light Bulb T-44, 6-8 Volt	.10

MODEL 14BR-1400A SAME AS ABOVE WITH THE FOLLOWING EXCEPTIONS:

R34 - BE1303 - 500M ohms, 0.5 watt resistor
T1 - BE111236 - Loop antenna assembly
C20 - BE129168 - .00001 mf mica condenser - 20%

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

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MONTGOMERY-WARD & CO.

WARDS AIRLINE RECORD-MAKER

PHONOGRAPH RECORD PLAYER
PUBLIC ADDRESS SYSTEM

Instructions for Installation, Operation, and Service

SHOULD IT BE NECESSARY TO WRITE US OR ORDER ANY REPAIR PARTS, ALWAYS SPECIFY COMPLETE MODEL NUMBER WHICH APPEARS ON LABEL ON COVER

CHECK YOUR LINE VOLTAGE

Unless otherwise marked, this recorder must be operated on 105 to 125 volt, 60 cycle AC supply only. If there is any doubt, consult the local power company before inserting the plug. Recorders of this model which are to be used on 50 cycle, 230 volt, or other service are so marked.

REPLACEMENT PARTS LIST

PRE-AMPLIFIER UNIT PARTS

MISCELLANEOUS

Part No.	Description	Selling Price
7A1I4	Neon Lamp for Rec Volume Indicator	.75
1X1I75	Red, Celluloid Indicator	Doz. .12
1A3I5	Microphone Socket—6 Prong	Ea. .90
1A3I6	Microphone Socket—Single Pin Tip	Ea. .90
1A3I6	Cutter Socket	.90
2A1I5	P.A.-Record Switch	.10
2A2I3	Record Cutter Changeover Switch	.30
3T1I4	Tone Arm and Hub Assembly for Changer, Sketch	.10
2S1I61	Record Changer Changeover Switch	.10
5T1I1	Record Cutter Transformer	.70
1B1I4	Knob for Microphone Volume Control	.06

CONDENSERS

D05I6	CI,C5	.1 mf.	400 V. Tubular	50.10
B6402	C2	.004 mf.	200 V. Tubular	.06
4X1I87	C3A	10 mf.	25 V. Dry Electrolytic	.30
4X1I18	C4	4 mf.	25 V. Dry Electrolytic	.24
§ D6B50	C6	.05 mf.	400 V. Tubular	.06

RESISTORS

B4509	R1	2 Megohm	0.5 W. Carbon	.24
B4410	R2	1 Megohm	0.5 W. Carbon	.22
B4410	R3	1 Megohm	0.5 W. Carbon	.22
2A3I35	R4	Microphone Volume Control and Switch		.12
B4354	R5	250,000 Ohm	0.5 W. Carbon	.12
B4344	R6	500,500 Ohm	0.5 W. Carbon	.12
D4450	R7	5000 Ohm	2.0 W. Carbon	.16
B4360	R8	30 Ohm	0.5 W. Carbon	.06
B4502	R9	5,000 Ohm	0.5 W. Carbon	.06
B4502	R10	400,000 Ohm	0.5 W. Carbon	.06
B4344	R11	100,000 Ohm	0.5 W. Carbon	.06
B4402	R12	1000 Ohm	0.5 W. Carbon	.06
B4434	R13	100,000 Ohm	0.5 W. Carbon	.06
4X1I18	R14	1.5 Ohm, Wire Wound		.10

JUNCTION BOX PARTS

3A303	Speaker or Recorder Cable Sockets—Octal (2 Prong)	Ea. .90
1A1I05	Phono Sockets—Single Pin Tip	Ea. .06
2A1I75	Junction Box Switch	.10

W-28A74 RECORDER UNIT PARTS

28A533	Recorder Arm Swivel Head Clamp, Blued and Screw Assembly	50.12
26A334	Recorder Arm Height Adjusting Screw and Nut Assembly	.06

W-31A868	Cartridge Spring	Doz. .20
W-31A870	Cutter Cartridge (Crystal Type X-28)	12.90
W-31A878	Recorder Arm Only	1.85
W-31A912	Recorder Arm Post Gear	.90
W-31A913	Felt Washer for above Gear	Doz. .10
W-31A872	Felt Washer for Turntable Gear	.90
W-28A177	Needle Screw for Recorder Arm or Tone Arm	.10
W-1S8B36	Motor 60 cycle—115 Volt	7.90
W-17A1O1	Turntable	9.96
W-17A1X9	Rubber Idler Wheel	.40
W-31A911	Felt Washer for above	Doz. .06
W-31A910	Felt Washer for above	Doz. .06
W-31A866	Pitch Paper Washer for above	Doz. .04
W-31A870	Pitch Cir. Arm Only	1.56
W-31A1X8	Crystal Cartridge for Tone Arm L 48	4.36
W-32A010	AC Switch	.36

MICROPHONE AND CABLES

28A75	Recording Microphone complete with stand and cable	25.10
13X448	Recorder Cable with Molded Octal Plug and Single Pin Tip Jack	8.04
13X442	Phono Cable Single Pin Tip Jack	.48
13X443	Pre-Amplifier Cable complete with 2 Prong Plug	.54
13X441	Speaker Socket Cable complete with Octal Plug	.40

Prices Subject to Change Without Notice.

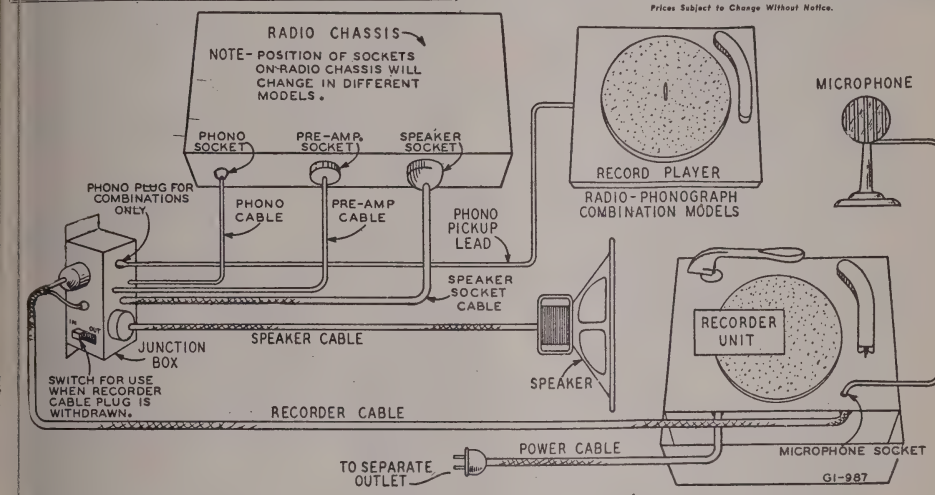

Fig. 6—Cable Connections

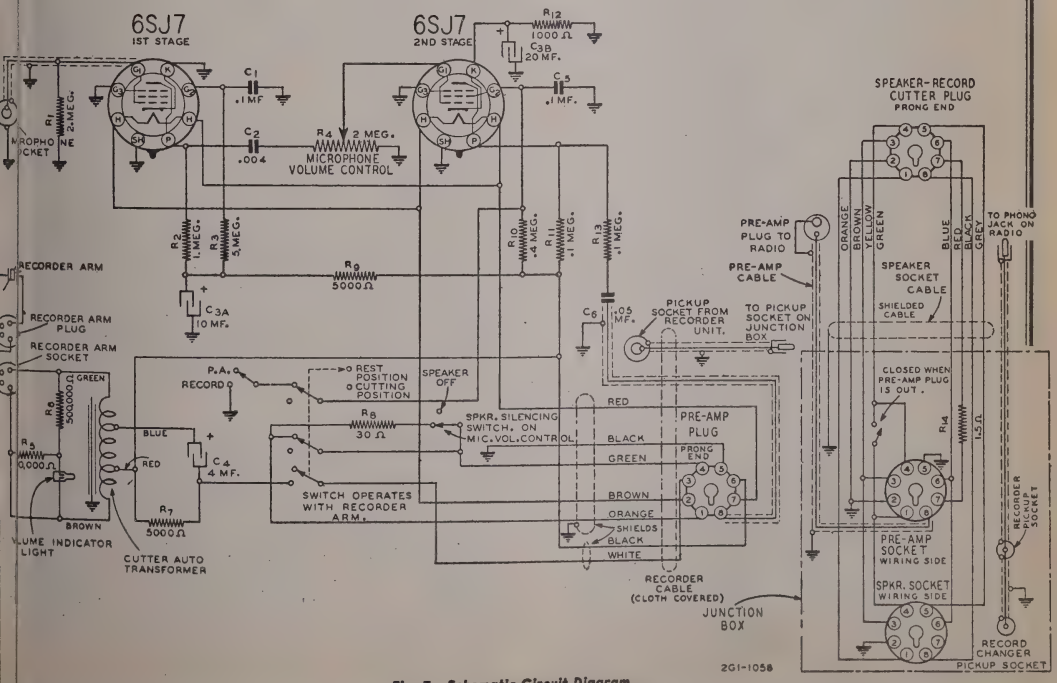

Fig. 7—Schematic Circuit Diagram

MODEL 14WG-499

MONTGOMERY-WARD & CO.

ATTACHING THE RECORD-MAKER TO THE RADIO

The Airline Record-Maker may be used with a number of Airline radios and radio-phonograph combinations in which the radio chassis has been suitably wired and has the necessary sockets for proper cable connections.

First, mount the Junction Box. This is generally mounted at the back edge of the cabinet near the radio chassis. Several locations are shown in Fig. 1. In some models a wood block will be seen at the back of the cabinet on which the Junction Box may be mounted. In other models there is room on the chassis shelf for the Junction Box. In cabinets with a side and top rail at the back, mount the Junction Box to the rail even though only two screws, one on each flange, can be used. If there is a built-in loop aerial, keep it as far away from this aerial as possible.

After the Junction Box is secured to the cabinet with the wood screws provided, complete the cable connections between the radio and the Junction Box as shown in Fig. 6. If there is a record player with the radio, the pickup lead should be connected as shown.

The Record-Maker may be placed on a table, stand, or on top of the radio, whichever is most convenient. The cable to the Junction Box is connected as illustrated in Fig. 6. The cover of the Record-Maker may be removed by tipping it back and lifting up.

The Record-Maker may be disconnected after being used by withdrawing the plugs on the end of the recorder cable from the Junction Box (See Fig. 6) and pushing the switch below to "out" position.

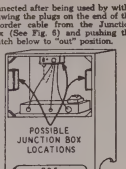

Fig. 1. Junction Box Locations

SET RECORDER ARM BEFORE MAKING FIRST RECORD

When this record-maker is to be operated for the first time to make a record, adjust the recorder arm as follows:

Place a blank record disc on the turntable. Lift up the recorder arm and move it toward the center of the turntable until the cutting needle is at the outer edge of the paper label or 1½ inches from center of record.

Do not set the recorder arm down on the record. Then move the recorder arm back to its rest position on the

1. TO MAKE A RECORD FROM A RADIO PROGRAM

A—Recorder arm in rest position—See Fig. 3.

B—Tone arm in rest position—See Fig. 2.

C—Microphone Volume Control in OFF position—See Fig. 2.

D—P.A.-Record Switch in RECORD position.

E—Phono-Radio Knob (On radio panel) in RADIO position.

F—Tune in the desired radio program carefully to room volume.

G—Place a blank record disc on the turntable with the small pin in the turntable extending through the hole in the disc.

H—The Tone Control on the radio panel should, for most recordings, be in the TREBLE position.

I—Lift up the cutting end of the recorder arm, see that the cutting needle is properly in place (See article "Recording Needles," page 4), move this arm over to the intermediate position and set it down gently —See Fig. 3. The volume of the radio program will be reduced. Bring the volume up with the Radio Volume Control until the red indicator light just flashes on and passes out. Then back the volume down a slight amount so that the red indicator light does not flicker.

J—Push the Motor Switch Knob to the ON position (Fig. 2) and allow the turntable to come up to full speed.

K—Lift up the recorder arm and carefully let it down with the needle point about ¼ inch from the outside edge of the blank record.

L—Watch the volume indicator light as the recording is being made. It is not necessary to continuously adjust the position of the Radio Volume Control—merely make sure that the red light does not flicker. A slight flicker on very loud passages only will not be harmful.

M—The thread which forms at the cutting needle may be pushed gently toward the center with a soft brush while the record is being cut. Considerable care must be taken that the operator does not tangle this thread around the cutting needle or that he does not slow up the turntable by touching it with his hands, as either condition will cause poor recordings. After the recording is completed, remove the thread from the record.

N—The record can be cut until the cutting needle is about 1½ inches from the center of the record or until a short distance before the paper label is reached. Shortly before the needle reaches its final position, reduce the volume to zero with the Radio Volume Control (without turning the knob to the OFF position on those models which have a combined Switch and Volume Control) and cut 3 to 5 blank grooves on the record. Then lift off the recorder arm and return it to the rest position. Push the Motor Switch Knob to the OFF position.

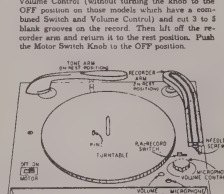

Fig. 2. Top View of Recording Unit

2. TO MAKE A RECORD USING THE MICROPHONE

Voice or music that can be picked up by the microphone with sufficient volume can be recorded. Keep the room quiet, as all extraneous noises picked up by the microphone will be on the record.

A—Recorder arm in rest position—See Fig. 3.

B—Tone arm in rest position—See Fig. 2.

C—Microphone Volume Control in OFF position—See Fig. 2.

D—P.A.-Record Switch in RECORD position.

E—Phono-Radio Knob (On radio panel) in PHONO position.

F—Insert the plug on the end of the microphone cord in the microphone socket (Fig. 2) on the motor panel and push this plug all the way down.

G—Turn the radio On-Off Switch (On the radio panel) to the ON position.

H—Place a blank record disc on the turntable with the small pin in the turntable extending through the hole in the disc.

I—The Tone Control on the radio panel should, for most recordings, be in the TREBLE position.

J—Keep the microphone at least one yard away from the radio loudspeaker at all times. If the recording is to be speech, keep the lips about 6 inches (for cutting) away from the microphone. If the recording is to be music or sound, place the microphone near the sound source, moving it closer or farther away as the volume requires.

K—Lift up the cutting end of the recorder arm, see that the cutting needle is properly in place (See article "Recording Needles," page 4), move this arm over to the intermediate position and set it down gently—See Fig. 3.

Turn the Microphone Volume Control past the point at which the speaker silencing switch is felt to operate. This switch is at about the half-way mark on the control. Speak or start the music or sound into the microphone

After the Microphone Volume Control knob has been turned past the point at which the switch is thrown, the sound can no longer be heard through the radio speaker but the sound intensity will be shown by the red indicator light. Turn the Microphone Volume Control until the speech or sound picked up by the microphone causes the red indicator light to flicker. Then turn the Microphone Volume Control down slowly until the red light just disappears.

If in reducing the microphone volume, the knob is turned below the point at which the switch is felt to operate, the sound will again be heard through the radio speaker. The recording continues and no harm will result if the microphone is kept at least one yard from the radio speaker. If brought closer, a howl may occur.

L—Push the Motor Switch Knob to the ON position (Fig. 2) and allow the turntable to come up to full speed.

M—Lift up the recorder arm and carefully let it down with the needle point about ¼ inch from the outside edge of the blank record.

N—After 1 or 2 blank grooves have been cut in the record, start the speech, music, or sound into the microphone. Watch the volume indicator light as the recording is being made. It is not necessary to continuously adjust the position of the Microphone Volume Control—merely make sure that the red light does not flicker. A slight flicker on very loud passages only will not be harmful.

O—Remove thread as explained in Article 1, Step M.

P—The record can be cut until the cutting needle is about 1½ inches from the center of the record or until a short distance before the paper label is reached. Shortly before the needle reaches its final position, reduce the volume to zero with the Microphone Volume Control and cut 3 to 5 blank grooves on the record. Then lift off the recorder arm and return it to the rest position. Push the Motor Switch Knob to the OFF position.

3. TO PLAY BACK THE HOME RECORDING; TO PLAY ORDINARY PHONOGRAPH RECORDS

The record made in Articles 1 and 2 may be played back immediately.

Also, ordinary commercial records may be played in the following manner:

A—Recorder arm in rest position—See Fig. 3.

B—Turn Phono-Radio Knob on radio panel to PHONO position.

C—Push Motor Switch Knob to ON position.

D—Lift tone arm, see that the needle is in place, and set arm down gently with needle in outside groove of record. See article on Home Recording and Ordinary Phonograph Needles, page 4.

E—Adjust volume by means of Radio Volume Control to desired intensity

F—Adjust tone by means of Radio Tone Control to desired quality.

G—Lift up tone arm at end of recording, set it in its rest position, and push Motor Switch Knob to OFF position.

TO PLAY 12 INCH COMMERCIAL RECORDS, lift tone arm off rest and bend the tone arm rest over to a horizontal position.

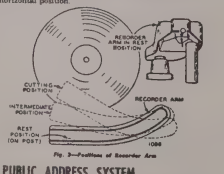

Fig. 3—Positions of Recorder Arm

4. TO USE MICROPHONE AND RADIO AS A PUBLIC ADDRESS SYSTEM

A—Recorder arm in rest position—See Fig. 3.

B—Tone arm in rest position—See Fig. 2.

C—Microphone Volume Control in OFF position—See Fig. 2.

D—P.A.-Record Switch in P.A. position.

E—Phono-Radio Knob (On radio panel) in PHONO position.

F—Insert the plug on the end of the microphone cord in the microphone socket (Fig. 2) on the motor panel and push this plug all the way down.

G—Turn the Radio On-Off Switch (On the radio panel) to the ON position.

H—Turn the Microphone Volume Control to about the half-way mark. The speaker silencing switch at about the mid-point of the Microphone Volume Control is not effective when the recorder arm is in the rest position.

Keep the microphone at least one yard away from the radio speaker at all times. The lips should be about 2 inches (for public address) away from the microphone.

I—Speak into the microphone and adjust the volume by means of the Microphone Volume Control to the proper intensity. If this control is turned too high, a howl may result. Should this happen, turn down the microphone volume slightly, move the lips closer to the microphone, and move the microphone farther away from the radio speaker.

5. TO USE THE MICROPHONE FOR MAKING ANNOUNCEMENTS WHEN PLAYING THE RADIO OR PHONOGRAPH

Follow all of the steps as given in Article 4 except the for radio reception the Phono-Radio Knob is in RADIO position.

Reduce the radio or phonograph volume by means of the Radio Volume Control when making an announcement.

6. TO USE THE MICROPHONE FOR SUPERIMPOSING AN ANNOUNCEMENT OR ACCOMPANYING THE PROGRAM WHEN MAKING A RECORD OF A RADIO PROGRAM

The microphone can be used for superimposing an announcement to be recorded at any time when making a record of a radio program.

A musical instrument or a singing voice may be used to accompany a radio program while recording it.

A—Instructions for cutting the record are given in Article 1. Be sure P.A.-Record Switch is in RECORD position.

B—Insert the plug on the end of the microphone cord in the microphone socket (Fig. 2) on the motor panel and push this plug all the way down.

C—Keep the microphone at least one yard away from the radio speaker at all times. The lips should be about 6 inches away from the microphone.

D—If an announcement or title is to be inserted, reduce the volume of the radio program with the Radio Volume Control to any desired level, just before the announcement is to be made or the title is to be put in.

If a musical instrument or singing voice is to be used to accompany the radio program, the latter may be reduced with the Radio Volume Control or may be left at normal volume.

E—Turn the Microphone Volume Control up to just below the point at which the speaker silencing switch is felt to operate. This switch is at about the half-way mark on the control. (Continuing to turn this knob in a clockwise direction would throw the switch, and the sound could no longer be heard through the radio speaker but the recording would continue.)

F—Speak, or start the sound into the microphone and observe the indicator light. To increase volume, speak louder and get closer to the microphone. To decrease volume, of course, reverse these procedures and turn down the Microphone Volume Control. Keep volume just below point at which red indicator light flickers.

G—When the announcement or accompaniment is completed, turn the Microphone Volume Control to the OFF position and if additional radio program recording is wanted, turn up the Radio Volume Control to just below the point at which the red indicator light flickers.

7. TO MAKE A RECORD FROM ANOTHER RECORD

WITH A RADIO-PHONOGRAPH COMBINATION

If you have a radio-phono combination, play the record to be copied on the phonograph.

Follow all of the instructions as given in Article 1 except that the Radio-Phono Switch on the radio should be in the PHONO position.

WITH A SEPARATE ELECTRIC PHONOGRAPH

If you have or can borrow a small phonograph of the electric type, play the record to be copied on this phonograph. Place the recorder microphone about 12 inches away, then proceed to make the new record in the usual manner with the microphone—See Article 2.

ADDITIONAL INFORMATION

RECORDING NEEDLES

Two recording needles are supplied with the recording unit.

Use Wards Article No. 62-3296 needles when reordering.

Handle recording needles carefully. They are very sharp and can be easily damaged. Every precaution must be taken to prevent the cutting point at all times; in cutting, the arm should be lowered gently on the blank with the turntable running.

Note that these needles have a long "flat" on one side of the shank. To install a recording needle, first loosen the needle screw—See Fig. 2. Place the recording needle all the way in the hole on the underside of recorder arm, with the flat portion of the needle shank toward the needle screw. Tighten the needle screw firmly. If the needle is in backward or at a wrong angle, it will not cut properly, and will damage the record and the needle.

A recording needle is considered worn when the background hiss becomes objectionable or when the thread becomes ragged. In general, the ordinary steel recording needle will have a satisfactory life of from ½ to 1½ hours, depending upon the original quality of the needle and the type the record is cut.

Important: After a recording needle has been used for a short time, it may become loose in the cutting head; it is good practice to retighten after each recording.

HOME RECORDING NEEDLES—ORDINARY PHONOGRAPH RECORD NEEDLES

Fifty tone arm needles are supplied with this recorder unit. These may be used to play back home recordings and to play ordinary commercial records on the recorder unit.

Needles which are used on home recordings may be used for ordinary commercial records, but these needles on commercial records cannot be used for home recordings, as the latter would be ruined.

Change tone arm needles often so that records are not damaged and the quality of the music is not impaired.

When reordering tone arm needles, we recommend Article No. 62-3297.

RECORD BLANKS

We recommend Wards recording blanks. A selection of these is available at Wards Retail outlets or through the Mail Order Catalog. Ten inch is the largest size record blank that can be used.

TIMING YOUR RECORDS

The following is the approximate maximum time for each record:

8" size . . Each side 1½ min.
8" size . . Each side 3 min.
10" size . . Each side 4½ min.

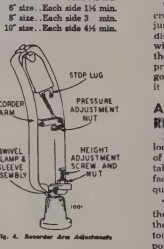

Fig. 4. Recorder Arm Adjustments

For best results, you should rerse your selection and time it for ording. This will permit you to space your grooves nicely on the record and also insure against using up the record before your selection is finished. After your selection is finished, do not lift the needle at once but allow it to cut several extra grooves while you remain silent.

ADJUSTING THICKNESS OF THREAD (PRESSURE ADJUSTMENT)

The pressure on the cutting needle can be varied by the adjusting nut shown in Fig. 4. This pressure determines the thickness of the thread cut from the blank record.

All recorders are adjusted at the factory to cut grooves approximately .0015 inches deep. When cut at this depth, the thread will be approximately as thick as a human hair.

You can get a fairly good idea of the depth of the cut by examining the record with a magnifying glass. The width of the groove should be about equal to the space between grooves if the cutting needle is sharp and the cutting head is correctly adjusted.

The thickness of the thread is increased by rotating the pressure adjusting nut in a counterclockwise direction. Turning this nut clockwise will decrease the thickness of the thread. Before making any pressure adjustment, be sure that a good cutting needle is used and that it is properly inserted.

ADJUSTING HEIGHT OF RECORDER ARM

In Fig. 4 is shown the screw and locking nut for adjusting the height of the recorder arm above the turntable. This height is adjusted at the factory and ordinarily does not require readjustment.

To check for proper height, grasp the needle screw and lift it until the cartridge assembly is felt to touch the recorder arm. The needle point will then be approximately ⅛ inch above the record surface.

If, due to variations in recording needle length, the height must be adjusted, loosen the locking nut, adjust the screw to the proper height and retighten the nut.

RECORDING TECHNIQUE

Making records has been likened to popular photography. It takes time to master the essentials of the art and learn how to do a real good job. The Airline Record-Maker has been so simplified that any one can start making satisfactory records right away, but to make the best, it is necessary to learn more of the technique of the art.

Follow the step-by-step instructions as given in this booklet, slowly and carefully.

RECORDER UNIT SERVICE NOTES

OILING

Oil the two bearings, one at either end of the worm shaft, fibre gear bearing, recorder arm hinge pivot and recorder arm shaft once a year.

CAUTION: Never oil the friction clutch or the felt washers on the rubber idler wheels. (The purpose of the felt washers is to silence the operation of the idler wheels and not to lubricate.)

HIGH PITCH ON PLAY BACK

If the pitch when a home recording is played back appears to be too high, it may be due to excessive depth of cut. This causes too great a load on the motor, slowing it down. The remedy, of course, is to reduce cutting needle pressure.

SAPPHIRE NEEDLE

If a sapphire cutting needle is used in place of a steel cutting needle, the needle pressure must be increased to maintain .0015" depth of cut.

CUTTER CARTRIDGE VERTICAL STOP

With the cutting needle resting on a record, raise the cutting arm slowly. There should be from 1/32" to 3/16" of motion of the cutting arm before the cutting needle lifts from the record. This will allow free vertical movement of the cutter cartridge and compensate for any slight wobble of the turntable or record. To get slightly more or less movement, bend stop lug on male pivot which bears against cutting arm, down or up—see Fig 4.

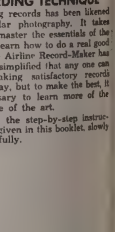

Fig. 5—Pre-Amplifier Unit Tube Arrangement

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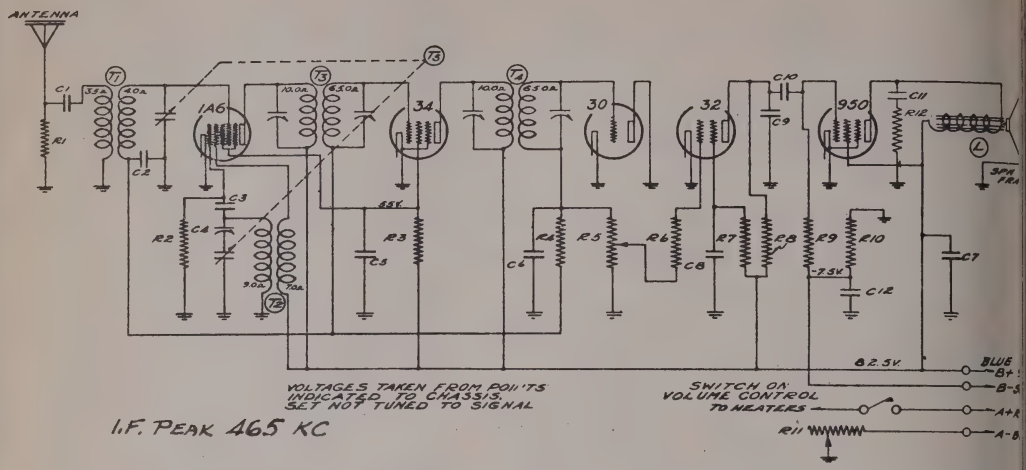
MODEL 14WG-2672C

MONTGOMERY-WARD & CO.

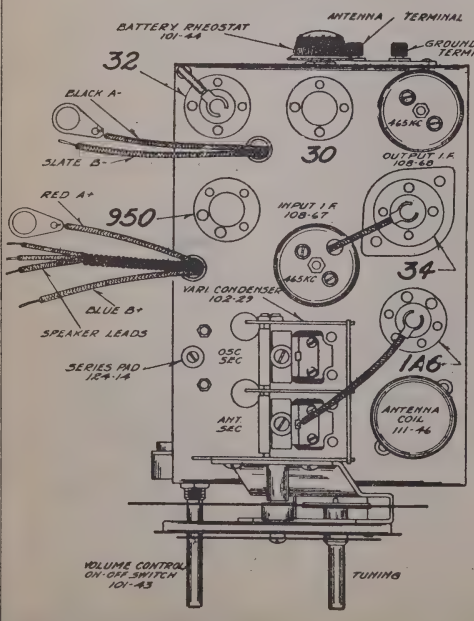
MODEL 62-240

MONTGOMERY-WARD & CO.



I.F. PEAK 465 KC

No.	Part No.	Description
		RESISTORS
R1	130-17	10M Ohm-½ Watt - 20% - 20 Volt - Carbon
R2	130-52	50M Ohm-½ Watt - 20% - 10 Volt - Carbon
R3	130-17	10M Ohm-½ Watt - 20% - 20 Volt - Carbon
R4	130-38	2 Meg Ohm - ½ Watt - 20% 100 Volt - Carbon
R5	101-43	1 Meg Ohm Volume Control and Switch
R6	130-52	50M Ohm - ½ Watt - 20% 10 Volt - Carbon
R7	130-19	1 Meg Ohm - ½ Watt - 20% 100 Volt - Carbon
R8	130-9	200M Ohm - ½ Watt - 20% - 20 Volt - Carbon
R9	130-19	1 Meg Ohm - ½ Watt - 20% 100 Volt - Carbon
R10	130-93	450 Ohm - ½ Watt - 10% 10 Volt - Carbon
R11	101-44	4.75 Ohms - Rheostat
R12	130-52	50M Ohm - ½ Watt - 20% 10 Volt - Carbon
		CONDENSERS
C1	100-11	.01 x 400 Volt - 25%
C2	100-22	.05 x 200 Volt - 25%
C3	129-12	.00025 Mica - MT - 20%
C4	124-14	Series Pad
C5	100-9	.05 x 200 Volt - 25%
C6	129-5	.0001 Mica - MT - 20%
C7	100-6	.25 x 200 Volt
C8	100-9	.05 x 200 Volt - 25%
C9	129-2	.0005 Mica - MT - 20%
C10	100-11	.01 x 400 Volt - 25%
C11	100-11	.01 x 400 Volt - 25%
C12	119-22	10.0 Mfd. x 25 Volts - W ing Voltage
		PARTS
T1	111-46	Antenna Coil
T2	110-36	Oscillator Coil
T3	108-67	Input I.F. Coil 465 K.C.
T4	108-68	Output I.F. Coil 465 K.C.
T5	102-29	Two Gang Condenser
L	114-19	Six Inch Magnetic Speake



ALIGNING I.F. TRANSFORMERS: (465 K.C.)

1. With volume control full on and with variable condenser at it minimum capacity position, plates entirely out of mesh, and wit external oscillator set at 465 K.C. connected in series with a .1 mfd. condenser, to the grid of the 1A6 tube (cap at top of tube), adjust I.F. transformers, parts number 108-67 and 108-68, t resonance. Both of these transformers have two (2) adjustment each, they are accessible from the tops of the cans (for locatio see top view).

   Use as a resonance indicator an output meter connected acros the outside terminals of the speaker or by means of an adapte to the plate and screen of the type 950 output tube. Maximum deflection of the volt meter indicates resonance.

   Use only enough signal to get a readily readable output.

   A low range output meter or the low scale of a multi-rang meter should be used.

BROADCAST BAND ALIGNMENT:

1. Set external oscillator to 1720 K.C. and connect it in series with a 200 mmfd. condenser to the antenna and ground posts.
   (a) With variable condenser in its minimum capacity position plates entirely out of mesh, adjust oscillator trimmer (rea section of variable condenser) to resonance.
   (b) Re-set external oscillator to 1400 K.C. Rotate variable con denser, pick up signal and adjust antenna trimmer (fron section of variable condenser) to resonance.
   (c) Re-set external oscillator to 600 K.C., move dial pointer t 600 K.C., and adjust series pad, part number 124-14 (see top view), to resonance. While making this adjustment, slowly rock variable condenser to and fro until maximum output i obtained.
   (d) Check for sensitivity at 1400, 1000, 600 K.C. DO NOT BEND PLATES.

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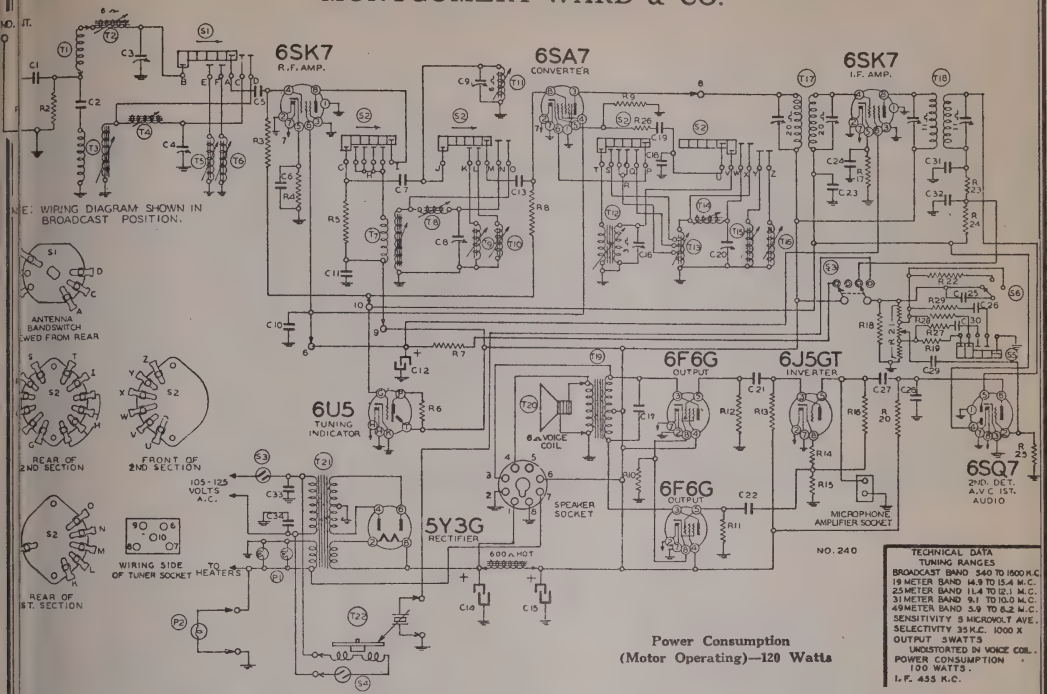
MODEL 248R-914A

MONTGOMERY-WARD & CO.

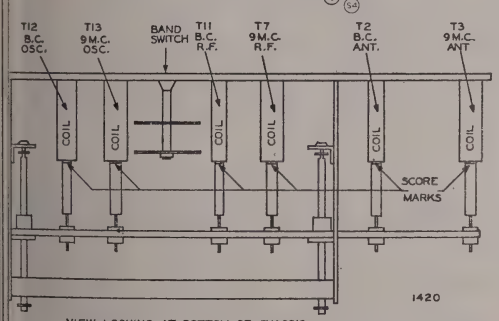


NOTE: WIRING DIAGRAM SHOWN IN BROADCAST POSITION.

TECHNICAL DATA

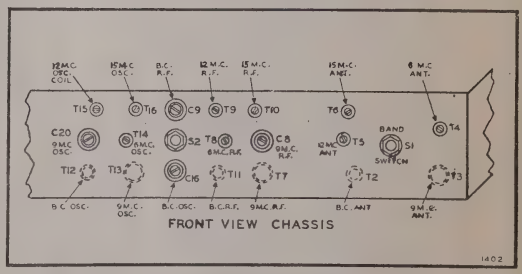
TUNING RANGES
BROADCAST BAND 540 TO 1600 K.C.
19 METER BAND 14.9 TO 15.4 M.C.
25 METER BAND 11.4 TO 12.1 M.C.
31 METER BAND 9.1 TO 10.0 M.C.
49 METER BAND 5.9 TO 6.2 M.C.
SENSITIVITY 5 MICROVOLT AVE.
SELECTIVITY 35 K.C. 1000 X
OUTPUT 5 WATTS
UNDISTORTED IN VOICE COIL.
POWER CONSUMPTION 100 WATTS.
I.F. 455 K.C.

Power Consumption (Motor Operating)—120 Watts

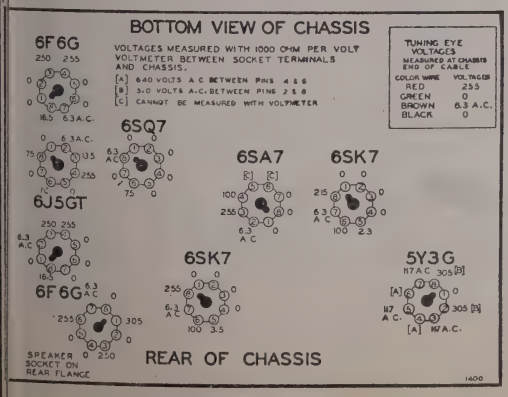


VIEW LOOKING AT BOTTOM OF CHASSIS

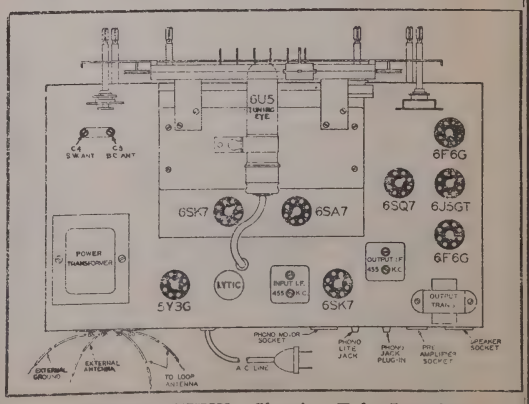
IRON CORE ADJUSTMENT VIEW



TRIMMER VIEW



VOLTAGE CHART



CHASSIS VIEW. Showing Tube Location
Note: Antenna and Ground Terminals at Back of Chassis

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ALIGNMENT PROCEDURE

- Tone control—Treble.
- Volume control—Maximum all adjustments.
- Connect dummy antenna value in series with generator output lead.
- Use an all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted To Maximum in Order Shown
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	On Top of Output I.F.
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	On Top of Input I.F.
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C20—Osc. (See Trimmer View) C8—R.F. (See Chassis View) C4—Ant.
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14—Osc. (See Trimmer View) T8—R.F. (See Trimmer View) T4—Ant.
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15—Osc. (See Trimmer View) T9—R.F. (See Trimmer View) T5—Ant.
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16—Osc. (See Trimmer View) T10—R.F. (See Trimmer View) T6—Ant.
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C16—Osc. (See Trimmer View) C9—R.F. (See Chassis View) C3—Ant.
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11—R.F. Rotate Core T2—Ant. (See Iron Core Adjustment View)

REPLACEMENT PARTS LIST

In ordering parts refer to model number on chassis label

MAIN CHASSIS PARTS LIST

Part No.	Schematic Diagram Reference	Description	No. Selling Used In Set	Price Each
CONDENSERS				
BE100139	C30	.0015 x 200 Volt Tubular Condenser	1	.12
BE1009	C22	.05 x 200 Volt Tubular Condenser	1	.12
BE10013	C21	.05 x 400 Volt Tubular Condenser	1	.12
BE10019	C29	.006 x 600 Volt Tubular Condenser	1	.12
BE10020	C24	.1 x 200 Volt Tubular Condenser	1	.12
BE10026	C23, C27	.02 x 400 Volt Tubular Condenser	2	.12
BE10061	C33, C34	.02 x 600 Volt Bakelite Condenser	2	.16
BE10071	C17	.004 x 600 Volt Tubular Condenser	1	.12
BE1002	C26	.003 x 300 Volt Tubular Condenser	1	.12
BE1292	C1	.0005 Mica Type Condenser—20%	1	.12
BE12921	C28	.0002 Mica Type Condenser—20%	1	.12
BE12931	C25	.00012S Mica Type Condenser—20%	1	.12
BE129165	C31, C32	Dual .00005 Mica Type Condenser—20%	1	.12
BE119109	C12, C14, C15	Electrolytic Filter Condenser—10 Mfd. x 350 V.; 15 Mfd. x 450.; 15 Mfd. x 450 V.	1	1.20
—or—				
BE119109B	C12, C14, C15	Electrolytic Filter Condenser—10 Mfd. x 350 V.; 15 Mfd. x 450 V.; 15 Mfd. x 450 V.	1	1.20
RESISTORS				
BE1307	R27	40M Ohm—½ Watt Resistor—10%	1	.10
BE1301	R1, R2	25M Ohm—½ Watt Resistor—20%	2	.12
BE1303	R11, R12, R18, R19	500M Ohm—½ Watt Resistor—20%	4	.10
BE1304	R24	3 Megohm—½ Watt Resistor—20%	1	.10
BE13011	R20	250M Ohm—½ Watt Resistor—20%	1	.10
BE13012	R23	50M Ohm—½ Watt Resistor—20%	1	.10
BE13019	R16	1 Megohm—½ Watt Resistor—20%	1	.10
BE13351	R29	80M Ohm—½ Watt Resistor—10%	1	.10
BE13352	R28	150M Ohm—½ Watt Resistor—10%	1	.10
BE13370	R17	500 Ohm—½ Watt Resistor—10%	1	.10
BE13103	R13, R15	100M Ohm—½ Watt Resistor—10%	2	.10
BE13218	R14	5M Ohm—½ Watt Resistor—10%	1	.10
BE13220	R10	300 Ohm—½ Watt Resistor—10%	1	.10
BE13257	R25	5 Megohm—½ Watt Resistor—25%	1	.10
BE10662	R7	12,500 Ohm—½ Watt Resistor Strip	1	.26
BE130191	R22	1.5 Megohm—½ Watt Resistor—20%	1	.10
COILS				
BE10176	T18	Output I.F. Coil Complete in Can	1	.76
BE10177	T17	Input I.F. Coil Complete in Can	1	.76
BE11256B	T1	Loop Antenna Assembly	1	1.64
TRANSFORMERS				
BE104202B	T21	Power Transformer, 50 to 60 Cycles 105-125 Volt Primary	1	3.00
BE104203B		Power Transformer, 25 to 60 Cycles 105-125 Volt Primary		
BE105111C		Output Transformer for Speaker	1	.98
SOCKETS				
BE121171		Eight Prong Octal Wafer Socket	1	.10
BE121210		Eight Prong Octal Molded Socket	5	.10
BE121273		Eight Prong Octal Wafer Socket—with Shield for Guide Pin	1	.10
BE107387		Socket for Pilot Lite	3	.10

Part No.	Schematic Diagram Reference	Description	No. Selling Used In Set	Price Each
BE128687-14		Knob—Mottled Brown—"Tuning"	1	.12
BE128683-14		Knob—Mottled Brown—Radio-Phono—"Control"	1	.12
BE128683-14		Knob—Mottled Brown—"Band"	1	.12

TUNER CHASSIS PARTS LIST

Part No.	Schematic Diagram Reference	Description	No. Selling Used In Set	Price Each
CONDENSERS				
BE10020	C6	.1 x 200 Volt Tubular Condenser	1	.12
BE10047	C2	.002 x 600 Volt Tubular Condenser	1	.12
BE10074	C10, C11	.1 x 400 Volt Tubular Condenser	2	.20
BE124138	C7	9 MC. R.F. Adjustable Trimmer Condenser	1	.12
BE124139	C9	B.C., R.F. Adjustable Trimmer Condenser	1	.16
BE124143	C3, C4	B.C. and 9 MC. Dual Adjustable Antenna Trimmer Condenser	1	.20
BE124144	C16	B.C. Oscillator Adjustable Trimmer Condenser	1	.12
BE124145	C20	9 MC. Oscillator Adjustable Trimmer Condenser	1	.24
BE1292	C5, C13	.0005 Mica Type Condenser—20%	2	.12
BE12938	C19	.00005 Mica Type Condenser—10%	1	.12
BE129168	C7	.00001 Mica Type Condenser—20%	1	.12
BE129167	C18	.0002 Silver Mica Type Condenser—3%	1	.16
RESISTORS				
BE13019	R3, R8	1 Megohm—½ Watt Resistor—20%	2	.10
BE130218	R5	5M Ohm—½ Watt Resistor—10%	1	.10
BE130232	R9	25M Ohm—½ Watt Resistor—10%	1	.10
BE13039	R4	250 Ohm—½ Watt Resistor—10%	1	.10
	R6	1 Megohm—In Tuning Eye Cable	1	.10
BE130174	R26	50 Ohm—½ Watt Resistor—10%	1	.10
COILS				
BE10962	T11	B.C., R.F. Coil with Iron Slug	1	.70
BE10958	T8	6 MC. R.F. Coil with Iron Slug	1	.30
BE10959	T7	9 MC. R.F. Coil with Iron Slug	1	.56
BE10960	T9	12 MC. R.F. Coil with Adjusting Screw	1	.20
BE10961	T10	15 MC. R.F. Coil with Adjusting Screw	1	.16
BE110161	T12	B.C. Osc. Coil with Iron Slug	1	.64
BE110156	T14	6 MC. Osc. Coil with Adjusting Screw	1	.20
BE110157	T13	9 MC. Osc. Coil with Iron Slug	1	.64
BE110158	T15	12 MC. Osc. Coil with Adjusting Screw	1	.20
BE110159	T16	15 MC. Osc. Coil with Adjusting Screw	1	.16
BE111195	T2	B.C. Ant. Coil with Iron Slug	1	.70
BE111189	T4	6 MC. Ant. Coil with Iron Slug	1	.30
BE111190	T3	9 MC. Ant. Coil with Iron Slug	1	.56
BE111191	T5	12 MC. Ant. Coil with Adjusting Screw	1	.20
BE111192	T6	15 MC. Ant. Coil with Adjusting Screw	1	.16
MISCELLANEOUS				
BE120373		Spring Washer for Coils	9	.02
BE131316B		"C" Washer for Coils	3	.02
BE125122	S2	R.F. and Oscillator Band Switch	1	.80
BE125078	S1	Antenna Band Switch	1	.50
BE11757A		Bracket for Tuning Eye	1	.08
BE11757B		Clamp for Tuning Eye	1	.08
BE11757C		Wing Bolt for Bracket and Clamp	1	.04
BE115589		Link for Band Switches	1	.10
BE11712		Switch Arm with Bushing for Band Switches	2	.08

SPEAKER

Part No.	Schematic Diagram Reference	Description	No. Selling Used In Set	Price Each
BE114208	T20	Ten Inch Electrodynamic Speaker—Less Output Transformer	1	4.00
BE105111C	T19	Output Transformer for Speaker	1	.98

MISCELLANEOUS

Part No.	Schematic Diagram Reference	Description	No. Selling Used In Set	Price Each
BE101267	R21	Volume Control (2.8 Megohm)	1	.50
BE125176	S6	Treble Tone Switch	1	.50
BE125175	S5	Bass Tone Switch	1	.50
BE107266		Line Cord and Plug	1	.30
BE10794	P1	6-8 Volt Pilot Lite Bulb—Type T-44	2	.10
BE107388		Cable Assembly for Tuning Eye	1	.38
BE125177	S3	Phono-Radio Switch	1	.70
BE13244		10—32 x 1¼ Chassis Mounting Bolts	6	.02
BE131145		Steel Washers for Mounting Bolts	6 Dz.	.10
BE131356		Snap-in Split Pins to Mount Loop to Cabinet	Dz.	.10

DIAL AND TUNING PARTS

Part No.	Schematic Diagram Reference	Description	No. Selling Used In Set	Price Each
BE112967		Dial Scale	1	.50
BE112966		Light Rod for Dial	1	.36
BE112967-41		Escutcheon for Dial—Mahogany	1	.70
BE112967-14		Escutcheon for Dial—Mottled Brown	1	.70
BE112130		Clips to Fasten Dial Scale 4	Dz.	.06
BE112968-41		Escutcheon for Buttons—Mahogany	1	.70
BE112968-14		Escutcheon for Buttons—Mottled Brown	1	.70
BE128678-41		Pushbuttons—Mahogany	6	.12
BE128678-14		Pushbuttons—Mottled Brown	6	.12
BE112961		Set of Station Call Letters	1	.12
BE128584-41		Knob—Mahogany—"Bass"	1	.12
BE128585-41		Knob—Mahogany—"Treble"	1	.12
BE128686-41		Knob—Mahogany—"Volume"	1	.12
BE128687-41		Knob—Mahogany—"Tuning"	1	.12
BE128682-41		Knob—Mahogany—"Control"	1	.12
BE128683-41		Knob—Mahogany—"Band"	1	.12
BE128684-14		Knob—Mottled Brown—"Bass"	1	.12
BE128685-14		Knob—Mottled Brown—"Treble"	1	.12
BE128685-14		Knob—Mottled Brown—"Volume"	1	.12

TUNER MECHANICAL PARTS

Part No.	Schematic Diagram Reference	Description	No. Selling Used In Set	Price Each
BE115680		Right Drive Link—With Studs	1	.06
BE11568B		Left Drive Link—With Studs	1	.06
BE115682		Connecting Link for Both Right and Left Drive Links	2	.02
BE120393		Spring for Intermediate Link	1	.06
BE120394		Spring for Arms	3	.02
BE115582		Slug Tuning Bar	1	.12
BE117844		Drive Rod—With Ball on End	2	.10
BE115683		Ball Retainer Spring	2	.02
BE134136		Rubber Bushings for Tuning Bar	2	.02
BE131251		"O" Washer for Drive Rod 4	Dz.	.03
BE120392		Spring Washer for Drive Rod 2	Dz.	.04
BE134134		Core Mounting Grommet—With Insert	6	.02
BE115685		Retainer Spring for Cam Locking Spring	6	.02
BE120214		Pointer String—Silk Line	Yd.	.12
BE115572		Pushrod Carriage—With Cam	6	.16
BE115573B		Pushrod for tuner	6	.12
BE115569		Cam Locking Spring	6	.02
BE120366		Coiled Return Spring for Pushrods	6	.02
BE112701		Drive Pulley (With Bushing)	1	.16
BE112957		Pointer	1	.14
BE120372		Coiled Tension Spring for Pointer String	1	.02
BE117707		Tuning Shaft	1	.12
BE117708		Pinion Gear	1	.12
BE115564		Treadle Bar Complete with Link Arms, Trunnions, and Gear Segment	1	.48

RECORD CHANGER COMPARTMENT

Part No.	Schematic Diagram Reference	Description	No. Selling Used In Set	Price Each
BE104311	T22, S4	Automatic Record Changer Complete. 60 Cycles Only. With LP6 Cartridge	1	
BE104328		Automatic Record Changer Complete. 25 Cycles Only, with LP6 Cartridge		
BE10794	P2	6-8 Volt Indicator Light Bulb, Type T-44	1	.10
BE107388		Socket and Cable Assembly for Indicator Light	1	.26

NOTICE—There is a model number label on the chassis. This model number identifies the radio as to year, manufacturer, chassis and issue number or letter. When ordering parts or writing, be sure to mention the complete model number.
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

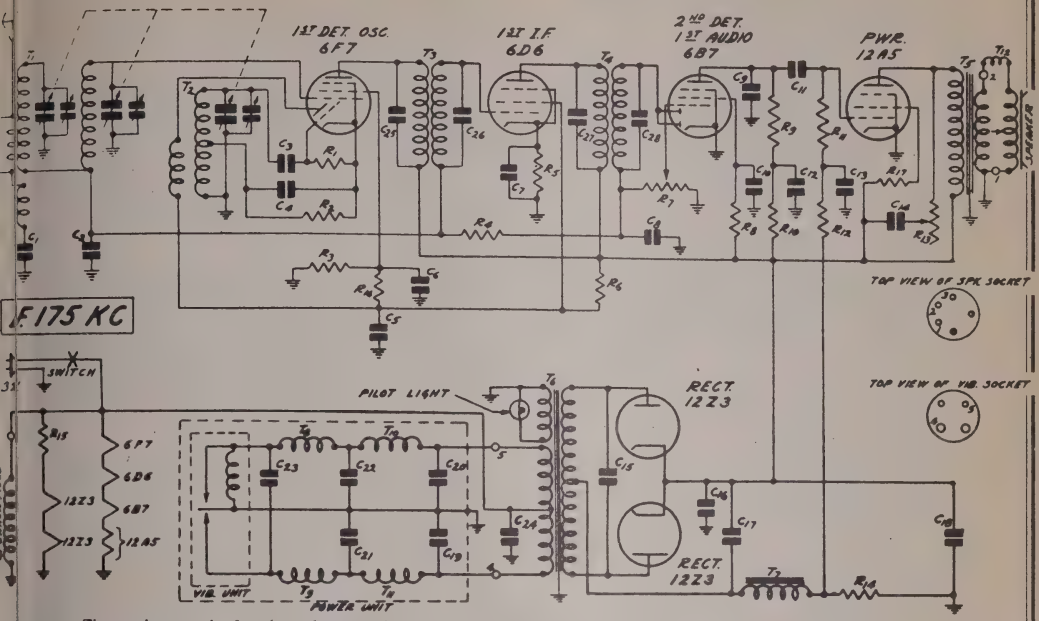
For Oak RC-1 Record Changer
See Rider's book,
"Automatic Record Changers
and Recorders"

Push Button Data the same
as Model 14BR-1400-A

Date 3/42

MODELS 62-231, 62-243

MONTGOMERY-WARD & CO.



The numbers on the 2 sockets shown at the right above, correspond with the numbers as shown in the circuit.

ct 1934

Fig. 1—Schematic Circuit Diagram

CONDENSERS

Part No.	Code	Capacity	Voltage	Type
P-862	C1	.05 Mf.	200V	Tubular
P-862	C2	.05 Mf.	200V	"
P-801	C3	35 Mmf.		Wire Capacitor Part of Osc. Assem
P-862	C4	.05 Mf.	200V	Tubular
P-858	C5	.25 Mf.	200V	"
P-849	C6	.05 Mf.	200V	"
	C7	.05 Mf.	200V	"
P-811	C8	100 Mmf.		Wire Capacitor
P-851	C9	.002 Mf.	600V	Tubular
P-868	C10	.25 Mf.	200V	"
P-872	C11	.01 Mf.	600V	"
P-868	C12	.25 Mf.	200V	"
P-852	C13	.01 Mf.	140V	"
P-855	C14	.05 Mf.	400V	"
P-852	C15	.015 Mf.	1600V	"
P-887	C16	.10 Mf.	400V	"
P-816	C17	8.0 Mf.	300V	Electrolytic Block
	C18	8.0 Mf.	300V	
P-893	C24	.5 Mf.	140V	Tubular
P-806	C25	70 Mmf.		Wire Capac. Part of 1st I.F.Assem.
P-814	C26	45 Mmf.		Wire Capac. Part of 1st I.F.Assem.
P-808	C27	90 Mmf.		Wire Capac. Part of 2nd I.F.Assem
P-810	C28	100 Mmf.		Wire Capac. Part of 2nd I.F.Assem
P-812	C29	200 Mmf.		Wire Capac. Part of Ant. Assem.
P-815				Three Gang Condenser

RESISTORS

Part No.	Code	Resistance	Wattage	Type
P-A95104	R1	100,000 Ohm	.2	Carbon
P-A95152	R2	1,500 Ohm	.2	Carbon
P-B94303	R3	30,000 Ohm	.5	Carbon
P-A98[illegible]	R4	2 Megohm	.2	Carbon
P- 98021	R5	400 Ohm	.2	Wire Wound
P-C93702	R6	7,000 Ohm	1.0	Carbon
P- 96014	R7	500,000 Ohm		Volume Control
P-B94204	R8	200,000 Ohm	.5	Carbon
P-B94603	R9	60,000 Ohm	.5	Carbon
P-A95203	R10	20,000 Ohm	.2	Carbon
P-A95504	R11	500,000 Ohm	.2	Carbon
P-A94104	R12	100,000 Ohm	.2	Carbon
P- 97011	R13	150,000 Ohm		Tone Control
P- 98035	R14	450 Ohm	2.0	Wire Wound
P- 98034	R15	25 Ohm	3.0	Wire Wound
P-B95602	R16	6,000 Ohm	.5	Carbon

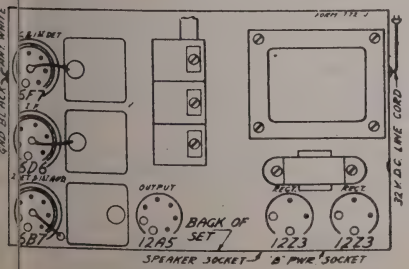


Fig. 2—Arrangement of Tubes

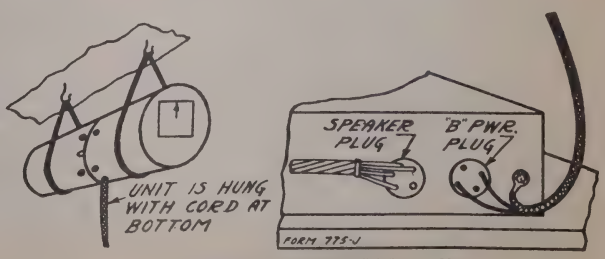


Fig. 3—Method of Installing "B" Power Unit

MODELS 62-231, 62-243

MONTGOMERY-WARD & CO.

Circuit

This receiver is designed to operate from a power supply source of 32 volts D. C. Six and twelve volt tubes are used. The heaters of these tubes are connected in series across the 32 volt line as shown in Fig. 1. As shown in this illustration, the heaters of the 6F7, 6D6, 6B7 and 12A5 tubes are in one series while the heaters of the two 12Z3 tubes and a 25 ohm resistor are in another series across the 32 volt line. A third connection across the line consists of the speaker field winding. A vibrator unit is used to provide the necessary high voltage which is rectified by the two 12Z3 tubes and then filtered for use in the plate and screen circuits.

The receiver uses 1.56 amps. at 32 volts input.

The maximum undistorted power output is 1.5 watts, measured with a load impedance of 4000 ohms.

Sensitivity

600 K. C.—25 microvolts absolute.
1500 K. C.—15 microvolts absolute.

D. C. RESISTANCE OF WINDINGS

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D. C. Resistance in Ohms
P-5300	Primaries of Antenna Trans. in Series	T1	Small
	1st Secondary of Antenna Transformer	T1	3.2
	2nd Secondary of Antenna Transformer	T1	2.4
P-5202	Oscillator Plate Coil	T2	2.0
	Oscillator Grid Coil	T2	3.5
P-5221	1st I. F. Transformer Primary	T3	67
	1st I. F. Transformer Secondary	T3	93
P-5203	2nd I. F. Transformer Primary	T4	63
	2nd I. F. Transformer Secondary	T4	63
P-50624	Output Transformer Primary	T5	243
	Output Transformer Secondary and Bucking Coil in Series	T5 & L12	Small
P-50637	"B" Filter Reactor	17	300
P-2147	Speaker Field		97
P-2173	Speaker Voice Coil		Small
P-50626	Power Transformer Primary	T6	
	Center Tap to Inside	T6	3.6
	Center Tap to Outside	T6	4.4
	Power Transformer H. V. Secondary	T6	
	Center Tap to Inside	T6	322
	Center Tap to Outside	T6	350
	Power Transformer Pilot Lamp Sec.	T6	.3
P-2153	Vibrator Unit Magnetizing Coil		1025
	Vibrator Unit Filter Chokes		3.0

VOLTAGES AT SOCKETS

Input 32 Volts—Antenna Shorted to Ground

Type of Tube	Function	Across Filament	Plate to Cathode	Screen to Cathode	Grid to Cathode	Normal Plate M.A.
6F7	1st Det. & Osc.	6.3	167(1)	90	2.6	7.0(1)
			117(2)		0	2.8(2)
6D6	I. F.	6.3	172	120	3.2	8.2
6B7	2nd Det.	6.3	25	25	7.25	2.0
12A5	Output	12.6	180	180	25	32
12Z3	Rectifier	12.6	225			25

(1) Pentode Section of Tube

(2) Triode Section of Tube

Eliminating Ignition and Generator Noise

After the receiver is in working order, the following procedure must be followed in practically all cases to eliminate ignition and generator noise caused by the charging plant. If the charging plant causes no noise, then of course, these steps do not have to be taken.

One spark plug suppressor must be placed on each spark plug of the engine. One spark plug suppressor for example would be required on a one-cylinder engine and four must be used on a four-cylinder engine. To connect the spark plug suppressor, remove the wire from the top of the plug, put the suppressor on and attach the wire to the other end of the suppressor.

The generator condenser consists of two .5 mfd. sections in one unit. The two sections have one side grounded to the metal case of the condenser. Mount the condenser on the frame of charging plant. This will ground it. Then connect the two leads to the charging switch, one on each side of the line.

In some large installations, where the charging unit is on only two or three times a week, the above steps do not have to be taken, as interference is only caused when the generating plant is in operation.

Condenser Alignment

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the broadcast band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide accurately calibrated signals over the broadcast band and at the intermediate frequency, and an output meter are required for indicating the effect of adjustments.

First set the signal generator for 1730 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator adjustment is connected to the antenna lead of the receiver. Adjust the trimmer of the oscillator section of the 3 gang condenser until maximum output is obtained. The oscillator section is the one with the cut plate rotor.

Now set the signal generator for 1400 K. C. and turn the rotor until maximum output is obtained. Adjust the other two trimmers on the gang condenser for maximum output.

To obtain dial scale calibration tune in an 800 K. C. signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

The use of the cut plate type of condenser eliminates the necessity of a 600 K. C. padder and no adjustment at this frequency, therefore, is required.

32 Volt Power Supply

This receiver is designed for use on farms and in those places where the power supply consists of a 32 volt direct current generating plant. The receiver may not be satisfactory on plants which do not use storage batteries.

Line Voltage Range

The receiver will operate satisfactorily within a line voltage range of 27 to 38 volts. If the line voltage runs higher, it will have to be cut down and one method of doing this is to use a series resistor.

Series Resistor

Let us say the line voltage is 40. The receiver uses 1.56 amps. at 32 volts. A resistance of 5.13 ohms, therefore, capable of dissipating 12.5 watts will be required in the receiver line to cut the voltage down to 32. If the line voltage varies a variable resistor may be required.

Starting Current

When first turned on the drain for a few seconds is slightly higher than normal until the tubes heat up. Some automatic plants are adjusted to start under a load of 200 to 300 watts. If a number of devices such as lights or motors are being used and the radio set is turned on the total drain may be sufficient to start the plant.

No Polarity

When inserting the line plug no attention need be paid to polarity.

Servicing Power Unit

Vibrator Unit

The vibrator is mounted inside the "B" power unit. Normally the vibrator will last upward of 1000 hours. However, in the same manner as a tube it may become defective in less time and require replacement.

If the tubes light and by touching the power unit case, no vibration is felt, then the vibrator unit is probably not operating. If the pilot lamp is not lighted this will be a further indication of the same fact.

To replace the vibrator unit in the power supply remove the end of the case on which the label is placed by taking out the four screws which hold the vibrator shield can to the framework. The old vibrator may then be withdrawn and a new unit inserted in the same manner as a tube.

One or more of the vibrator units should be kept on hand for replacement purposes. It is advisable when servicing the receiver, to try one out in the same manner as a new set of tubes would be tried.

Filter Unit

The other side of the power unit case contains the filter unit which is made up of several chokes and condensers as shown in Fig. 1. The purpose of this filter is to prevent high frequency currents from getting out of the power unit case.

Failure in the unit may affect the voltage supply to the power transformer or it may result in radio frequency noise. The chokes and condensers should be tested and replaced, if necessary. A resistance continuity test should be made of the wiring in the unit and to the chassis, using the circuit diagram as a guide.

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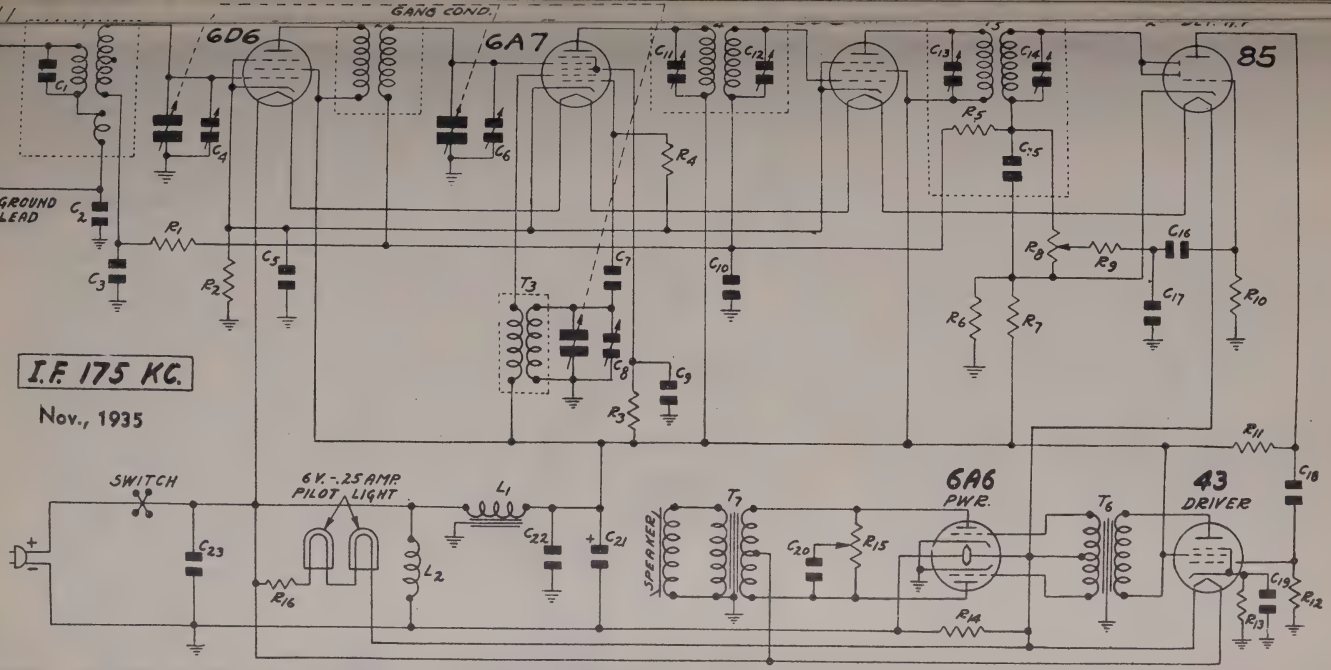

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

C_1	250 MMf MOULDED	C_{21}	30 Mf 50V. WET ELECTROLYTIC P-44X25	R_1	100 000 OHM .2 W
C_2	.05 Mf 180V.	C_{22}	.25 Mf 180V.	R_2	450 OHM .2 W.
C_3	.05 Mf 180V.	C_{23}	.25 Mf 180V.	R_3	30 000 OHM .2 W.
C_4	GANG TRIMMER			R_4	100 000 OHM .2 W.
C_5	.05 Mf 180 V.			R_5	1.0 MEGOHM .2 W.
C_6	GANG TRIMMER			R_6	350 OHM .2 W.
C_7	35 MMf MOULDED			R_7	6000 OHM .2 W.
C_8	GANG TRIMMER			R_8	.50 MEGOHM VOL. CONTROL
C_9	.05 Mf 180V.			R_9	50 000 OHM .2 W. P-36X213
C_{10}	.05 Mf 180V.			R_{10}	2.0 MEGOHM .2 W
C_{11}	40-100 MMf DUAL			R_{11}	80 000 OHM .2 W.
C_{12}	40-100 MMf P-17A39			R_{12}	1.0 MEGOHM .2 W.
C_{13}	40-100 MMf DUAL			R_{13}	400 OHM 2 W.
C_{14}	40-100 MMf P-17A39				
C_{15}	100 MMf MOULDED				
C_{16}	.01 Mf 180V.				
C_{17}	50 MMf MOULDED				
C_{18}	.01 Mf 180V.				
C_{19}	12. Mf 25V. DRY ELECTROLYTIC P-95X207				
C_{20}	.10 Mf 180V.				

R_{14}	180 OHM 1.0 W.	T_1	ANTENNA INTERSTAGE TRANS. P-9A452
R_{15}	75000 OHM TONE CONTROL	T_2	INTERSTAGE R.F. TRANS P-9A453
R_{16}	67 OHM 4.0 W ARMORED WIRE WOUND		

I-f. peak 175 kc.
Osc. adj. 1750 kc.
with cond. rotor
full open.
R-f. adj. 1500 kc.

Power Consumption - 1.2 Amperes at 32 Volts DC
Power Output - - - - - .25 Watts Undistorted
Selectivity - - 29 KC Broad at 1000 times Signal
Sensitivity - - - - - 10 Microvolts Absolute
Tuning Range - - - - - - - 530 to 1750 KC
Speaker - - - - - - - - - - 6" Dynamic

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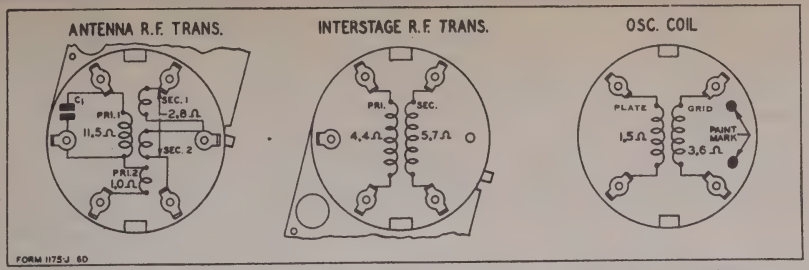

Fig. 3—R.F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

D. C. Resistance of Windings

Refer to Fig. 3

Part No.	Winding	Code	D. C. Resistance in Ohms
P-9A452	Antenna R.F. Transformer	T1	
	Primary No. 1		11.5
	Primary No. 2		1.0
	Secondary Windings in Series		2.8
P-9A453	Interstage R.F. Transformer	T2	
	Primary Winding		4.4
	Secondary Winding		5.7
P-9A454	Oscillator Coil	T3	
	Grid Coil		3.6
	Plate Coil		1.5
P-9A455	1st I.F. Transformer	T4	
	Primary Winding		102.0
	Secondary Winding		99.
P-9A456	2nd I.F. Transformer	T5	
	Primary Winding		101.
	Secondary Winding		102.
P-50X22	Audio Input Transformer	T6	
	Primary Winding		380.
	Secondary Winding		
	Center Tap to Inside		85.
	Center Tap to Outside		95.
P-12A219	Dynamic Speaker		
	Speaker Field	L2	100.
	Speaker Voice Coil		3.1
	Audio Output Transformer (51X23)	T7	
	Primary Winding		
	Center Tap to Inside		152.
	Center Tap to Outside		176.
	Secondary Winding		1.4
P-52X33	Filter Choke	L1	50.

Replacing Drive Cord

Take off the station pointer by removing the screw at the center of the dial.

Remove the pilot lamp assembly by pulling the socket clips upward off the dial assembly.

Loosen the dial assembly by removing the two screws which secure this assembly to the chassis brackets.

Then lay the complete dial assembly face down in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

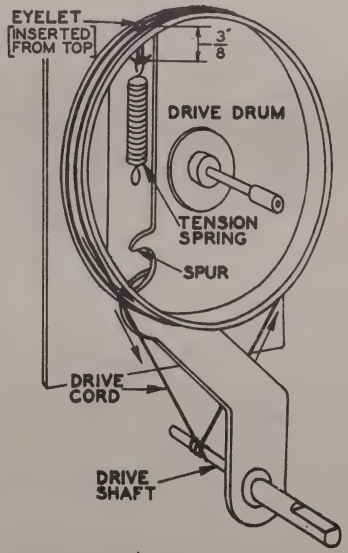

Fig. 6—Replacing Drive Cord

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 6.

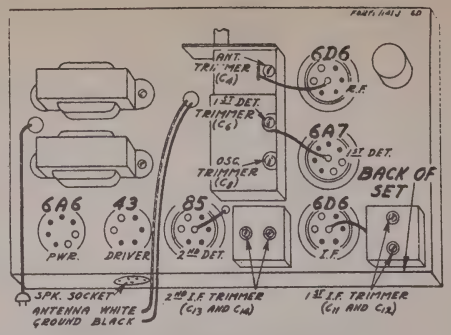

Fig. 4—Tube Arrangement

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 6. Insert one end of the new drive cord from the outside through this eyelet in the drive drum.

Tie the end of the cord which has been inserted through the eyelet to one end of the tension spring.

Wrap the cord in a counter clockwise direction (facing front of chassis) around the drive drum approximately one and one-quarter turns progressing toward the front.

Volume Control at Maximum — Antenna Connected to Ground LEAD

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground	Normal Plate MA.
6D6	R.F.	6.4	31	31	2	1.5
6A7	1st Det. & Osc.	6.4	31 31(1)	18	2	.2 .65(1.
6D6	I.F.	6.4	31	31	2	1.5
85	2nd Det.	6.4	12.5		18	.20
43	1st Audio	25.6	28	31	3.5	7
6A6	Output	6.4	31		0	11 (per plate)

MONTGOMERY-WARD & CO.

MODELS 62-241, 62-244, 62-245, 62-252

Power Consumption - 1.8 Amperes at 6.3 Volts

Power Output - - - - - - 1 Watt Undistorted

Tuning Frequency Range

B Range - - - - - - - - - - 535 to 1730 KC.
C Range - - - - - - - - - - 1680 to 4800 KC.
D Range - - - - - - - - - - 5650 to 16000 KC.

ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN. CONTACT LOCATIONS 4 AND 10 IN OSC. AND ANT. SECTIONS AND 3, 4 AND 10 IN ANT. SECTION ARE BLANK.
POSITION 1 STANDARD WAVE(B) 5 6 7 8 9 11 12 1 2 3
POSITION 2 SHORT WAVE(C) 5 6 7 8 9 11 12 1 2 3
POSITION 3 SHORT WAVE(D) 5 6 7 8 9 11 12 1 2 3
OSC. & INT. SECTION
ANT. SECTION
I.F. 456 KC.
GENEMOTOR CABLE SHIELD
GENEMOTOR PLUG AS YOU SIDE SHOWN
SPEAKER
SWITCH
+6V.
-6V.
SOCKET BOTTOM VIEW
GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

C 1 250 mmf.
C 2 2.25 mmf.
C 3 2.25 mmf.
C 4 25 mmf.
C 5 .25 mf. 180 V.
C 6 2.25 mmf.
C 7 2.25 mmf.
C 8 2.25 mmf.
C 9 35 mmf.
C10 .25 mf. 180 V.
C11 70-150 mmf. } ONE
C12 70-150 mmf. } UNIT
C13 .05 mf. 180 V.
C14 20.0 mf. 150 V. Electrolytic
C15 .25 mf. 180 V.
C16 70-150 mmf. } ONE
C17 70-150 mmf. } UNIT
C18 .05 mf. 180 V.
C19 .05 mf. 180 V.
C20 .05 mf. 180 V.
C21 50 mmf.
C22 40-100 mmf.
C23 .05 mf. 180 V.
C24 100 mmf.
C25 50 mmf.
C26 .002 mf. 600 V.
C27 250 mmf.
C28 .01 mf. 180 V.
C29 .05 mf. 240 V.
C30 20.0 mf. 150 V. Electrolytic
C31 .05 mf. 180 V.
C32 .05 mf. 180 V.
C33 .25 mf. 180 V.
C34 .25 mf. 180 V.
C35 .25 mf. 180 V.
C36 .50 mf. 180 V.
C37 .15 mmf.
C38 300-600 mmf. } ONE
C39 40-100 mmf. } UNIT
C40 2-25 mmf.
C41 2-25 mmf.
C42 1400 mmf.
C43 2-25 mmf.
C44 .25 mf. 18 V.
R 1 100,000 ohm .2 W.
R 2 60,000 ohm .2 W.
R 3 1 megohm .2 W.
R 4 100,000 ohm .2 W.
R 5 50,000 ohm .2 W.
R 6 3,000 ohm .5 W.
R 7 1,000 ohm .2 W.
R 8 60,000 ohm .2 W.
R 9 3 megohm .2 W.
R10 1 megohm Vol. Control
R11 1 megohm .2 W.
R14 3 megohm .2 W.
R16 500,000 ohm .2 W.
R17 1500 ohm Tone Control
R12 12.5 ohm 1.0 W. } ARMORED
R13 12.5 ohm 1.0 W. } WIRE-WOUND
R15 .70 ohm .50 W. } RESISTOR
R18 150 ohm 2.0 W. }
T 1 Ant. R. F. Trans.
T 2 Interstage R. F. Trans.
T 3 1st I. F. Trans.
T 4 2nd I. F. Trans.
T 5 3rd I. F. Trans.
T 6 Push Pull Input Trans.
T 7 Osc. Inductors
L 1 Single Filament Reactor
L 2 } Double Filament
L 3 } Reactor
L 4 "B" Choke
L 5 "B" Choke
L6, L7, L8 & L9 Genemotor Windings
L10 "A" Choke
L11 "A" Choke
L12 Osc. Tracking Coil

Nov., 1935

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A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 4800, 4200, 16,000, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I.F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a 0.1 mf. condenser to the switch end of condenser C9—see Fig. 2. There is a lead which goes to the lug on the top of the center stator section of the tuning condenser—see Fig. 4. The connection can be made at this lug.

Connect the ground lead of the receiver to the ground post of the signal generator

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 4.

RANGE B ALIGNMENT

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C43) until maximum output is obtained. The location of this trimmer is shown in Fig. 5.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C6) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of the greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Be sure to use a non-metallic screwdriver for this adjustment.

RANGE C ALIGNMENT

4800 KC Adjustment

Set the signal generator for 4800 KC.

Connect the antenna lead of the receiver through a 400-ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band — green dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range C trimmer (C41) until maximum output is obtained. See Fig. 3 for location of this trimmer.

4200 KC Adjustment

Set the signal generator for 4200 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C7) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

RANGE D ALIGNMENT

16,000 KC Adjustment

Set the signal generator for 16,000 KC.

Keep the antenna lead of the receiver connected through the 400-ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range D trimmer (C40) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of the greatest intensity is obtained.

Then go back and repeat the procedure as given for the 16,000 KC adjustment. If it is found necessary to make any appreciable change in the settings of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 5 for location of this trimmer.

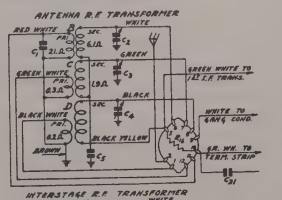

Fig. 5—Color Coding of Coil Wires and D. C. Resistance of Windings. (Also see complete D. C. Resistance List Below)

REPLACING DRIVE CORD

Remove the chassis from the cabinet. Take off the station pointer by removing the screw at the center of dial. Loosen the two set screws in the collar on the band selector switch shaft. Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis and one screw at the top which secures this assembly to the bracket. Pull the dial assembly forward until the collar is free of the band selector shaft; and lay the assembly face downward in front of the chassis.

Turn the dial drum until the opening in this drum is approximately vertical and with the hole at the top. Remove the tension spring and the old drive cord. When replacing this drive cord a 30 pound test cord as regularly supplied by the factory should be used.

See that the eyelet is in the hole in the drive drum. Insert one end of the new drive cord from the outside through the hole in the eyelet in the drive drum. Tie the end of the cord, which has been inserted through the hole, to one end of the tension spring. Now wrap the cord in a counter clock-wise direction (facing the front of the chassis) around the drive drum for approximately one and one half turns, progressing towards the front. Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around this shaft, progressing toward the back of the chassis. Wrap the cord on directly in line with the drive drum above. Then bring this cord up to the drive drum until it is up to the eyelet in the drive drum.

Now insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring when hanging free and with the slack taken out of the drive cord should be three eights or less from the flang of the drum. Cut off the surplus length of the cord after it has been knotted.

Now secure the other end of the tension spring over the spur on the drive drum. Turn the drive shaft back and forth several times.

Replace the dial assembly and pointer.

Replace the chassis in the cabinet.

MONTGOMERY-WARD & CO.

MODELS 62-241, 62-244, 62-245, 62-252

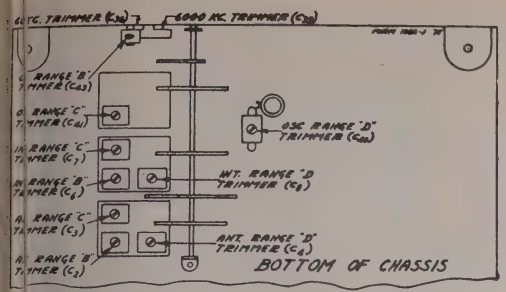
OSC. TRIMMER (C30)
6000 KC. TRIMMER (C29)
RANGE "B" TRIMMER (C23)
RANGE "C" TRIMMER (C21)
RANGE "C" TRIMMER (C7)
RANGE "B" TRIMMER (C4)
RANGE "C" TRIMMER (C3)
RANGE "B" TRIMMER (C2)
OSC. RANGE "D" TRIMMER (C28)
ANT. RANGE "D" TRIMMER (C6)
BOTTOM OF CHASSIS

Fig. 3—Arrangement of Trimmers

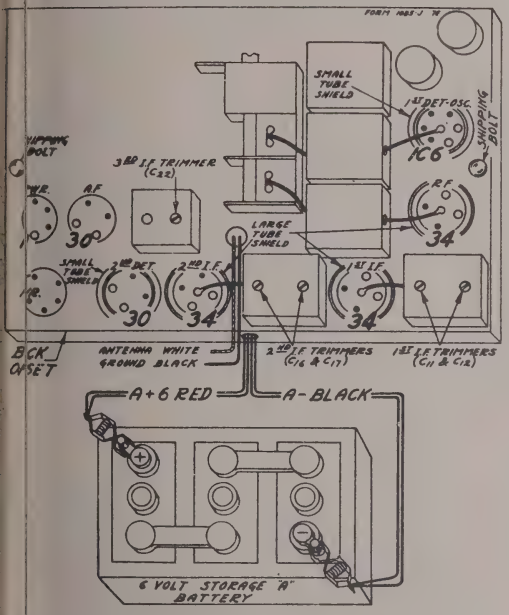

Fig. 4—Tube Arrangement and Battery Connections

VOLTAGES AT SOCKETS

Antenna Shorted to Ground—Battery 6 Volts under load
Volume Control at Maximum

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Bias Voltage (see Notes)	Normal Plate M. A.
34	R. F.	2.0	135	45	1.5(1)	1.7
6	1st Det.	2.0	135 80(2)	70	2.0(3)	3.2 1.7(2)
34	1st I. F.	2.0	135	45	1.5(1)	1.7
34	2nd I. F.	2.0	135	80	4.0(3)	3.2
30	2nd Det.	2.0				
30	1st A. F.	2.0	135		8.0(4)	2.3
19	Power	2.0	135		3.9(5)	2.3 (per plate)

(1) As read from negative filament leg to low potential end of resistor R12.
(2) Anode Grid
(3) As read from negative filament leg to ground.
(4) Total voltage drop from negative filament leg to ground and across R18.
(5) As read across R18.

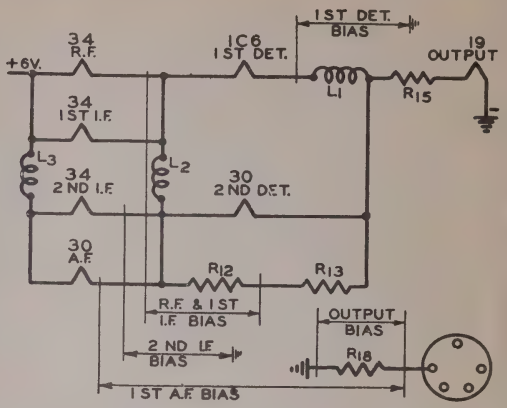

Fig. 6—Abridged Wiring Diagram showing Filament Wiring System and Points at which No-Signal Bias Voltages are obtained.

D. C. Resistance of Windings

Refer to Figs. 5 & 2

Following are the D. C. resistances of the various coil windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Winding	Code	D.C. Resistance in Ohms
P-9A419	Antenna R. F. Transformer	T1	
	Range B Primary Winding		21.0
	Range C Primary Winding		0.3
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.1
	Range C Secondary Winding		1.9
	Range D Secondary Winding		Small
P-9A420	Interstage R. F. Transformer	T2	
	Range B Primary Winding		3.6
	Range C Primary Winding		2.6
	Range D Primary Winding		0.5
	Range B Secondary Winding		6.8
	Range C Secondary Winding		1.7
	Range D Secondary Winding		Small
P-9A421	Oscillator Coils	T	
	Range B Plate Coil		1.1
	Range C Plate Coil		1.0
	Range D Plate Coil		0.4
	Range B Grid Coil		3.8
	Range C Grid Coil		0.9
	Range D Grid Coil		Small
P-9A422	1st I. F. Transformer	T3	
	Primary Winding		11.4
	Secondary Winding		11.4
P-9A423	2nd I. F. Transformer	T4	
	Primary Winding		11.4
	Secondary Winding		11.4
P-9A424	3rd I. F. Transformer	T5	
	Primary Winding (either section)		8.4
	Secondary Winding		130.8
P-50X11	Audio Input Transformer	T6	
	Primary Winding		1005.0
	Secondary Winding		
	Center Tap to Inside		580.0
	Center Tap to Outside		630.0
*P-12A218	8 Inch Magnetic Speaker		
	Speaker Coil		
	Center Tap to Inside		275.0
	Center Tap to Outside		300.0
P-9A403	Single Filament Reactor	L1	.65
P-9A404	Double Filament Reactor (either section)	L2 & L3	.65
P-9A391	High Frequency Oscillator Tracking Coil	L12	0.7

*Speakers with other part numbers may have slightly different values of D. C. Resistance.

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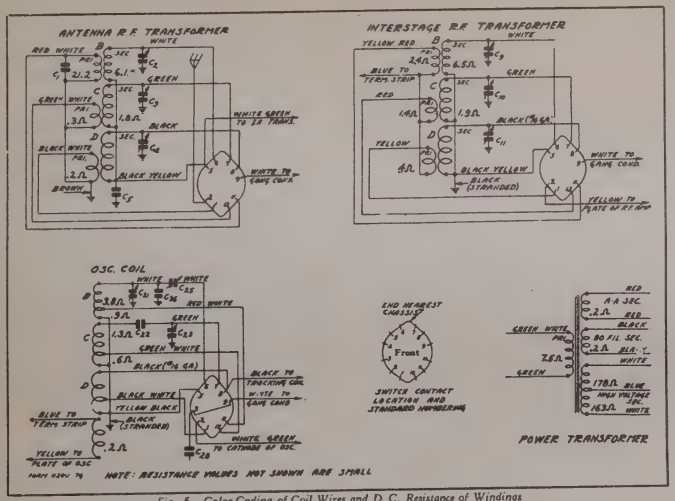

Fig. 5—Color Coding of Coil Wires and D. C. Resistance of Windings
(Also see complete D. C. Resistance List in this Manual)

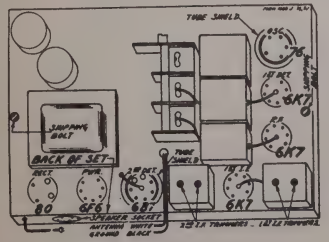

Fig. 6—Location of Tubes

VOLTAGES AT SOCKETS
Line Voltage, 115 - Volume Control at Maximum
Antenna Shorted to Ground

Type of Tube	Function	Heater or Filam't	Plate to Ground	Screen to Ground	Cathode to Ground	Plate M. A.
6K7 (6D6)	R. F.	6.1	230	95	3.0	6.4
6K7 (6D6)	1st Det.	6.1	230	100	9.0	3.2
76	Osc.	6.1	100			5.2
6K7 (6D6)	I. F.	6.1	230	120	3.0	9.
6B7	2nd Det.	6.1	55(1)	40		2.3
6F6 (42)	Power	6.1	215	230	17(2)	30.0
80	Rectifier	4.7				34. per plate

(1) As read with 500,000 ohm meter
(2) As read across R16

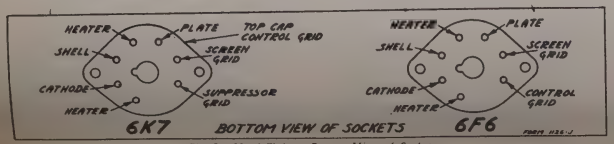

Fig. 7—Metal Tubes—Bottom View of Sockets

Servicing R. F. Coil Assemblies

The R. F. transformers and oscillator coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmers are soldered to the can, and cannot be easily disassembled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 5.

If it is ever necessary to remove one of coil assemblies from the can, proceed as follows: First remove the nuts from the screws at the top of the can. The outside lug on the trimmer condenser is inserted in a slot in the coil can, and this lug is soldered into position.

Apply a soldering iron to the can at the point of the soldered connection. Then with a screw driver lift up on the outside edge of the trimmer (edge soldered to can) until the trimmer is clear of the can. After the trimmers are all unsoldered, the coil can be taken out.

Tuning Frequency Range

B Range - - - - - - - - - - 535 to 1730 KC.
C Range - - - - - - - - - - 1715 to 5800 KC.
D Range - - - - - - - - - - 5750 to 18300 KC.

Sensitivity

B Range Average - - - - 0.5 Microvolts Absolute
C Range Average - - - 1.0 Microvolts Absolute
D Range Average - - - - 2.0 Microvolts Absolute

Power Consumption 68 Watts (At 115 volts 60 cycles)

Power Output - - - - - - 3 Watts Undistorted

Selectivity - 28 KC Broad at 1000 times Signal (Sharp)

Intermediate Frequency - - - - - - - - 456 KC.

Speaker - - - - - - - - - 6" and 8" Dynamic

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 5. In contact locations not used, the number applying to that particular location is not employed.

Changes in Early Models

In the early models of this receiver, the antenna transformer (T1) had two Range B Primary windings as shown in Fig. 8.

The oscillator Range B and C trimmer locations varied in the early and intermediate models of this receiver as shown in Figs. 3 and 4.

Referring to Fig. 2, in the early models of this receiver, contact No. 4 in the interstage section of the band selector was not used. The purpose of this contact arrangement is to short out variable resistor R2 in the second short wave position. In these models the relative positions of resistors R1 and R2 were reversed. The common connection from the suppressor grid and cathodes of the R. F. and I. F. amplifier tubes was connected to the control arm of variable resistor R2. The latter was connected to resistor R1 which was grounded at the other end. The by-pass condenser C6 remains connected as before, to the cathode and suppressor grid connection.

The type 6K7 and 6F6 metal tubes replace the types 6D6 and 42 glass tubes respectively which were used in the early models.

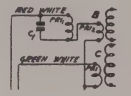

Fig. 8—Antenna Transformer in Early Models

Phonograph Connections

Phonograph connections can be made as shown in Fig. 9. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch—See Fig. 10.

For mounting the 12 mfd. 25 volt dry electrolytic condenser, two No. 27 drill holes should be drilled in the side of the chassis directly below the wet electrolytic condensers. These holes are 1¼" from the bottom, ⅞" and 3¾" from the front of chassis. The ground lug which extends out from the side of the chassis should be bent back into the chassis wall.

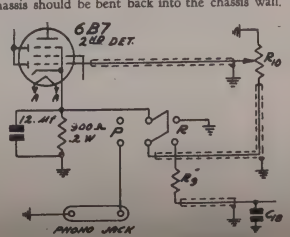

Fig. 9—Phonograph Connections

Replace the single lug insulated terminal strip (located on the rear panel, directly in back of the band selector switch) with (P-4A39) double lug insulated terminal strip with ground lug. Be sure to solder back to this new terminal strip any leads that were connected to the other terminal strip.

The connections are made by opening the diode return circuit at the volume control. Unsolder the 50,000 ohm resistor R9 (covered with saturated sleeving in early models) from the lug at the volume control and from the shielded lead which runs from the I. F. transformer. Cut this shielded lead to length and connect to the open lug on the new terminal strip. Connect one side of the 50,000 ohm resistor R9 to the same lug and the other side to the phono switch—see Fig. 9. Ground the shield to the ground lug of the terminal strip.

The extra shielded lead which is provided should be inserted into a piece of saturated sleeving.

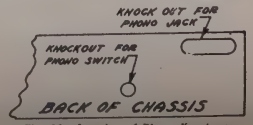

Fig. 10—Location of Phono Knockouts

MONTGOMERY-WARD & CO.

MODEL 62-246

C1	2.25 mmf.		C29	15 mf. 300 V.		R1	150 ohm .2 W.
C2	2.25 mmf.		C30	14 mf. 600 V.		R2	2500 ohm } Dual Vol. Control
C3	.05 mf. 180 V.		C31	.05 mf. 600 V.		R10	50000 ohm }
C4	.25 mf. 180 V.		C32	.002 mf. 600 V.		R3	3000 ohm .5 W.
C5	.05 mf. 360 V.		C33	.01 mf. 180 V.		R4	6000 ohm .5 W.
C10	2.25 mmf.		C34	.01 mf. 480 V.		R5	2500 ohm .2 W.
C11	2.25 mmf.		C35	.004 mf. 600 V.		R6	1600 ohm 2.0 W.
C12	.25 mf. 240 V.		R1	150 ohm .2 W.		R7	2.0 Megohm .2 W.
C13	.05 mf. 780 V.			2500 ohm } Dual Vol. Control		R8	30000 ohm .5 W.
C14	70-150 mmf. } ONE UNIT		R10	50000 ohm }		R9	9000 ohm .2 W.
C15	70-150 mmf. } ONE UNIT		R2	3000 ohm .5 W.		R11	60000 ohm .2 W.
C17	150-250 mmf. } ONE UNIT		R4	6000 ohm .5 W.		R13	25000 ohm 1.0 W.
C18	50 mmf.		R5	2500 ohm .2 W.		R14	80000 ohm .2 W.
C19	.25 mf. 360 V.		R6	1600 ohm 2.0 W.		R15	15000 Tone Cont.
C20	.25 mf. 360 V.		R7	2.0 Megohm .2 W.		R16	235 ohm 2.0 W.
C21	2.25 mmf.		R8	30000 ohm .5 W.		R17	100000 ohm .2 W.
C22	1400 mmf.		R9	9000 ohm .2 W.		R18	500000 ohm .2 W.
C23	2.25 mmf.		R11	60000 ohm .2 W.		T1	Antenna R.F. Trans.
C24	2.25 mmf.		R13	25000 ohm 1.0 W.		T2	Interstage R.F. Trans
C25	300-600 mmf. } ONE UNIT		R14	80000 ohm .2 W.		T3	1st I.F. Trans.
C26	40-100 mmf. } ONE UNIT		R15	15000 Tone Cont.		T4	2nd I.F. Trans.
C27	.10 mf. 360 V.		R16	235 ohm 2.0 W.		T5	Osc. Inductors
C28	35 mmf.		R17	100000 ohm .2 W.		T6	Power Trans.
C29	15 mf. 300 V.		R18	500000 ohm .2 W.		T7	Output Trans.
C30	14 mf. 600 V.		T1	Antenna R.F. Trans.		L1	Choke Coil
C31	.05 mf. 600 V.		T2	Interstage R.F. Trans		L2	Osc. Tracking Coil
C32	.002 mf. 600 V.		T3	1st I.F. Trans.			
C33	.01 mf. 180 V.		T4	2nd I.F. Trans.			
C34	.01 mf. 480 V.		T5	Osc. Inductors			
C35	.004 mf. 600 V.		T6	Power Trans.			
R1	150 ohm .2 W.		T7	Output Trans.			
	2500 ohm } Dual Vol. Control		L1	Choke Coil			
R10	50000 ohm }		L2	Osc. Tracking Coil			
R2	3000 ohm .5 W.						
R4	6000 ohm .5 W.						
R5	2500 ohm .2 W.						
R6	1600 ohm 2.0 W.						
R7	2.0 Megohm .2 W.						
R8	30000 ohm .5 W.						
R9	9000 ohm .2 W.						
R11	60000 ohm .2 W.						
R13	25000 ohm 1.0 W.						
R14	80000 ohm .2 W.						
R15	15000 Tone Cont.						
R16	235 ohm 2.0 W.						
R17	100000 ohm .2 W.						
R18	500000 ohm .2 W.						
T1	Antenna R.F. Trans.						
T2	Interstage R.F. Trans						
T3	1st I.F. Trans.						
T4	2nd I.F. Trans.						
T5	Osc. Inductors						
T6	Power Trans.						
T7	Output Trans.						
L1	Choke Coil						
L2	Osc. Tracking Coil						

	POSITION 1	POSITION 2	POSITION 3 (D)
ANT. & OSC. SECTION	STANDARD WAVE (B)	SHORT WAVE (C)	SHORT WAVE (D)
INT. SECTION	4 5 6 7 8 9 10 11 12	4 5 6 7 8 9 10 11 12	4 5 6 7 8 9 10 11 12
CONTACT LOCATIONS 3, 4 AND 10 IN ANT. AND OSC. SECTIONS AND 3 AND 10 IN INT. SECTION ARE BLANK.			

I.F. 456 K.C.

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

THE CAPACITY OF SHIELD "D" AND "E" IS 30-441 EACH.

ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

LOCATION OF OSCILLATOR TRIMMERS RANGE "B" & "C" IN EARLY MODELS

LOCATION OF OSCILLATOR TRIMMERS RANGE "B" & "C" IN INTERMEDIATE MODELS

Fig. 4—Oscillator Trimmer Location

Fig. 3—Location of Trimmers (Latest Models)

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Circuit

This model is a three band receiver with a tuning range in each band as shown in the specifications above. Three band coverage is accomplished by means of three sets of R. F. and oscillator coils and a three section triple throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R. F. transformer assemblies and T5 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively. The three sections of the band switch are designated in the schematic as the antenna, interstage and oscillator sections.

The band switch completes connections to the coils in use. It also short circuits the R. F. transformer secondary and oscillator coil of lower frequency not in use.

The antenna transformer with tuned secondary feeds into a type 6K7 R. F. amplifier tube. The output of this tube is fed through the interstage R. F. transformer with tuned secondary into another 6K7 tube which functions as the 1st detector.

A separate type 76 tube is employed in the oscillator circuit. Referring to the oscillator assembly T5, Fig. 2, B, C and D refer to the standard wave, 1st short wave and 2nd short wave oscillator coils respectively. The oscillating circuit is always resonant at 456 KC above the frequency to which the R. F. amplifier is tuned.

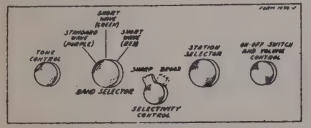


Fig. 1—Arrangement of Controls

The oscillator potential is fed into the cathode circuit of the 6K7 first detector tube. This results in the intermediate or beat frequency of 456 KC being present in the plate circuit of this tube.

One stage of I. F. amplification is employed using a 6K7 tube. The primaries and secondaries of the first and second I. F. transformers are tuned by small trimmer condensers.

Selectivity Control—Referring to the 1st I. F. transformer T3 in Fig. 2, it will be noted that there is a coupling winding shown in the illustration below the primary. Refer also to the by-pass arrangement in the pentode plate circuit of the 6B7.

When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer results in high selectivity. High audio frequencies are by-passed to ground through condenser C35.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

In order to allow passage of the higher audio frequencies in the broad position, the capacity of the by-pass condenser to ground is greatly reduced (C35 and the capacity of shield E in series).

Dual Volume Control—A dual manual volume control is employed. In one section the audio voltage applied to the 1st audio section of the 6B7 tube is varied (R10). In the other section the R. F. and I. F. bias is varied (R2). The purpose of the latter section is to reduce the sensitivity of the receiver at low volume settings in order to cut down noise pick-up between stations. The variable section R2 is shorted out through contact No. 4 of the interstage section of the band selector when in the 2nd short wave position.

A type 6B7 duo diode pentode tube functions as the second detector and a one stage audio amplifier. The two diode plates are connected together. AVC voltage is applied through isolating resistors to the control grid circuits of the R. F. and I. F. tubes. The audio voltage developed across volume control resistor R10 is applied through the movable arm to the control grid of the 6B7 tube. Resistance coupling is used between the first audio stage and the output stage which employs a type 6F6 output pentode tube. A type 80 full wave rectifier tube is used in the power unit.

Alignment and Calibration

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity switch to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 6.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C21) until maximum output is obtained. The location of this trimmer is shown in Figs. 3 and 4.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

There is a lever arm in front of the large gear on the tuning condenser shaft by means of which the position of the station pointer may be adjusted. Set the station pointer at the 1500 KC mark on the dial scale by adjusting this lever arm.

Adjust the interstage Range B trimmer (C9) and antenna Range B trimmer (C2) to maximum.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

Adjust the oscillator Range C trimmer (C23) until maximum output is obtained. See Figs. 3 and 4 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

Adjust the oscillator Range D trimmer (C24) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C11) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

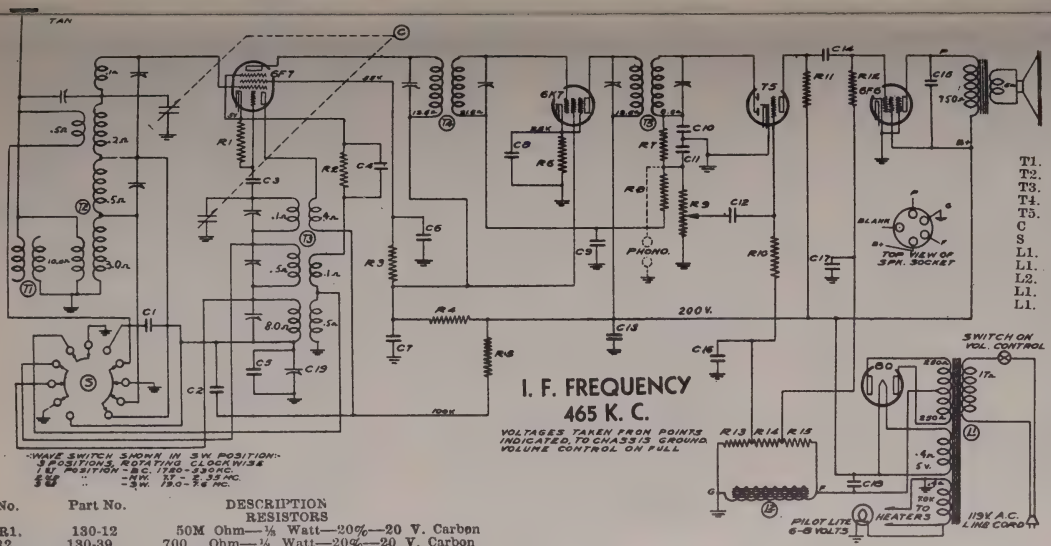
General Service Data

D. C. Resistance of Windings

Refer to Fig. 5.

Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D. C. Resistance in Ohms
9A376	Antenna Transformer	T1	
	Range B Primary Winding		21.2
	Range C Primary Winding		0.3
	Range D Primary Winding		0.2
	Range B Secondary Winding		6.1
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
9A377	R. F. Interstage Transformer	T2	
	Range B Primary Winding		2.4
	Range C Primary Winding		1.4
	Range D Primary Winding		0.3
	Range B Secondary Winding		6.0
	Range C Secondary Winding		1.9
	Range D Secondary Winding		Small
9A378	Oscillator Coils	T5	
	Range B Grid Coil		
	Red White Tap to White		3.8
	Red White Tap to Ground		0.9
	Range C Grid Coil		
	Green White Tap to Green		1.3
	Green White Tap to Ground		0.6
	Range D Grid Coil		
	Black White Tap to Black		Small
	Black White Tap to Ground		Small
	Oscillator Plate Coil		0.2
9A379	1st I. F. Transformer	T3	
	Primary Winding		11.6
	Secondary Winding		
	Long Portion		11.4
	Short Portion		0.5
9A380	2nd I. F. Transformer	T4	
	Primary Winding		14.3
	Secondary Winding		4.4
*12A223	Dynamic Speaker (8")	L1	
	Output Transformer Primary Winding	T7	510.
	Output Transformer Sec. Winding	T7	1.0
	Speaker Field		1025.
	Speaker Voice Coil		4.1
	Speaker Bucking Coil		0.2
53X91	115 Volt 60 Cycle Power Transformer	T6	
	Primary Winding		7.5
	Tube Filament Winding (A-A)		0.2
	80 Filament Secondary		0.2
	High Voltage Secondary Winding		
	Center Tap to Inside		163.
	Center Tap to Outside		178.
9A391	High Frequency Oscillator Tracking Coil	L2	1.1



I. F. FREQUENCY
465 K. C.

VOLTAGES TAKEN FROM POINTS INDICATED, TO CHASSIS GROUND. VOLUME CONTROL ON FULL

MISCELLANEOUS

T1.	Antenna Choke Coil
T2.	Antenna Coil
T3.	Oscillator Coil
T4.	Input I.F. Transformer
T5.	Output I.F. Transformer
C	Two Gang Variable Cond.
S	Wave Change Switch
L1.	Power Transformer 50/60 Cycle
L1.	Power Transformer 25 Cycle
L2.	Speaker—Field Resistance 1550 Ohms
L1.	Power Trans. Universal 50/60 Cycle
L1.	Power Trans. Universal 25 Cycle.

No.	Part No.	DESCRIPTION
		RESISTORS
R1.	130-12	50M Ohm—½ Watt—20%—20 V. Carbon
R2.	130-39	700 Ohm—½ Watt—20%—20 V. Carbon
R3.	130-20	100M Ohm—½ Watt—20%—50 V. Carbon
R4.	130-44	25M Ohm—½ Watt—20%—150 V. Carbon
R5.	130-42	20M Ohm—½ Watt—20%—100 V. Carbon
R6.	130-32	250 Ohm—½ Watt—20%—10 V. Wire Wound
R7.	130-12	50M Ohm—½ Watt—20%—20 V. Carbon
R8.	130-3	500M Ohm—½ Watt—20%—100 V. Carbon
R9.	101-18	500M Ohm Volume Control
R10.	130-19	1 meg Ohm—½ Watt—20%—100 V. Carbon
R11.	130-11	250M Ohm—½ Watt—10%—100 V. Carbon
R12.	130-11	250M Ohm—½ Watt—10%—100 V. Carbon
R13.	130-48	15M Ohm—½ Watt—10%—20 V. Carbon
R14.	130-47	180M Ohm—½ Watt—10%—100 V. Carbon
R15.	130-46	800M Ohm—½ Watt—10%—100 V. Carbon
		CONDENSERS
C1.	129-23	.002 Mica—MW—5%
C2.	100-20	.1 x 120 V.—25%
C3.	129-5	.0001 Mica—MT—20%
C4.	100-20	.1 x 200 V.—25%
C5.	129-24	.00038—MT—5%
C6.	118-1	.1x 200 V.—Dual Plus 50%; Minus 10%
C7.	118-1	.1 x 200 V.—Dual Plus 50%; Minus 10%
C8.	118-1	.1 x 200 V.—Dual Plus 50%; Minus 10%
C9	118-1	.1 x 200 V.—Dual Plus 50%; Minus 10%
C10.	129-51	.000125—Mica MT—20%
C11.	129-51	.000125—Mica MT—20%
C12.	100-22	.05 x 200 V.—25%
C13.	103-7	.8 mfd. x 300 V. Electrolytic
C14.	100-11	.01 x 400 V.—25%
C15.	100-19	.006 x 600 V.—25%
C16.	118-1	.1 x 200 V.—Dual Plus 50%; Minus 10%
C17.	118-1	.1 x 200 V.—Dual Plus 50%; Minus 10%
C18.	103-6	.8 mfd. x 350 V. Electrolytic
C19.	124-5	B. C. Series Pad J-3-S.

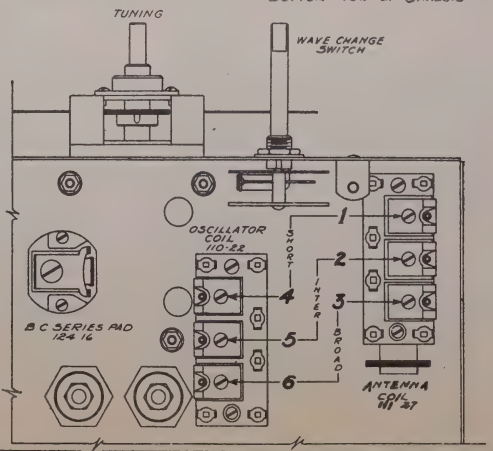
TUNING RANGE—

Standard Broadcast Band
530-1720 Kilocycles.

Intermediate Band
2350-7700 Kilocycles.

Short Wave Band
7.6-19.0 Megacycles.

BOTTOM VIEW OF CHASSIS



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DESCRIPTION

The Tube complement of this chassis is as follows:
1 Type 6F7—triode pentode as oscillator and first detector.
1 Type 6K7—remote cut-off pentode as I.F. amplifier.
1 Type 75—duplex diode triode as diode detector, A.V.C. and A.F.
1 Type 6F6—pentode output tube.
1 Type 80—high vacuum rectifier.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagrams.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 119 volts on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

ALIGNING INSTRUCTIONS

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and take the chassis out of the cabinet, remove the three bolts by which it is fastened and the speaker plug which you will find on the front flange of the chassis panel.

Aligning I. F. Transformers

1. With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, extreme left of its rotation, and with variable condenser at its minimum capacity position, plates entirely out of mesh, adjust the I.F. transformers (two adjustments at the top of parts number 108-38 and 108-40—see top view).
   (a) Connect external oscillator which has been adjusted to 455 kilocycles in series with I.F. dummy antenna, to the control grid cap of the type 6K7 tube and chassis ground. Adjust output I.F. transformer, part number 108-40, to resonance.
   (b) Move generator output clip from grid of 6K7 to grid cap of type 6F7 tube and align input I.F. transformer, part number 108-38.
   (c) With generator connected to grid of type 6F7 tube, readjust output I.F. transformer, part number 108-40, to resonance.

Broadcast Band Alignment—
(540 - 1720 Kilocycles)

1. With wave changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with broadcast dummy antenna to tan antenna and black ground leads and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance, for location of this adjustment, number 6, see diagram.
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. For location of this adjustment, number 3, see diagram.

5-Tube 3-Band Superheterodyne with Avc.

   (c) Re-set external oscillator to 600 kilocycles and adjust series pad to resonance, rotate condenser and move dial pointer to 600 kilocycles by gently rocking condenser to and fro. Pick up oscillator signal while adjusting series pad to resonance, maximum deflection on an output meter. This adjustment is accessible from the top of the chassis and is located between variable condenser and power transformer, see top view—part number 124-16.
   (d) Check for tracking and sensitivity at 1000 kilocycles.

NOTE (Series "B", "C" and "D" only)

25 Cycle Chassis differ only from 60 cycle chassis in that part number 104-18 transformer is used in place of 50/60 cycle transformer, part number 104-14.

Short Wave Band Alignment—
(7.6 - 19.0 Megacycles)

1. This band is aligned after the I.F. adjustments have been completed. Set wave changing switch to short wave position, extreme right of its rotation, set dial pointer to 18 megacycles.
   (a) With external oscillator adjusted to 18 megacycles and connected in series with short wave dummy antenna to tan antenna and black ground leads, adjust the oscillator short wave trimmer until generator signal is picked up. For location of this adjustment, number 4, see diagram.
   (b) Adjust short wave antenna trimmer to resonance. For location of this adjustment, number 1, see diagram.
   (c) Re-set external oscillator to 9 megacycles, rotate condenser, move dial pointer to 9 megacycles and check for tracking and sensitivity. Do not bend plates. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

Intermediate Band Alignment—
(2.35 - 7.7 Megacycles)

1. With wave changing switch in center position, and with dial pointer set to 7 megacycles, make the following adjustments:
   (a) With external oscillator set at 7 megacycles and connected in series with short wave dummy antenna, as for short wave adjustments, adjust trimmer of oscillator coil, part number 110-22 until 7 megacycle signal is picked up. For location of this adjustment, number 5, see diagram.
   (b) Adjust antenna trimmer to resonance, adjustment number 2, see diagram.
   (c) Re-set external oscillator to 2.5 megacycles (2500 kilocycles), rotate variable condenser, move pointer, pick up oscillator signal and check for tracking and sensitivity. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

LIST OF REPAIR PARTS

Parts Used in Ser. A	Parts Used in Ser. B	Parts Used in Ser. C-D	DESCRIPTION	Not Used in Set	List Price Each
			CONDENSERS		
100-11	100-11	100-11	.01 x 400V—25%	1	$0.25
100-15	100-15	100-15	.015 x 400V—Plus 10%; Minus 20%	1	.25
100-19	100-19	100-19	.000 x 600V—25%	1	.25
100-20	100-20	100-20	.1 x 120V—25%	4	.25
Not Used	100-22	100-22	.05 x 200—25%	1	.25
Not Used	103-6	103-6	8 Mfd. x 350V Electrolytic	1	.85
Not Used	103-7	103-7	8 Mfd. x 300V Electrolytic	1	.75
118-1	118-1	118-1	Dual 1 x 200V—Plus 50%; Minus 10% (Series B & C use 3 per set)	1	.50
119-11	Not Used	Not Used	4-3-4 Mfd. Electrolytic	1	2.00
119-12	Not Used	Not Used	8-8-4 Mfd. Electrolytic (For 25 Cy. Only	1	2.50
129-2	129-2	129-2	.0005 Mica—MT—20%	1	.25
129-5	129-5	129 5	.0001 Mica—MT—20%	1	.25
129-15	129-15	Not Used	.00035 Mica—MT—5%	1	.25
129-16	129-16	Not Used	.00287 Mica—MW—5%	1	.35
Not Used	Not Used	129-23	.002 Mica—MW—5%	1	.35
Not Used	Not Used	129-24	.000425 Mica—MT—5%	1	.25
			RESISTORS		
130-3	130-3	130-3	500M Ohm—1/5 Watt—20%—100V—Carbon	1	.20
130-11	130-11	130-11	250M Ohm 1/3 Watt—20%—50V—Carbon	1	.20
130-12	130-12	130-12	50M Ohm—1/3 Watt—20%—20V—Carbon	1	.20
130-19	130-19	130-19	1 Meg Ohm—1/3 Watt—20%—100V—Carbon	1	.20
130-20	130-20	130-20	100M Ohm—1/5 Watt—20%—50V—Carbon	1	.20
Not Used	130-32	130-32	250 Ohm—1/3 Watt—20%—10V—Wire W.	1	.20
130-38	Not Used	Not Used	2 Meg Ohm—1/3 Watt—20%—20V—Carbon	1	.20
130-39	130-39	130-39	700 Ohm—1/3 Watt—20%—30V—Carbon	1	.20
130-40	Not Used	Not Used	19M Ohm—1/2 Watt—20%—150V—Carbon	1	.20
130-41	Not Used	Not Used	800 Ohm—1/3 Watt—20%—20V—Carbon	1	.20
130-42	130-42	130-42	20M Ohm—1/2 Watt—20%—100V—Carbon	1	.20
Not Used	130-44	130-44	25M Ohm—1/2 Watt—20%—150V—Carbon	1	.20
Not Used	130-46	130-46	800M Ohm—1/5 Watt—10%—100V—Carbon	1	.20
Not Used	130-47	130-47	180M Ohm—1/5 Watt—10%—100V—Carbon	1	.20
Not Used	130-48	130-48	15M Ohm—1/5 Watt—10%—20V—Carbon	1	.20
			POWER TRANSFORMERS		
104-14	104-14	104-14	50/60 Cycle Power Transformer	1	3.00
104-17	104-17	104-17	Universal Power Trans.—40 Cy. Primary	1	5.00
104-18	104-18	104-18	25 Cycle Power Transformer	1	4.00
Not Used	105-9	Not Used	Antenna Choke Coil	1	.50
Not Used	Not Used	105-10	Antenna Choke Coil	1	.50
108-26	108-26	Not Used	Input I. F. Transformer Complete	1	1.50
108-27	Not Used	Not Used	Output I. F. Transformer Complete	1	1.50
Not Used	108-28	Not Used	Output I. F. Transformer Complete	1	1.50
Not Used	Not Used	108-38	Input I. F. Transformer Complete	1	1.50
Not Used	Not Used	108-40	Output I. F. Transformer Complete	1	1.50
110-13	Not Used	Not Used	Oscillator Coil Complete	1	2.50
Not Used	110-14	Not Used	Oscillator Coil Complete	1	2.50
Not Used	Not Used	110-22	Oscillator Coil Complete	1	2.50
111-17	Not Used	Not Used	Antenna Coil Complete	1	2.25
Not Used	111-18	Not Used	Antenna Coil Complete	1	2.75
Not Used	Not Used	111-27	Antenna Coil Complete	1	2.25
			COILS		
			SOCKETS		
121	121	121	Four Prong Socket—Type 80	1	.10
121	121	121	Five Prong Socket—Speaker	1	.10
121	121	121	Six Prong Socket—Type 43	1	.10
121	121	121	Six Prong Socket—Type 75	1	.10
121	121	121	Six Prong Socket—Type 6D6	1	.10
121	121	121	Seven Prong Socket—Type 6F7	1	.10
			MISCELLANEOUS		
101-18	101-18	101-18	Volume Control	1	1.35
102-12	102-12	102-12	Two Gang Variable Condenser	1	3.00
106-18	Not Used	Not Used	Metal Clad Resistor	1	.50
107-5	107-5	107-5	Line Cord	1	.50
112-15	112-15	112-15	Crystal	1	.12
112-16	112-16	112-16	Pointer	1	.05
112-19	112-19	112-19	Drive Disc Complete	1	.40
112-26	112-26	112-26	Planetary Drive Complete	1	1.25
112-31	112-31	112-31	Compression Spring	1	.05
112-40	112-40	112-40	Pilot Light Bracket	1	.10
112-62	112-62	112-62	Drive Bracket Assembly	1	.50
112-66	112-66	112-66	Bakelite Escutcheon with Glass	1	.80
112-66	Not Used	Not Used	Dial Scale	1	.25
Not Used	112-64B	112-64B	Dial Scale	1	.25
115-22	115-22	115-22	Tube Shield	2	.15
116-5	116-5	116-5	Pilot Light Bulb—6-8 Volt—T50	1	.10
124-16	124-16	124-16	Type T-2-S Padder	1	.25
125-6	125-6	125-6	Wave Change Switch	1	.75
131-2	131-2	131-2	Bakelite Knobs	2	.15
131-10	131-10	131-10	Bakelite Knobs (3 Dots)	1	.20
114-19	Not Used	Not Used	Six Inch Speaker	1	6.00
Not Used	114-15	114-15	Six Inch Speaker	1	6.00
			Midget Cabinet		5.00

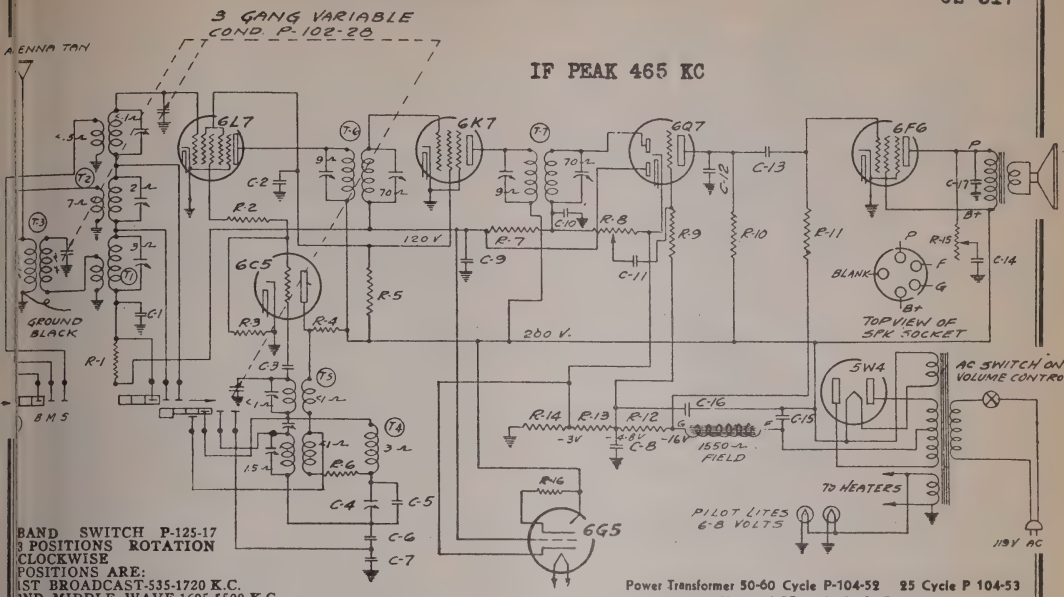
All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

All prices quoted are list and are subject to the usual trade discounts.
Prices subject to change without notice.
Shipments are F.O.B. our Factory. When remitting in advance, please include postage.
We cannot supply speaker cones only. We can replace a speaker on which the cone has been damaged for $1.50, if defective speaker is returned.

MONTGOMERY-WARD & CO.

MODELS 62-249, 62-317



Power Transformer 50-60 Cycle P-104-52 25 Cycle P 104-53
Universal 25 Cycle P-104-54
Universal 40 Cycle P-104-55

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Outer Scale —Blue	535 to 1720 K.C. (Kilocycles)
Middle Wave	Center Scale—Green	1695 to 5500 K.C. (Kilocycles)
Short Wave	Inner Scale —Buff	5.2 to 18.3 M.C. (Megacycles)

LIST OF REPAIR PARTS (Serial No. 6E249976 and up)

Use Only Genuine Factory Replacement Parts

Part No.	Schematic Reference	Description	No. Used In Set
		CONDENSERS	
3E100-1	C-2	.1 x 400 Volt Tubular	1
3E 100-11	C-11; C-18	.01 x 400 Volt Tubular	2
3E 100-30	C-8	.1 x 200 Volt Tubular	1
3E 100-33	C-1; C-9	.05 x 200 Volt Tubular	2
3E 100-35	C-17	.002 x 600 Volt Tubular	1
3E 100-37	C-14	.025 x 600 Volt Tubular	1
3E 102-6	C-15	8 Mfd. x 350 Volt Electrolytic	1
3E 102-7	C-16	8 Mfd. x 300 Volt Electrolytic	1
3E 129-2	C-12	.0005 Mica—Type MT—20%	1
3E 129-[illegible]	C-10	.00025 Mica—Type MT—20%	1
3E 129-39	C-3	.00005 Mica—Type MT—20%	1
3E 129-54	C-7	.002 Mica—Type MW—2½%	1
3E 129-55	C-6	.0034 Mica—Type MW—2½%	1
3E 129-56	C-5	.00055 Mica—Type MT—10%	1
		RESISTORS	
3E 106-26	R-12; R-13; R-14	(R-12, 220 Ohm) (R-13, 32 Ohm) (R-14, 52 Ohm) Metal Clad Resistor	1
3E 130-4	R-9	2 Meg Ohm—½ Watt—20%—100 Volt Carbon	1
3E 130-12	R-8	50M Ohm—½ Watt—20%— 20 Volt Carbon	1
3E 130-19	R-7	1 Meg Ohm—½ Watt—20%—100 Volt Carbon	1
3E 130-20	R-1	100M Ohm—½ Watt—20%— 50 Volt Carbon	1
3E 130-27	R-6	50 Ohm—½ Watt—20%— 3 Volt Carbon	1
3E 130-102	R-11	500M Ohm—½ Watt—10%— 50 Volt Carbon	1
3E 130-103	R-10	100M Ohm—½ Watt—10%— 50 Volt Carbon	1
3E 130-104	R-4; R-5	9M Ohm—1 Watt—20%—100 Volt Carbon	2
3E 130-105	R-3	150 Ohm—½ Watt—20%— 10 Volt Carbon	1
3E 130-110	R-16	1 Meg Ohm—1/10 Watt—10%—100 Volt Carbon	1
		COILS	
3E 108-73	T-7	Output I.F. Coil Assem. Comp. with Can.	1
3E 108-74	T-6	Input I.F. Coil Assem. Comp. with Can.	1
3E 110-38	T-4	Broadcast Oscillator Coil Assem. Comp. with Can.	1
3E 110-39	T-5	Mid Wave and Short Wave Oscillator Assem. less Can.	1
3E 111-49	T-1	Broadcast Antenna Coil Assem. Comp. with Can.	1
3E 111-50	T-2	Mid Wave and Short Wave Antenna Coil Assem. less Can.	1
3E 111-51	T-3	Broadcast Preselector Coil Assembly	1
		SOCKETS	
3E 121-8		Five Prong Socket—Marked "SPKR"	1
3E 121-12		Seven Prong Socket—Marked "6K7"	1
3E 121-14		Seven Prong Socket—Marked "6F6"	1
3E 121-15		Five Prong Socket—Marked "5W4"	1
3E 121-17		Six Prong Socket—Marked "6C5"	1
3E 121-18		Seven Prong Socket—Marked "6L7"	1
3E 121-26		Seven Prong Socket—Marked "6Q7"	1
		SPEAKER	
A 114-15		Six Inch Dynamic	1
		TRANSFORMERS	
BE 104-52		Power Transformer, 50/60 Cycle	1
BE 104-53		Power Transformer, 25 Cycle	1
BE 104-54		Universal Power Transformer, 25 Cycle Primary	1
BE 104-55		Universal Power Transformer, 40 Cycle Primary	1
		MISCELLANEOUS	
BE 101-46	R-8	Volume Control and Switch (1 Meg Ohm)	1
BE 101-58	R-15	Tone Control 50M Ohm	1
BE 102-28		Three Gang Variable Condenser	1
BE 107-5		Line Cord and Plug	1
BE 115-35		Antenna, Oscillator, Shield	2
BE 124-28	C-4	J-S Series Pad 3 Pf. (80-225)	1
BE 125-17	S	Band Switch	1
BE 128-44		"Volume" Knob with Spring	1
BE 128-46		"Band Switch" Knob with Spring	1
BE 128-47		"Tuning" Knob with Spring	1
BE 128-45		"Tone" Knob with Spring	1

CATHODE RAY TUNING INDICATOR PARTS

BE 107-35	Cable and Socket Assembly	1
BE 112-153	Metal Oval Escutcheon	1
BE 117-57	Holder and Clamp	1
BE 130-110	1 Meg Ohm—1/10 Watt—10%—100 Volt Carbon	1

DIAL PARTS LIST

	ASSEMBLIES	
BE 117-41	Drive Bracket Including: 1—No. 117-19—Tuning Shaft Bushing	1
BE 117-66	Switch Disc and Link Assembly, including: 1—No. 117-12 —Switch Arm 1—No. 117-25 —Bushing with Screws 1—No. 117-40B—Switch Link 3—No. 131-26 —Spring Washers 3—No. 162-5 —Rivets 1—No. 112-144—Switch Disc—Inc. Red Tape	1
	DIAL PARTS ONLY	
BE 112-125	Drive Belt	1
BE 112-143	Oval Escutcheon complete with Celluloid Crystal	1
BE 112-148A	Dial Scale complete with Fastener, Pointer Disc, and Screw	1
BE 112-147	Tuning Shaft	1
BE 112-151	Pointer complete with Screw	1
BE 112-156	Pilot Light Assembly	2
BE 116-13	6.8 Volt T-51 Pilot Light	2
BE 117-20A	Tuning Shaft Pulley	1
BE 117-38	Stud, for take-up Spring	1
BE 117-39	Pulley, for take-up Spring	1
BE 120-14	Take-up Spring	1
BE 134-9	Horse Shoe Washer	1
BE 134-40	Rubber Grommet	2

Note: Speakers cannot be ordered, defective speakers must be repaired.

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MODELS 62-249, 62-317

MONTGOMERY-WARD & CO.

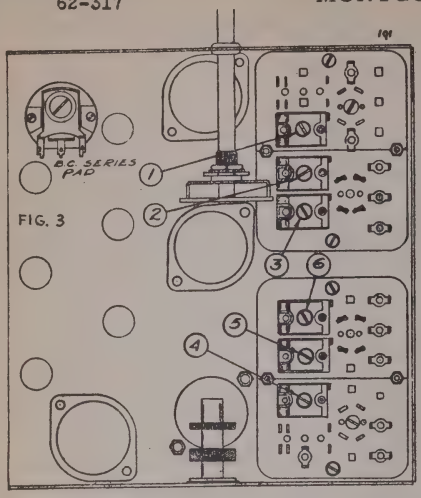

FIG. 3

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-73 Output I.F. Transformer
Part No. 108-74 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-73) to resonance.

   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6L7 and adjust input I.F. transformer (No. 108-74) to resonance.

   (c) With oscillator still connected to 6L7, readjust output I.F. transformer (108-73) if necessary.

BROADCAST BAND ALIGNMENT:

535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with 'Dummy 2" to tan antenna lead and black ground lead, make following adjustments:

   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (Adjustment number 1; see bottom view of coil assembly, Fig. 3

   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis; Fig. 1, for location of this adjustment).

   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).

   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

   (e) Check for tracking and sensitivity at 1000 kilocycles. Under no circumstances bend plates of variable condenser sections to correct tracking.

SHORT WAVE BAND ALIGNMENT:

5.2 to 18.3 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead make the following adjustments:

   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.

   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.

   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 18.3 megacycle can be tuned in not only at 18.3 on the dial, but also at approximately 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

1695 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (adjustment number 2) and middle wave antenna (adjustment number 5) to resonance.

   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.

   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.

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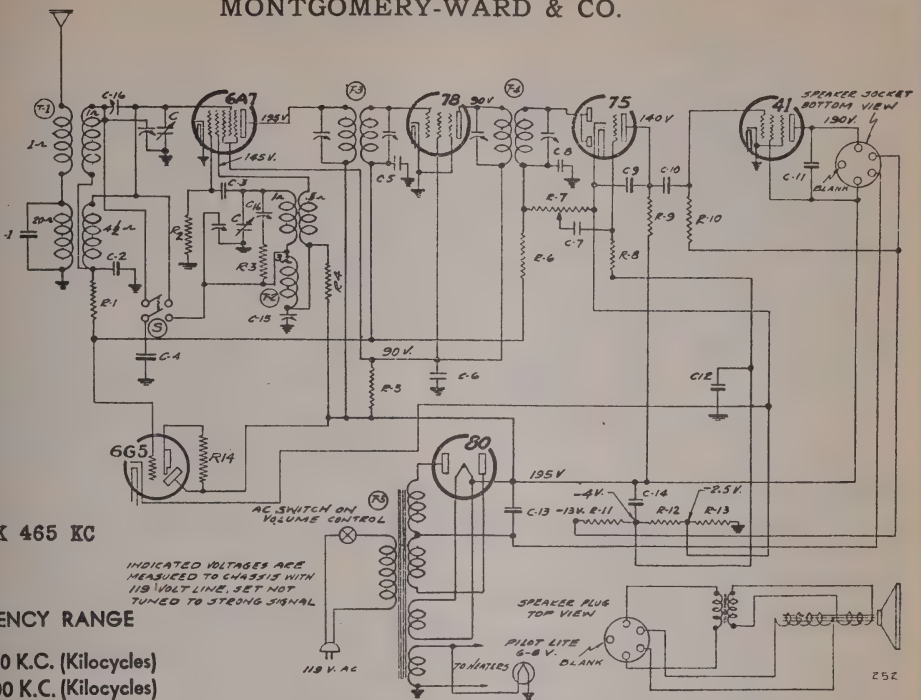
MODEL 62-256

MONTGOMERY-WARD & CO.



IF PEAK 465 KC

FREQUENCY RANGE

535 to 1720 K.C. (Kilocycles)

1280 to 6600 K.C. (Kilocycles)

o.	Part No.	Description
		RESISTORS
	130-111	100M Ohms 1/10 Watt—20%—50 Volt Carbon
	130-12	50M Ohms 1/3 Watt—20%—20 Volt Carbon
	130-112	100 Ohms 1/10 Watt—20%—10 Volt Carbon
	130-22	5M Ohms 1/3 Watt—20%—10 Volt Carbon
	130-77	10M Ohms 1 Watt—20%—100 Volt Carbon
	130-110	1 Meg Ohm 1/10 Watt—10%—100 Volt Carbon
	101-49	1 Meg Ohm Volume Control
	130-113	2 Meg Ohm 1/10 Watt—20%—100 Volt Carbon
	130-20	100M Ohms 1/3 Watt—20%—50 Volt Carbon
0	130-100	150M Ohms 1/3 Watt—20%—50 Volt Carbon
1	106-26	220 Ohms
2	106-26	33 Ohms
3	106-26	52 Ohms

R14	130-110	1 Meg Ohm 1/10 Watt—10%—100 Volt Carbon
	NOTE:	R11, R12, and R13 in one unit—106-26
		CONDENSERS
C1	129-63	.0004 Mica—W—10%
C2	100-26	.02 x 400 Volt—25%
C3	129-62	.00003 Mica—O—10%
C4	129-61	.0017 Mica—W—2½%
C5	100-9	.05 x 200 Volt—25%
C6	100-6	.25 x 200 Volt—25%
C7	100-11	.01 x 400 Volt—25%
C8	129-12	.00025 Mica—O—20%
C9	129-5	.0001 Mica—O—20%
C10	100-11	.01 x 400 Volt—25%
C11	100-19	.006 x 600 Volt—25%
C12	100-6	.25 x 200 Volt—25%
C13	103-6	8 mfd. x 350 Volt Electrol.
C14	103-7	8 mfd. x 300 Volt Electrolytic
C15	124-29	Adjustable condenser 390 mmf. working capacity
C16	124-30	Adjustable Dual Condenser
		MISCELLANEOUS PARTS
T1	111-56	Antenna Coil
T2	110-44	Oscillator Coil
T3	108-75	Input I.F. 465 kc.
T4	108-76	Output I.F. 465 kc.
T5	104-56	Power Transformer—60 Cycles
S	125-19	Band Switch
C	102-31	One Section of Two Gang Condenser

LIST OF REPAIR PARTS (Serial No. 6H369775 and up)

Use Only Genuine Factory Replacement Parts

rt No.	Schematic Reference	Description	No. Used in Set
		CONDENSERS	
100-6	C-12; C-6	.25 x 200 Volt Tubular—Without Bracket	2
100-9	C-5	.05 x 200 Volt Tubular	1
100-11	C-10; C-7	.01 x 400 Volt Tubular	2
100-19	C-11	.006 x 600 Volt Tubular	1
100-26	C-2	.02 x 400 Volt	1
103-6	C-13	8 Mfd. x 350 Volt Electrolytic	1
103-7	C-14	8 Mfd. x 300 Volt Electrolytic	1
129-5	C-9	.0001 Mica—Type O—20%	1
129-12	C-8	.00025 Mica—Type O—20%	1
129-61	C-4	.0017 Mica—Type W—2½%	1
129-62	C-3	.00003 Mica—Type O—10%	1
129-63	C-1	.0004 Mica—Type W—10%	1
		RESISTORS	
106-26	R-11; R-12; R-13	220 Ohm (R-11), 33 Ohm (R-12), 52 Ohm (R-13), Metal Clad Resistor	1
130-12	R-2	50M Ohm— ½ Watt—20%— 20 Volt—Carbon	1
130-20	R-9	100M Ohm— ½ Watt—20%— 50 Volt—Carbon	1
130-22	R-4	5M Ohm— ½ Watt—20%— 10 Volt—Carbon	1
130-77	R-5	10M Ohm— 1 Watt—20%—100 Volt—Carbon	1
130-100	R-10	150M Ohm— ⅓ Watt—20%— 50 Volt—Carbon	1
130-110	R-6; R-14	1 Meg Ohm—1/10 Watt—10%—100 Volt—Carbon	2
130-111	R-1	100M Ohm—1/10 Watt—20%— 50 Volt—Carbon	1
130-112	R-3	100 Ohm—1/10 Watt—20%— 10 Volt—Carbon	1
130-113	R-8	2 Meg Ohm—1/10 Watt—20%—100 Volt—Carbon	1
		COILS	
108-75	T-3	465 K.C. Input I.F. Coil Assembly Complete with Can	1
108-76	T-4	465 K.C. Output I.F. Coil Assembly Complete with Can	1
110-44	T-2	Oscillator Coil Assembly Complete with Can	1
111-56	T-1	Antenna Coil Assembly Complete with Can	1
		SOCKETS	
121-6		Six Prong Socket—Marked "78"	1
121-6		Six Prong Socket—Marked "75"	1
121-6		Six Prong Sock —Marked "41"	1
121-7		Seven Prong Socket—Marked "6A7"	1
121-8		Five Prong Socket—Marked "SPKR"	1
121-9		Four Prong Socket—Marked "80"	1

Part No.	Schematic Reference	Description	No. Used in Set
BE 104-58		25 Cycle—110 Volt Power Transformer	
BE 104-59		40 Cycle Primary—Universal Power Transformer	
		CATHODE-RAY TUNING INDICATOR PARTS	
		Cable and Socket Assembly	1
		Metal Oval Escutcheon	1
		Holder and Clamp	1
BE 130-110		1 Meg Ohm—1/10 Watt—10%—100 Volt Carbon	1
		MISCELLANEOUS	
BE 101-49	R-7	Volume Control & A. C. Switch (1 Meg Ohm)	1
BE 102-31	C	Two Gang Variable Condenser	1
BE 107-5		Line Cord & Plug	1
BE 112-15		Dial Crystal Only—Less Escutcheon	1
BE 112-131		Bakelite Escutcheon Complete with Crystal	1
BE 112-156		Pilot Light Assembly	1
BE 112-159		Dial Scale	1
BE 112-160		Dial Pointer Complete with Screw	1
BE 115-22		Tube Shield	2
BE 116-13		6-8 Volt, T-51 Pilot Light Bulb	1
BE 117-58		Dial Housing	1
BE 117-59		Pointer Stud	1
BE 117-60		Pointer Bushing Assembly	1
BE 117-61		Drive Pulley	1
BE 120-7		Belt Tension Spring	1
BE 124-29	C-15	Type TU5 Series Pad	1
BE 124-30	C-16	Dual Ceramic Padder	1
BE 125-19	S	Band Switch	1
BE 131-2		Bakelite Knob	3
BE 131-43		Cinch Button for Fastening Dial Scale	5
BE 131-49		Drive Belt	1
BE 134-9		Compression Spring	1
		SPEAKER	
BE 114-16		Five Inch Dynamic Speaker	1
		TRANSFORMERS	
BE 104-56	T-5	60 Cycle—110 Volt Power Transformer	1
BE 104-57		40 Cycle—110 Volt Power Transformer	

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MODEL 62-256

MONTGOMERY-WARD & CO.

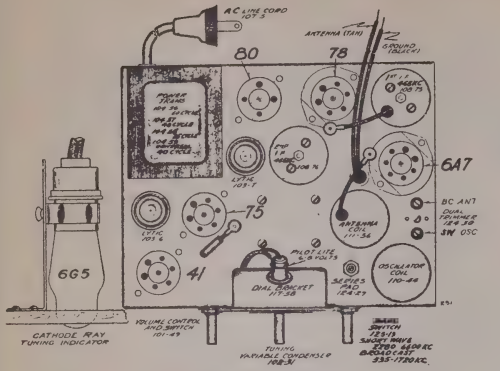

FIG. 1—TOP VIEW

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-76 Output I.F. Transformer
Part No. 108-75 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 78 tube, and adjust the output I.F. transformer (No. 108-76) to resonance.

   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 78 to grid cap to 6A7 and adjust input I.F. transformer (No. 108-75) to resonance.

   (c) With oscillator still connected to 6A7, readjust output I.F. transformer (108-76) if necessary.

BROADCAST AND SHORT WAVE BAND ALIGNMENT

Broadcast Band:—535 to 1720 Kilocycles.
Short Wave Band:—2280 to 6600 Kilocycles.

Important:—These adjustments must be made in the following order:

SHORT WAVE OSCILLATOR ADJUSTMENT:

1. With band switch in the short wave band position, extreme right of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with the external oscillator connected in series with "Dummy 1" to grid cap of the 6A7 tube, make the following adjustment:

   (a) Set external oscillator to 6.6 megacycles and adjust short wave oscillator trimmer to resonance. This adjustment is marked "S.W. Osc." (see top view of chassis, Fig. 1, for location of this adjustment).

NOTE: Make certain that the fundamental 6.6 megacycles signal has been tuned in and not the image frequency, noting that the image appears when the tuning knob is moved to approximately 5.7 megacycles.

BROADCAST BAND OSCILLATOR ADJUSTMENT:

1. With band switch in the broadcast position, extreme left of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 1" to grid cap of the 6A7 tube, make the following adjustment:

   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. This adjustment is the trimmer mounted on the front section of the variable gang condenser.

BROADCAST BAND ANTENNA ADJUSTMENT:

1. With the band switch still in the broadcast position, move the external oscillator from the grid cap of the 6A7 tube to the tan antenna lead and black ground lead, in series with "Dummy 2" and make the following adjustments:

   (a) Set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer to resonance. This adjustment is marked "B.C. Ant." (See top view of chassis, Fig 1, for location of this adjustment.)

   (b) Re-set external oscillator to 600 K.C. and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until, by adjusting series pad, maximum output is attained. This adjustment is located on the top of the chassis directly in front of the antenna coil. (See top view of chassis, Fig. 1).

   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

SHORT WAVE BAND ANTENNA ADJUSTMENT:

1. With the band switch in the short wave position, and with external oscillator connected in series with "Dummy 3," to the tan antenna lead and black ground lead, make following adjustment:

   (a) Set external oscillator to 6 megacycles and adjust the short-wave antenna trimmer to resonance. This adjustment is the trimmer mounted on the rear section of the variable gang condenser.

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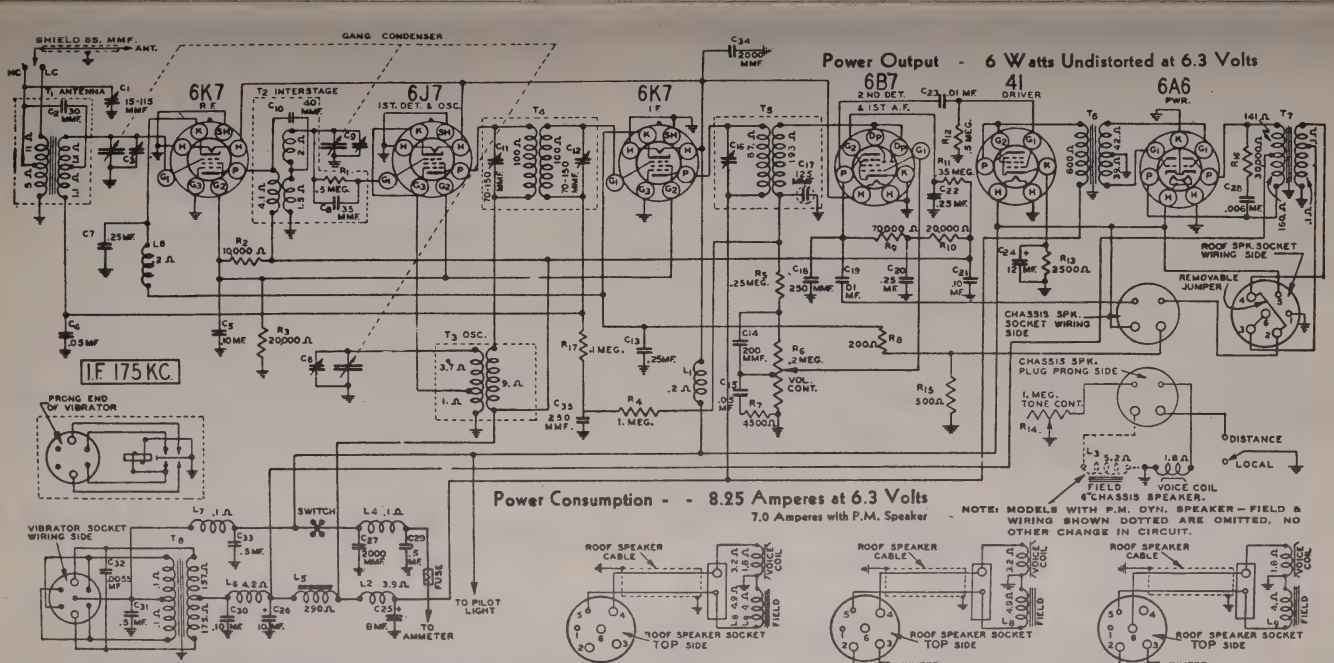


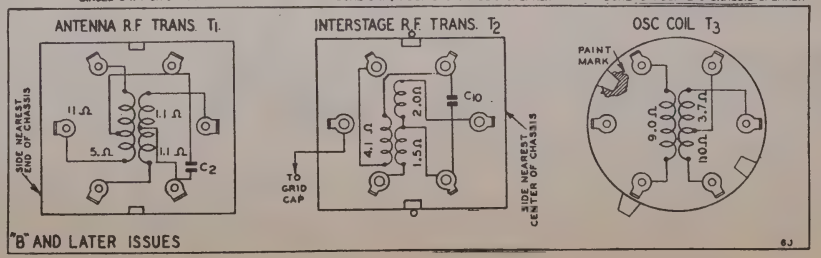
"B" AND LATER ISSUES

VOLTAGES AT SOCKETS ("B" AND LATER ISSUES)

Battery—6.3 Volts Under Load L-D Switch in Distance Position

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground
6K7	R.F.	5.8	250	132	3.6
6J7	1st Det. and Osc.	5.8	250	132	0
6K7	I.F.	5.8	250	132	3.6
6B7	2nd Det. & 1st A.F.	5.8	45(1)	45(1)	0
41	2nd A.F.	6.0	240	240	26
6A6	Power	6.0	262		0

(1) As read with 1000 ohm per volt meter—500 volt scale.



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CHANGES IN LATER MODELS

June, 1937

Later models of the Series have changes incorporated in them which are explained below. The models which have these changes may be identified by the issue letter which is a large letter stamped on top of the chassis base. The tube arrangement label on the chassis case cover also shows this issue letter.

When ordering parts, it is important that the issue letter be noted and the correct part number, as shown in the parts list, be specified.

The "D" issue Series is different from the "B" and "C" The gang condenser used in the "D" issue radios does not have the cut plate oscillator section. A padding condenser (600 KC) was added in series with the oscillator section of this gang condenser and the oscillator coil. The padding condenser is a part of the 2nd I. F. trimmer unit and is mounted in the 2nd I. F. coil can.

The capacity (C17) shown within a dotted circle in the 2nd I.F. coil assembly on the schematic has been changed to an actual part as shown in the supplementary parts list.

The antenna, R.F. Interstage, oscillator, and 2nd I.F. coil assemblies have been changed and have been given new part numbers as shown in the supplementary parts list.

SUPPLEMENTARY REPLACEMENT PARTS

The PARTS of the Series are used on the Series "D" issue Radio with the following EXCEPTIONS: PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

THE FOLLOWING NEW PARTS ARE USED:

No.	Code	Description	List Price
9A859	T1	Antenna Transformer and Can Assembly.....	$1.65
9A861	T2	R. F. Interstage Transformer and Can Assembly.....	1.75
9A862	T3	Oscillator Coil and Can Assembly.....	.95
9A858	T5	2nd I. F. Transformer and Can Assembly.....	2.35
47X57	C17	100 mmf. Molded Condenser.....	.10
17A79	(C16	30-100 mmf. 2nd I.F. Trimmer)	.45
	(	900-1300 mmf. Oscillator 600 KC Padder)	
14A77		3 Section Gang Condenser Complete with Drive Gears.....	5.05

THE FOLLOWING PARTS OF THE SERIES ARE NOT USED ON THE SERIES "D" ISSUE RADIO:

9A740) or 9A771)	T1	Antenna Transformer and Can Assembly.....	$1.65
9A741) or 9A765)	T2	R.F. Interstage Transformer and Can Assembly.....	1.70
9A742) or 9A772)	T3	Oscillator Coil and Can Assembly.....	.85
9A744	T5	2nd I.F. Coil and Can Assembly.....	1.60
17A65	C16	30-100 mmf. 2nd I.F. Trimmer.....	.20
14A65		3 Section Gang Condenser Complete with Drive Gears.....	5.85

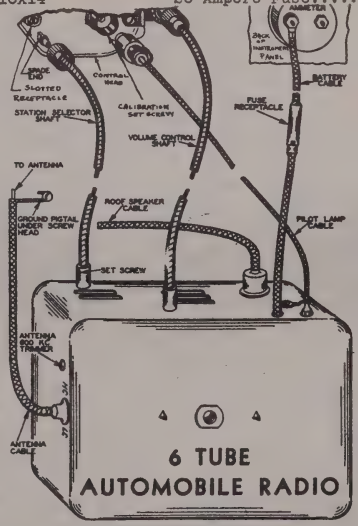
The Following Changes apply to all Issues of the Series

THE FOLLOWING NEW PARTS ARE USED:

46X213	C29	.5 mf. 180 volt Tubular Condenser.....	$0.30
16X16		15 Ampere Fuse.....	.10

THE FOLLOWING PARTS ARE NOT USED:

46X207	C29	.5 mf. 180 volt Tubular Condenser.....	$0.30
16X14		20 Ampere Fuse.....	.10



General Installation View

Alignment Procedure

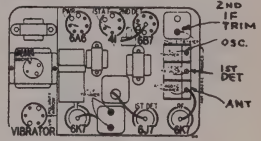
Set the signal generator for 175 KC and connect the output of the signal generator through a .05 mf. condenser to the stator of the 1st detector section of the tuning condenser. Set the volume control at the maximum position and attenuate the signal from the signal generator to prevent the levelling off action of the AVC. Then adjust the three IF trimmers until maximum output is obtained

Set the signal generator for 1581 KC. Turn the rotor of the tuning condenser to the full open position. Insert the antenna plug with the mark on the high capacity (HC) side. Connect the shielded antenna lead from the chassis through a 120 mmf. condenser to the antenna post of the signal generator. Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained.

Set the signal generator for 1400 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained. Adjust the 1st detector and antenna 1400 KC trimmers for maximum output. Do not change the setting of the oscillator trimmer.

Then set the signal generator for 600 KC and adjust the 600 KC antenna trimmer to maximum (see Fig. 10 for location of this trimmer).

After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted on the LC side if a low capacity (70 mmf.) car antenna is used.



Location of Tubes and Vibrator

Adjusting Antenna 600 KC Trimmer

Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig. 9 for location of this trimmer.

Antenna

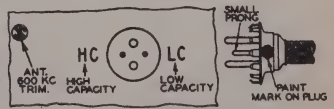


Fig. 9—Antenna Plug Insertion

IMPORTANT—The antenna plug can be inserted in two ways depending on whether the antenna is of high or low capacity.

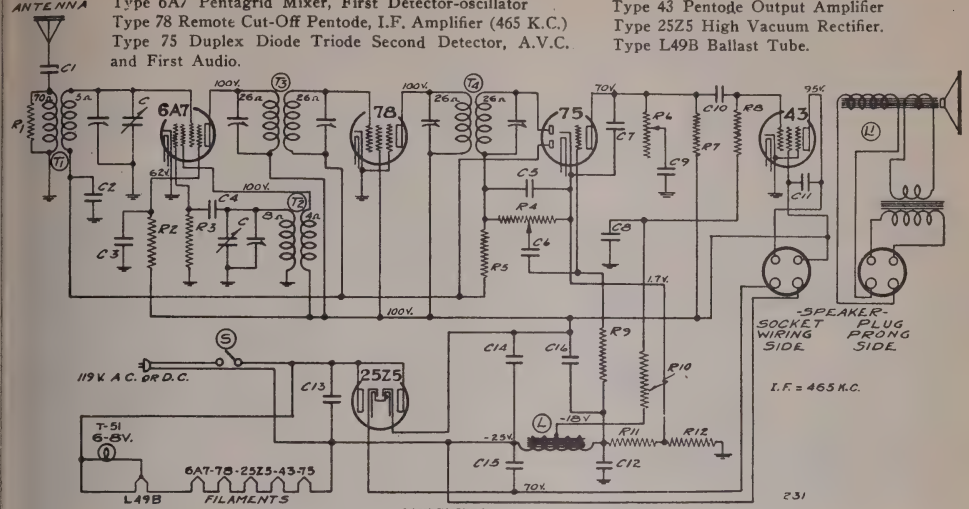
If the total capacity of the antenna and shielded lead is approximately 200 mmf., which would be the case in a running board or ordinary roof antenna (not metal roof), insert the antenna plug with the mark on the HC side—See Fig. 9.

If the total capacity of the antenna and shielded lead is approximately 70 mmf., such as is the case if a "fish pole" antenna is used, insert the antenna plug with the mark on the LC side.

MODEL 62-260

MONTGOMERY-WARD & CO.

Type 6A7 Pentagrid Mixer, First Detector-oscillator
Type 78 Remote Cut-Off Pentode, I.F. Amplifier (465 K.C.)
Type 75 Duplex Diode Triode Second Detector, A.V.C. and First Audio.
Type 43 Pentode Output Amplifier
Type 25Z5 High Vacuum Rectifier.
Type L49B Ballast Tube.



RESISTORS

Part No.		Description
130-12	50M	Ohm—½W—20%— 20V—Carbon
130-21	20M	Ohm—½W—20%— 20V—Carbon
130-12	50M	Ohm—½W—20%— 20V—Carbon
101-54	1 meg	Ohm—Volume Control
130-119	3 meg	Ohm—½W—20%—100V—Carbon
101-55	1 meg	Ohm—Tone Control
130-120	100M	Ohm—½W—20%— 50V—Carbon
130-5	300M	Ohm—½W—20%—100V—Carbon
130-38	2 meg	Ohm—½W—20%—100V—Carbon
0 130-9	200M	Ohm—½W—20%— 20V—Carbon
1 106-28	35	Ohm—Muter Strip
2 106-28	50	Ohm—Muter Strip

NOTE: R11 and R12 in one unit—No. 106-28.

TUNING RANGE—
Standard Broadcast Band
535-1720 Kilocycles

CONDENSERS

C1	100-29	.002	x600 Volt—25%
C2	100-22	.05	x200 Volt—25%
C3	100-22	.05	x200 Volt—25%
C4	129-12	.00025	Mica—MT—20%
C5	129-12	.00025	Mica—MT—20%
C6	100-11	.01	x400 Volt—20%
C7	129-2	.0005	Mica—MT—20%
C8	100-20	.1	x200 Volt—25%
C9	100-11	.01	x400 Volt—25%
C10	100-11	.01	x400 Volt—25%
C11	100-25	.002	x600 Volt—25%
C12	100-6	.25	x200 Volt—20%
C13	100-39	.1	x400 Volt—20%
C14	119-25	16 mfd.x100 Volt—Working Voltage	
C15	119-25	5 mfd.x100 Volt—Working Voltage	
C16	119-25	8 mfd.x100 Volt—Working Voltage	

NOTE: C14, C15, and C16 in one unit—No. 119-25

C	102-33	One section of two gang condenser
T1	111-57	Antenna Coil
T2	110-46	Oscillator Coil
T3	108-82	Input I.F. Coil—465 Kc.
T4	108-83	Output I.F. Coil—465 Kc.
L	105-29	Filter Choke (Resistance 600 Ohms)
L1	114-43	Five Inch Speaker (Field resistance 3000 Ohms)
S	101-54	On and off switch on Volume Control

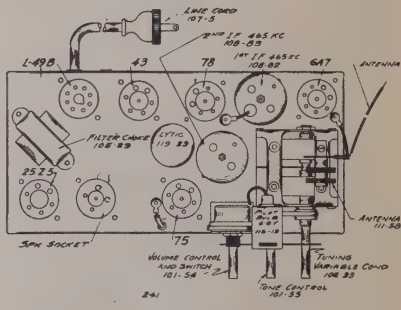


FIG. 2—TOP VIEW

SERIES B is the same as Series A, except for the following changes:-

1 - The C15 condenser was eliminated.

2 - The C14 condenser was replaced by a C15 (Part #119-29) 30 mfd. capacity, and the C16 was replaced by a C14 (Part #119-29) 5 mfd. capacity.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-83 Output I.F. Transformer
Part No. 108-82 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

(a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 78 tube, and adjust the output I.F. transformer (No. 108-83) to resonance.

(b) Move oscillator output clip from grid of 78 grid cap of 6A7 and adjust input I.F. transformer (No. 108-82) to resonance.

(c) With oscillator still connected to 6A7, readjust output I.F. transformer (108-83) if necessary.

R.F. ALIGNMENT: (535-1720 K.C.)

1. Unsolder the antenna wire from its terminal on the antenna coil and with gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 50 mmf. condenser to the antenna terminal on the antenna coil and chassis ground and make the following adjustments:

(a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer (rear of gang condenser).

(b) Re-set external oscillator to 1550 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser).

(c) Check sensitivity at 600 and 1000 kilocycles.

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MODEL 62-262

MONTGOMERY-WARD & CO.

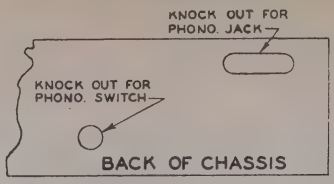

Fig. 8—Location of Phono Knockouts

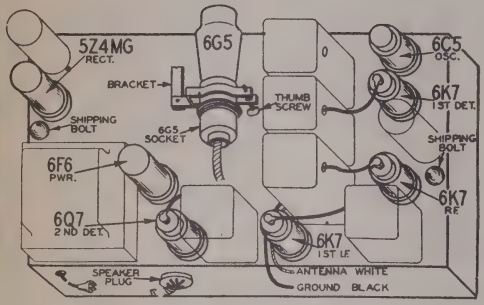

Fig. 6—Location of Tubes

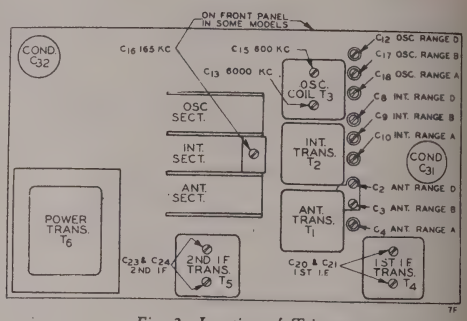

Fig. 3—Location of Trimmers

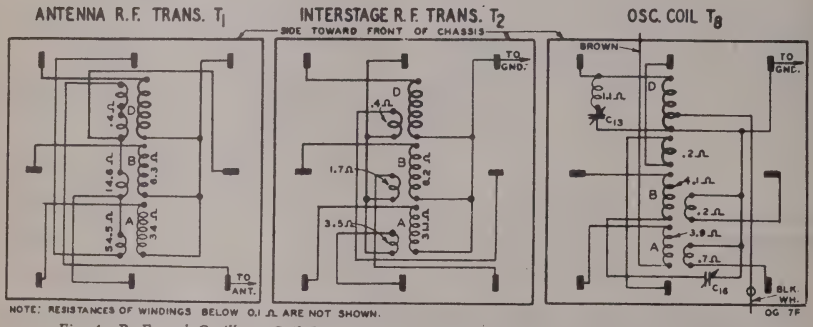

Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

Line Voltage: 115
Volume Control: Maximum

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	RF	0	6.1(1)	260	100	4.0	....	6.1(1)	4.0
6K7	1st Det.	0	6.1(1)	260	118	0	....	6.1(1)	9.0
6C5	Osc.	0	6.1(1)	120	...	0	....	6.1(1)	0
6K7	I F	0	6.1(1)	260	138	4.0	....	6.1(1)	4.0
6Q7	1st A.F.—2nd Det.	0	6.1(1)	105	0	0	....	6.1(1)	1.4
6F6	Power Amp.	0	6.1(1)	238	260	18	....	6.1(1)	0
5Z4MG	Rect.	0	4.9(2)	...	680(3)	...	680(3)	...	4.9(2)
6G5	Tuning Indicator	Plate to Ground 30(4)		Target to Ground 270		Cathode to Ground 0		Across Heater 6.1 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) A.C. voltage as read across heater terminals 2 and 8.
(3) A.C. voltage as read across terminals 4 and 6.
(4) As read with 500,000 ohm meter.

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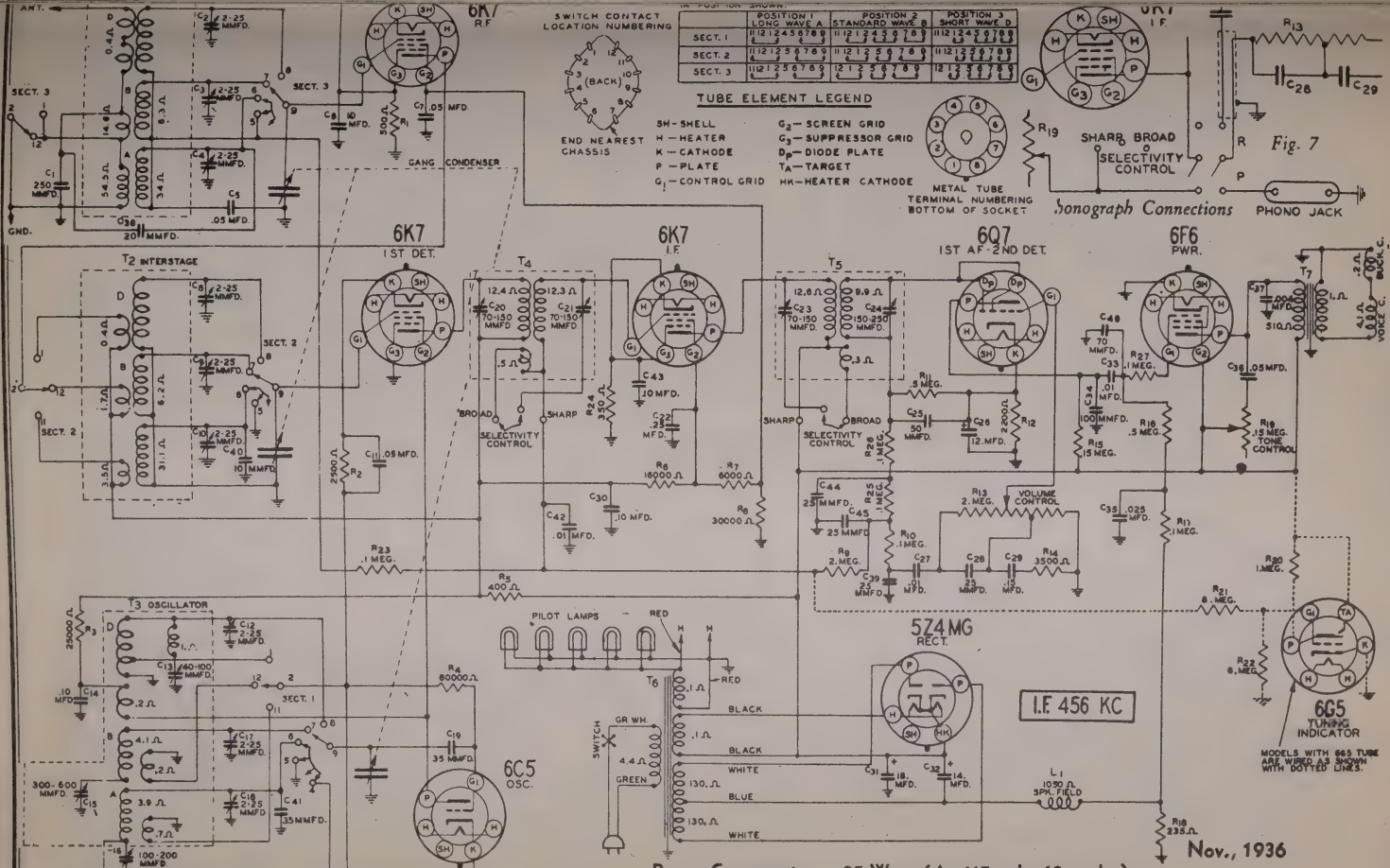

MONTGOMERY-WARD & CO.

MONT. WARD PAGE 14-61

MODEL 62-262

Tuning Frequency Range

A Range	148 to	380 KC.
B Range	528 to	1730 KC.
D Range	5750 to	18300 KC.

Sensitivity

A Range	0.5 to 2 Microvolts Absolute
B Range	0.5 to 2 Microvolts Absolute
D Range	1.0 to 4 Microvolts Absolute

Power Consumption . . 85 Watts (At 115 volts 60 cycles)
Power Output . . . . . 3 Watts Undistorted
Selectivity . . . . 28 KC Broad at 1000 times Signal (Sharp)
Speaker . . . . . 8" and 10" Dynamic

NOTE RESISTANCES OF WINDINGS LESS THAN 0.1 Ω ARE NOT SHOWN.

Nov., 1936

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I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the radio to the ground post of the signal generator.

Turn the band switch to the Range B position (medium wave band)

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Range A Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

380 KC Adjustment

Set the signal generator for 380 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range A position (long wave band).

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range A trimmer (C18) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

350 KC Adjustment

Set the signal generator for 350 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range A trimmer (C10) and antenna Range A trimmer (C4) to maximum.

Do not change the setting of the oscillator Range A trimmer.

165 KC Adjustment

Set the signal generator for 165 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 165 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range B position (medium wave band).

Keep the antenna lead of the receiver connected through the 200 mmf. condenser to the output of the signal generator.

Adjust the oscillator Range B trimmer (C17) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

In sets using pointers, loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Re-tighten the screw.

In sets using the moving beam of light, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until it is at the 1500 KC mark on the dial. Re-tighten the screw.

Adjust the interstage Range B trimmer (C9) and antenna Range B trimmer (C3) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 600 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC. It may be necessary to increase the input signal to hear the image.

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Connect the antenna lead of the radio through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

Adjust the oscillator Range D trimmer (C12) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Phonograph Connections

Switch on Back Panel of Chassis

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch —See Fig 8.

The phono switch must be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. Unsolder the .01 mf. condenser C27 from the volume control.

Strip about 2¾ inches of the shielding from each end of the cable furnished with the phono attachment parts. Connect one lead of the cable to the terminal on the volume control from which condenser C27 was removed. The other end of this lead is connected to the phono switch as shown in Fig. 7. The second cable lead is connected to the open end of condenser C27. Then connect the other end of this lead to the phono switch as shown in Fig. 7. Both of the shielded cable leads connected to the phono switch are connected to the switch terminals nearest the chassis base. Before connecting the cable leads to the phono switch, it will be necessary to slip a piece of varnished tubing over the portion of the cable that passes near the 6K7 1st I.F. tube socket.

Now ground the shielding by soldering it to the lugs on the chassis base. One of these lugs is located just below the planetary drive; the other is near the rear mounting foot of the gang condenser.

Complete the other connections as illustrated in Fig. 7. The lead between the tone control and the .05 mf. tubular condenser C36 mounted on the back of the chassis base, should be covered with a piece of varnished tubing.

The tin plate shield is soldered to the tone control mounting bracket in such a way that when it is bent down toward the bottom and back of the chassis it will shield the lower leads of the phono switch and the lead between the tone control and tubular condenser C36.

After making the phono connections, the I.F. stages should be realigned.

Switch Mounted Externally

The procedure for making the connections for this arrangement is the same as explained previously with the following exceptions: The switch being mounted externally, it is unnecessary to mount it with the terminals in a particular position.

The single unshielded flexible wire is run through a small hole which must be drilled in the back of the chassis base near the phono jack and is then connected to one terminal of this jack. The other end of this wire is connected to the phono switch as shown in Fig. 7.

Important—Instead of connecting the center terminal of the switch to the plate of the 6K7 I.F. tube as shown, this switch terminal is connected to the braided shielding of the cable. The switch terminal shown connected to the tone control R19 in Fig. 7, should be connected to the switch terminal which connects to the .01 condenser C27.

The braided shielding is run through the hole in the chassis base which is provided by the phono switch knockout. The shield is soldered to the base at this point and also to the bottom of the base at the lugs located just beneath the gang condenser. The tin plate mentioned previously is not used.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17-A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Across the volume control resistor R13 is a filter composed of condensers C28 and C29 and resistor R14. A tap connection near the low potential end of the volume control is connected between the two condensers. At high volume settings, the filter is not effective. At the low volume settings, as the pointer approaches the tap, the higher frequencies are bypassed through condenser C29. Very high frequencies are transmitted through condenser C28 to compensate for the reduction of these frequencies. At low volume settings the low frequency amplitudes are increased as a result.

Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	List Price
3A2H2	7 Prong Tube Socket	.10
3A3E2	5 Prong Tube Socket	.15
3A3S6	7 Prong Octal Base Tube Socket	.15
3A58	5 Prong Speaker Socket	.10
13X288	Tuning Indicator Tube Socket and Cable Assembly	.55

KNOBS

Specify Name of Knob and Model of Radio	Tone Control—Small Push-On Type	.15
	Volume Control—Small Push-On Type	.15
	Tuning Control—Large Push-On Type	.15
	Band Switch—Large Set Screw Type	.30

GENERAL

2E38	Felt Washers (Used Behind Knobs)	doz. .10
6X23	Rubber Chassis Mounting Cushions	ea. .10
4A18	Terminal Strip—Two Insulated Lugs	.10
4A49	Terminal Strip—Single Lug Insulated (With Mounting Hole at One End)	.10
4A50	Terminal Strip—Two Lugs Insulated (With Mounting Hole in Center)	.10
30X64	Grid Clip Only	doz. .10
2A64	3 Section, 3 Position, Band Change Switch	1.80
12X81	Line Cord and Plug	.55
13X214	Antenna and Ground Lead Assembly	.30
32X69	Tube Shield (Tuning Eye)	.15
32X70	Tube Shield Base (Tuning Eye)	.15
7X3221	Front Chassis Mounting Post	ea. .10
7X3231	Rear Chassis Mounting Post	ea. .10

TRANSFORMERS AND COILS

Part No.	Code	Description	List Price
9A478	T1	Antenna Transformer and Can Assembly	$2.48
9A471	T2	R.F. Interstage Transformer and Can Assembly	2.15
9A472	T3	Oscillator Coil and Can Assembly	2.40
9A473	T4	1st I.F. Transformer and Can Assembly	1.68
9A474	T5	2nd I.F. Transformer and Can Assembly	1.66
9X1111	T6	115-230 Volt 40-60 Cycle Power Transformer	4.80
91X31	T7	Output Transformer (Part of Speaker Assembly)	2.45

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
4A509	C5	.05 mf.	160	$0.15
4A2102	C27	.01 mf.	400	.15
4A2100	C28	.02 mf.	400	.15
4A2106	C29	.1 mf.	400	.20
4A5104	C32	.25 mf.	400	.25
4A2120	C37	.01 mf.	400	.15
4A2179	C35	.05 mf.	160	.20
4A2105	C30	.1 mf.	400	.20
4A2176	C33	.01 mf.	400	.15
4A2173	C38	.025 mf.	400	.15
4A2102	C39	.05 mf.	400	.15
4A2114	C40	.004 mf.	400	.15
4A2176	C41	.01 mf.	400	.15
4A2102	C42	.01 mf.	400	.15

ELECTROLYTIC

4SX209	C35	12 mf.	25 Dry	.65
4A511	C31	10 mf.	300 Wet	1.10
4SX10	C22	16 mf.	200 Wet	1.25

MOLDED

47259	C21	250 mmf.	.15
47253	C19	35 mmf.	.10
47256	C25	140 mmf.	.10
47257	C26	25 mmf.	.10
47251	C36	100 mmf.	.10
47248	C20	15 mmf.	.10
47277	C27	25 mmf.	.10
47263	C45	10 mmf.	.15
47253	C43	35 mmf.	$0.10
47273	C44	250 mmf.	.10
47272	C46	25 mmf.	.10
47262	C34	70 mmf.	.10

TRIMMER

17A46 Trimmer Strip	C21	2-25 mmf.	Range "D" Antenna Trimmer	.75
	C31	2-25 mmf.	Range "B" Antenna Trimmer	
	C34	2-25 mmf.	Range "A" Antenna Trimmer	
	C24	2-25 mmf.	Range "D" Interstage Trimmer	
	C28	2-25 mmf.	Range "B" Interstage Trimmer	
	C18	2-25 mmf.	Range "A" Interstage Trimmer	
	C17	2-25 mmf.	Range "D" Oscillator Trimmer	
	C17	2-25 mmf.	Range "B" Oscillator Trimmer	
	C16	2-25 mmf.	Range "A" Oscillator Trimmer	
See Part Number 17A36 for replacement of any one section				
17A36	C13	450-1500 mmf.	Range "D" Oscillator Padding Condenser	.45
	C15	1000-4000 mmf.	Range "B" Oscillator Padding Condenser	
17A43	C16	1500-2000 mmf.	Range "A" Oscillator Padding Condenser	.35
17A33	C30	70-150 mmf.	1st I.F. Trimmer Condenser	.40
	C31	70-150 mmf.		
17A34	C29	150-250 mmf.	2nd I.F. Trimmer Condensers	.40
	C28	150-250 mmf.		

MISCELLANEOUS

14A52	3 Gang Condenser less Dial and Drive Assembly	3.60
17A36	2-25 mmf. (To be used for replacement of any one section of Trimmer Strip 17A46)	.10

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
A14681	R1	500 Ohm	0.2	$0.10
A14282	R7	2,500 Ohm	0.2	.10
C14283	R3	25,000 Ohm	1.0	.10
A14680	R4	50,000 Ohm	0.2	.10
A14681	R6	400 Ohm	0.2	.10
D11163	R6	16,000 Ohm	2.0	.45
B14682	R7	1,000 Ohm	0.5	.10
B14383	R8	30,000 Ohm	0.5	.10
A15285	R9	2 Megohm	0.2	.10
A15184	R10	100,000 Ohm	0.2	.10
A14504	R11	500,000 Ohm	0.2	.10
A14422	R12	1,250 Ohm	0.2	.10
A14382	R14	2,500 Ohm	0.2	.15
A15184	R15	100,000 Ohm	0.2	.10
A15084	R16	500,000 Ohm	0.2	.10
A15184	R17	100,000 Ohm	0.2	.10
A15185	R20	1 Megohm	0.2	.10
A15285	R21	2 Megohm	0.2	.10
A15284	R22	2 Megohm	0.2	.10
A15184	R23	100,000 Ohm	0.2	.10
A14781	R24	700 Ohm	0.2	.10
A15184	R25	100,000 Ohm	0.2	.10
A15184	R26	100,000 Ohm	0.2	.10
A15184	R27	100,000 Ohm	0.2	.10

WIRE WOUND

43X42	R18	230 Ohm	2.0	.35

VARIABLE

36X215	R13	2.0 Megohm	Tapped Volume Control and On-Off Switch	1.05
40X211	R19	.15 Megohm	Tone Control and Selectivity Switch	1.15

PHONO ATTACHMENT PARTS

WITH SWITCH MOUNTED ON CHASSIS

Part No.	Description	List Price
2A31	Phono Switch (Double Pole Double Throw Switch)	$0.60
3A12	Phono Jack	.10
18A11	Switch Knob	.10
32X77	Shield Plate 3" x 11-7/8" x .015"	.10
	11½" of No. 746 G Shielded Cable	.10
	3" No. 1 Varnished Tubing	.10
	1" No. 2 Varnished Tubing	.10

WITH SWITCH MOUNTED EXTERNALLY

2A50	Phono Switch	.70
3A12	Phono Jack	.10
18A10B	Switch Knob	.10
6X169	One Set of "P" and "R" Stickers	.10
	21" 366-G Shielded Steering 5-16" Inside Diameter	.65
	20" 749-B No. 22 Solid Wire (Red-White)	.10
	48" 749-B No. 22 Solid Wire (White)	.10
	40" 749-B No. 22 Stranded Wire (Black)	.10

Prices Subject to Change Without Notice

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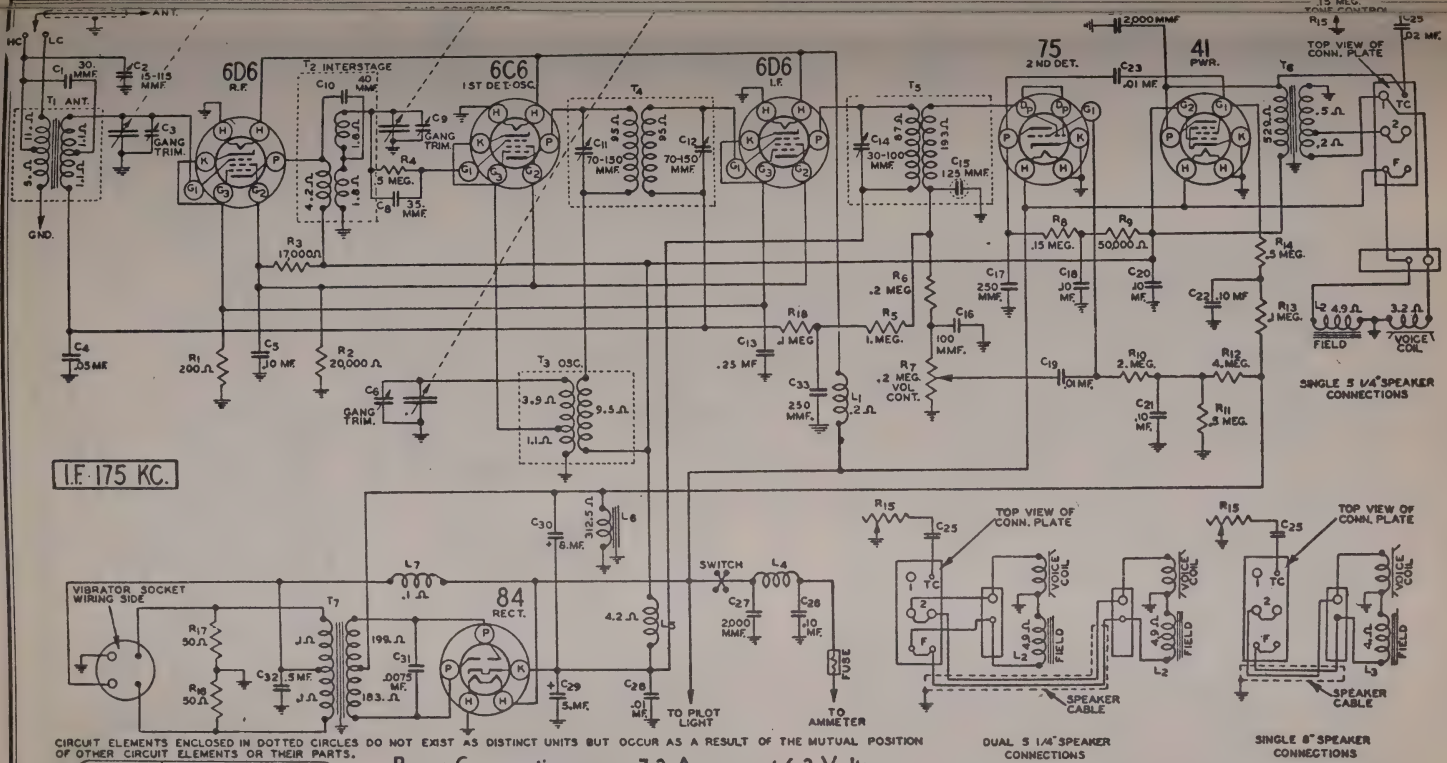

CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.

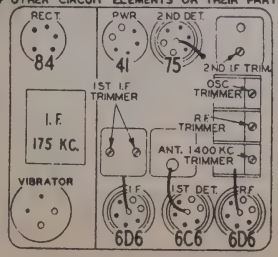

Fig. 2—Location of Tubes and Vibrator

Power Consumption - - 7.3 Amperes at 6.3 Volts

Power Output - - - - 2.4 Watts Undistorted

Sensitivity - - 0.8 Microvolts at 1 Watt Output

Selectivity - - 42 KC Broad at 1000 Times Signal

Tuning Frequency Range - - - 530 to 1581 KC

Speaker - - - - - - - - - 5¼ Inch Dynamic

Jan. 1937

6 Tube Automobile Radio

VOLTAGES AT SOCKETS

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground
6D6	R.F.	6.0	245	105	3.2
6C6	1st Det. and Osc.	6.0	243	105	
6D6	I.F.	6.0	245	105	3.2
75	2nd Det.	6.1	127		
41	Power	6.1	230	245	17(1)
84	Rectifier	6.1	600(2)		

(1) Grid bias read across filter choke L6

(2) A.C. voltage across plates Battery—6.3 Volts Under Load

MONTGOMERY-WARD & CO.

I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the output of the signal generator through a .05 mf. condenser to the stator of the R.F. interstage section of the tuning condenser. (See Fig. 2 for location of this section.)

Connect the ground lead of the signal generator to the chassis. The chassis should be in the case.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 2.

1581 KC Adjustment

Set the signal generator for 1581 KC.

Turn the rotor of the tuning condenser to the full open position.

Insert the antenna plug with the mark on the high capacity (HC) side. Connect the shielded antenna lead from the chassis through a 120 mmf. condenser to the antenna post of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

1400 KC Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the R.F. interstage and antenna 1400 KC trimmers for maximum output.

Do not change the setting of the oscillator trim mmf.

600 KC Adjustment

Set the signal generator for 600 KC.

Tune in this signal and adjust the 600 KC antenna trimmer to maximum (See Fig. 3 for location of this trimmer).

After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted on the LC side if a low capacity (70 mmf.) car antenna is used.

Adjusting Antenna 600 KC Trimmer

After the radio is installed and the car antenna is connected it will be necessary to readjust the antenna trimmer. Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig. 3 for location of this trimmer.

Calibrating the Radio

To calibrate the radio, tune in a station of known frequency. At the back of the control head is the calibration screw. Remove the pilot lamp assembly. Hold the tuning knob. Insert a fine blade screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received.

A very short insulated screwdriver will be helpful.

Inserting Antenna Plug

IMPORTANT—The antenna plug can be inserted in two ways depending on whether the antenna is of high or low capacity.

If the total capacity of the antenna and shielded lead is approximately 200 mmf., which would be the case in a running board or ordinary roof antenna (not metal roof), insert the antenna plug with the mark on the HC side—See Fig. 3.

If the total capacity of the antenna and shielded lead is approximately 70 mmf., such as may be the case if a "fish pole" antenna is used, insert the antenna plug with the mark on the LC side.

The 1936 Chrysler Motors cars (except Plymouth —but including Chrysler, Dodge and DeSoto) have a steel roof, separated from the body proper, which is used as an antenna. The capacity of these antennas is about 1500 mmf. If this radio is installed in these cars, it will be necessary to use a running board or "fish pole" antenna.

Most 1937 General Motors cars are equipped with an antenna built into the running board which is insulated from the body proper.

If a running board or under-car antenna is used, it must be one which is covered with a suitable insulation, to prevent short circuiting in wet weather.

The "B" issue of this series of auto radio receivers has several changes incorporated in it and its data differ

This issue can be identified by the issue letter which is stamped on the top of the chassis base and on the tube layout label on the chassis case cover. Specify this letter if parts be ordered.

The gang condenser used in the new issue does not have the cut-plate oscillator section. The new part number for the gang condenser is 14A77. A padding condenser (600 kc) was added in series with the oscillator section of this gang condenser and the oscillator coil. The padder is a part of the 2nd i-f trimmer unit and is mounted in the coil can. In other words, the 30-100 mmf condenser, C-14, and the new 900-1300-mmf condenser are mounted in the same can and have a part number 17A79.

The capacity C-15 shown within a dotted circle on the schematic in the 2nd i-f coil assembly, has been changed to an actual part and has a part number 47X57.

The following parts have been changed in the late issue and below will be found the new parts numbers:

T1 Antenna Transformer and Can Assembly 9A859
T2 R-f Transformer and Can Assembly 9A860
T3 Oscillator Coil and Can Assembly 9A862
T5 2nd I-F Transformer and Can Assembly 9A858

The 2000-mmf molded condenser in the plate circuit of the 41 output tube has been changed, to a 0.002-mf, 1000-volt tubular condenser, Part No. 46X-219. A 15-ampere fuse is now used instead of one rated at 20 amperes. The 25-inch volume or tuning control flexible drive shaft has been changed, the Part No. now being 18A49. The changes in this last paragraph apply to all issues receivers; not just the "B" issue like those above.

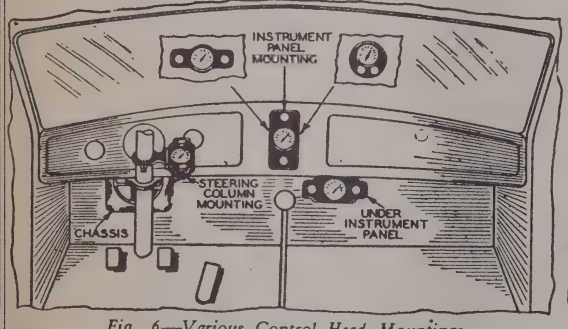

Fig. 6—Various Control Head Mountings

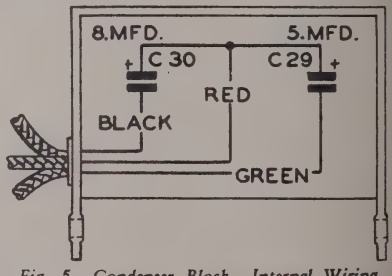

Fig. 5—Condenser Block—Internal Wiring

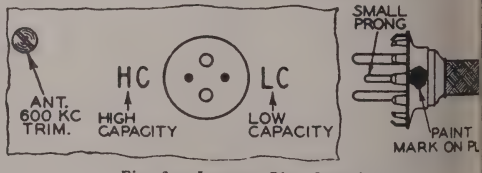

Fig. 3—Antenna Plug Insertion

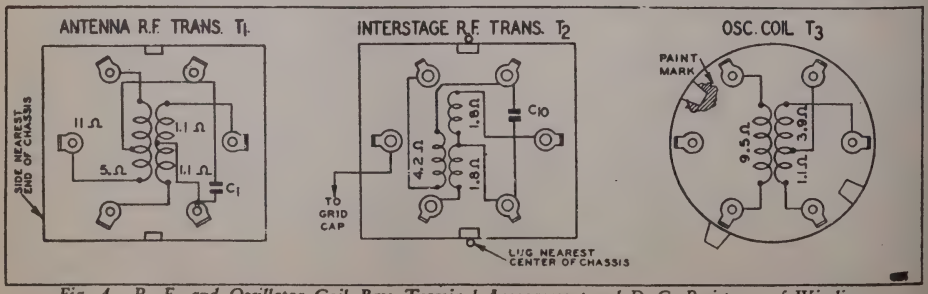

Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

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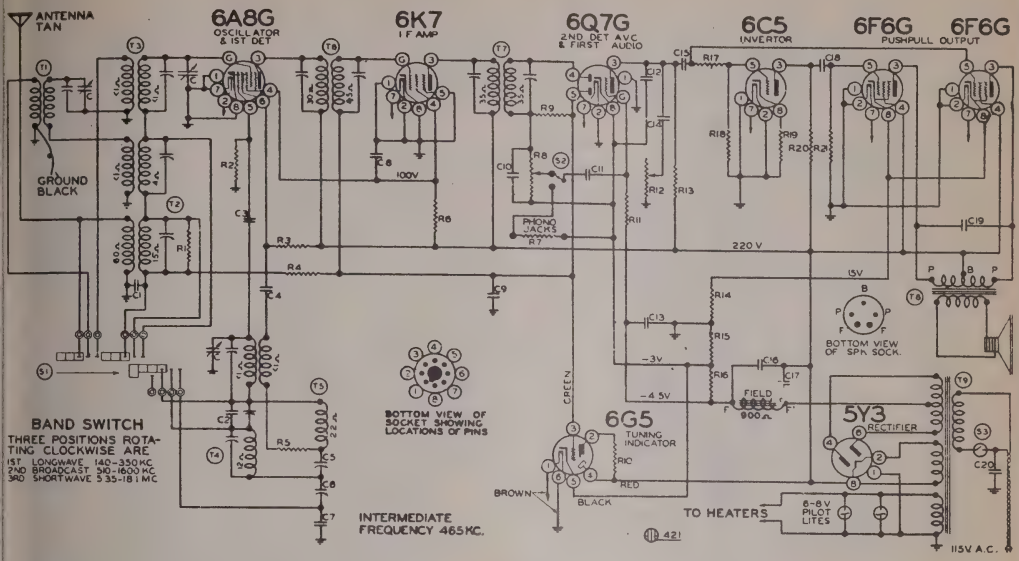

PARTS

R-1	130-3		500M Ohm
R-2	130-12		50M Ohm
R-3	130-48		15M Ohm
R-4	130-103		100M Ohm
R-5	130-27		50 Ohm
R-6	130-96		25M Ohm
R-7	130-103		100M Ohm
R-8	101-74	Volume Control	1 meg Ohm
R-9	130-4		3 meg Ohm
R-10	130-110	In Tuning Indicator Socket	1 meg Ohm
R-11	130-4		3 meg Ohm
R-12	101-75	Tone Control	300M Ohm
R-13	130-103		100M Ohm
R-14	106-37	Resistor Strip	250 Ohm
R-15	106-37	Resistor Strip	42 Ohm
R-16	106-37	Resistor Strip	20 Ohm
R-17	130-163		400M Ohm
R-18	130-103		100M Ohm
R-19	130-22		5M Ohm
R-20	130-12		50M Ohm
R-21	130-100		150M Ohm

NOTE—R-14, R-15, and R-16 in one unit, part 106-37

C	102-47	3 Gang Variable	
C-1	100-22		.05
C-2	129-67	Mica	.00004
C-3	129-39	Mica	.00005
C-4	100-12		.003
C-5	124-31	Adj. Padder	300 mmf.
C-6	124-32	Adj. Padder	565 mmf.
C-7	129-54	Mica	.003
C-8	100-39		.1
C-9	100-22		.05
C-10	129-5	Mica	.0001
C-11	100-11		.01
C-12	129-2	Mica	.0005
C-13	100-20		.1
C-14	100-57		.006
C-15	100-26		.02
C-16	103-14	Lytic Filter	16 mfd.
C-17	103-6	Lytic Filter	8 mfd.
C-18	100-26		.02
C-19	100-12		.003
C-20	100-61	(Bakelite Case, Type)	.02

T-1	111-62	B.C. Pre Selector
T-2	111-61	L.W. Ant. Coil Assembly
T-3	111-64	B.C. S.W. Ant. Coil Assembly.
T-4	110-49	B.C. S.W. Osc. Coil Assembly
T-5	110-47	L.W. Osc. Coil Assembly
T-6	108-105	Input I.F. — 465 K.c.
T-7	108-106	Output I.F. — 465 K.c.
T-8	114-66	6" Dynamic Speaker (900 Ohm Field)
T-9	104-96	Power Transformer 40 Cycle—Universal
S-1	125-17	Band Switch
S-2	125-22	Phono Switch
S-3		On-Off Switch on Volume Control

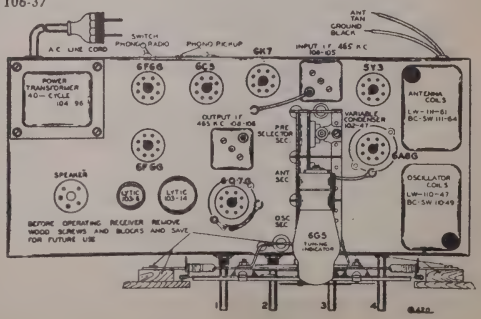

FIG. 1—TOP VIEW

MODEL 62-266

MONTGOMERY-WARD & CO.

BAND	DIAL SCALE	FREQUENCY RANGE
Long Wave	Outer Scale	350 to 140 K.C. (Kilocycles) 860-2150 Meters
Medium Wave	Center Scale	1600 to 510 K.C. (Kilocycles) 187-588 Meters
Short Wave	Inner Scale	18.1 to 5.35 M.C. (Megacycles) 16.5-56.5 Meters

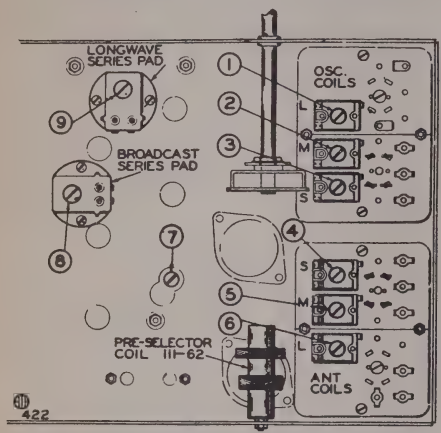

FIG. 3—BOTTOM VIEW SHOWING TRIMMERS

DUMMY ANTENNAS:

The following dummy antennas are used in aligning the receiver, and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Medium and long wave) — Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.) (645.1 METERS)

Part No. 108-106 Output I.F. Transformer
Part No. 108-105 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the medium position, (center of its rotation), and with the variable condenser set to minimum capacity make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-106) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6A8G and adjust input I.F. transformer (No. 108-105) to resonance.

SHORT WAVE BAND ALIGNMENT:

16.5 Meters (18.1 Mc) to 56.5 Meters (5.35 Mc).

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles (17.6 meters) and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles (17.6 meters) and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 4) to resonance.
   (b) Re-set external oscillator to 6 megacycles (50 meters) and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles (16.5 meters) and 5.3 megacycles (56.5 meters) for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 17 megacycle signal appears near 16.1 megacycles.

MEDIUM BAND ALIGNMENT:

588 Meters (510 K.C.) to 187 Meters (1600 K.C.)

1. With band changing switch in the medium wave position, center of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments.
   (a) Set external oscillator to 187 meters (1600 K.C.) and adjust medium wave oscillator trimmer to resonance (adjustment number 2; see bottom view of coil assembly. Fig. 3.)
   (b) Re-set external oscillator to 214 meters (1400 K.C.), rotate variable gang condenser and pick up signal. Adjust medium wave antenna trimmer (Adjustment number 5) to resonance; also adjust preselector trimmer condenser to resonance, (Adjustment number 7; see Bottom View, Fig. 3).
   (c) Re-set external oscillator to 500 meters (600 K.C.), and adjust medium wave series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3, Adjustment 8).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 300 meters (1000 K.C.) **Under no circumstances bend plates of variable condenser sections to correct tracking.**

IMPORTANT: This band must be completely rechecked after the long wave band has been adjusted.

LONG WAVE BAND ALIGNMENT:

860 Meters (350 K.C.) to 2150 Meters (140 K.C.)

1. With band changing switch in the long wave position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 860 meters (350 K.C.), and adjust long wave oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly. Fig. 3.)
   (b) Re-set external oscillator to 925 meters (325 K.C.), rotate variable gang condenser and pick up signal. Adjust long wave antenna trimmer (Adjustment number 6) to resonance.
   (c) Re-set external oscillator to 2000 meters (150 K.C.), and adjust long wave series pad to resonance by rotating condenser to approximately 2000 meters, rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3, Adjustment 9).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

IMPORTANT: This band must be completely rechecked after the medium wave band has been rechecked.

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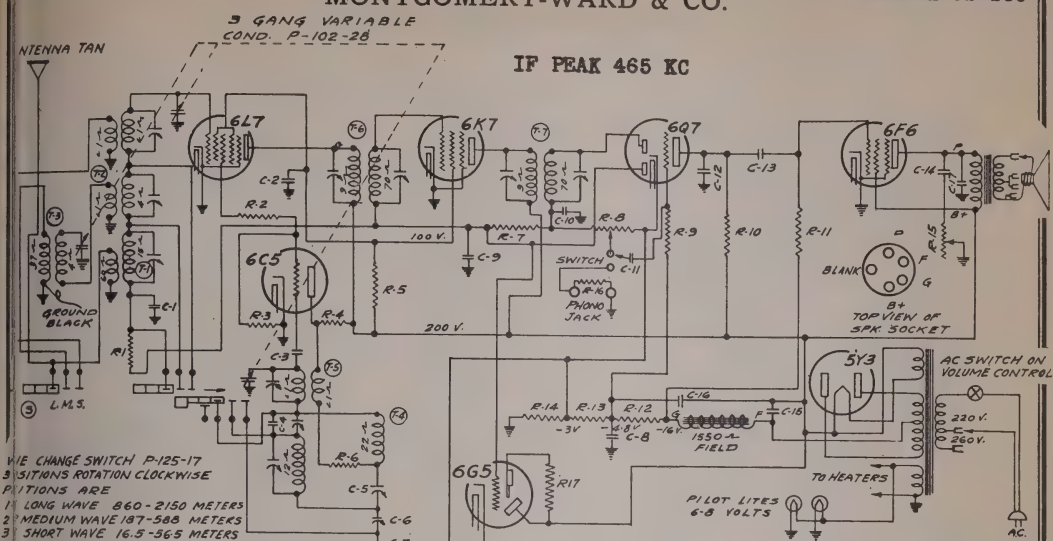
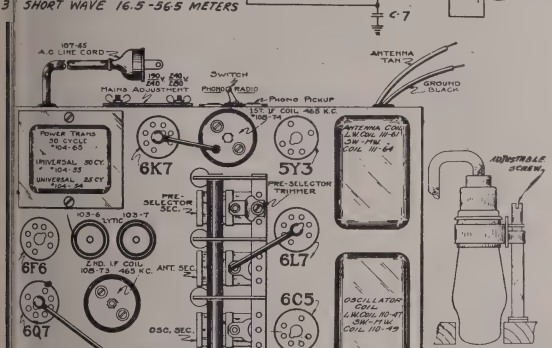
MODEL 62-269





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TOP VIEW—FIG. 1

DIAL PARTS LIST

ASSEMBLIES

117-41 Drive Bracket including:
1—No. 117-19—Tuning Shaft Bushing

117-66 Switch Disc and Link Assembly, including:
1—No. 117-12 —Switch Arm
1—No. 117-35 —Bushing with Screws
1—No. 117-40B—Switch Link
3—No. 131-26 —Spring Washers
3—No. 162-5 —Rivets
1—No. 112-144 —Switch Dis.—Inc. Red Tape

DIAL PARTS ONLY

112-125 Drive Belt
112-443 Oval Escutcheon complete with Celluloid Crystal
112-172 Dial Scale comp. with Fastener, Pointer Disc, & Screw
112-147 Tuning Shaft
112-151 Pointer complete with Screw
112-156 Pilot Light Assembly
116-13 6.8 Volt T-51 Pilot Light
117-20A Tuning Shaft Pulley
117-38 Stud, for take-up Spring
117-39 Pulley, for take-up Spring
120-14 Take-up Spring
134-9 Horse Shoe Washer
134-40 Rubber Grommet

No.	Part No.	Description
		RESISTORS
R1	130-103	100M Ohm—½W—10%— 50V—Carbon
R2	130-105	150. Ohm—½W—20%— 10V—Carbon
R3	130-117	50M Ohm—1/10W—20%— 20V—Carbon
R4	130-104	9M Ohm— 1W—20%—100V—Carbon
R5	130-34	19M Ohm— 1W—20%—100V—Carbon
R6	130-27	50 Ohm—½W—20%— 3V—Carbon
R7	130-19	1 meg Ohm—½W—20%—100V—Carbon
R8	101-46	1 meg Ohm—Volume Control
R9	130-4	3 meg Ohm—½W—20%—100V—Carbon
R10	130-103	100M Ohm—½W—10%— 50V—Carbon
R11	130-102	500M Ohm—½W—10%— 50V—Carbon
R12	106-26	220 Ohm—Muter Strip
R13	106-26	33 Ohm—Muter Strip
R14	106-26	52 Ohm—Muter Strip
R15	101-53	Tone Control (50M Ohms)
R16	130-103	100M Ohm—½W—10%— 50V—Carbon
R17	130-110	1 meg Ohm—1/10W—20%—100V—Carb.

NOTE: R12, R13, and R14 in one unit—part No. 106-26

		CONDENSERS
C1	100-22	.05 x 200 Volt—25%
C2	100-20	.1 x 200 Volt—25%
C3	129-39	.00005 Mica—MT—O—20%
C4	129-67	.00004 Mica—MT—O—10%
C5	124-31	Series Pad 300 mmf. Working Cap'y.
C6	124-32	Series Pad 565 mmf. Working Cap'y.
C7	129-54	.003 Mica—MW—W—2½%
C8	100-20	.1 x 200 Volt—25%
C9	100-22	.05 x 200 Volt—25%
C10	129-12	.00025 Mica—MT—O—20%
C11	100-11	.01 x 400 Volt—25%
C12	129-12	.00025 Mica—MT—O—20%
C13	100-11	.01 x 400 Volt—25%
C14	100-27	.025 x 600 Volt—25%
C15	103-6	8 mfd. x 350 Volt Electrolytic
C16	103-7	8 mfd. x 300 Volt Electrolytic
C17	100-25	.002 x 600 Volt—20%

		MISCELLANEOUS PARTS
T1	111-61	Long Wave Antenna Coil
T2	111-64	Medium Wave & Short Wave An. Coil
T3	111-62	Antenna Preselector Coil
T4	110-47	Long Wave Oscillator Coil
T5	110-49	Med. Wave & Short Wave Osc. Coil
T6	108-74	Input I.F.—465 Kc.
T7	108-73	Output I.F.—465 Kc.
S	125-17	Band Switch

TUNING RANGE—

Long Wave Band
860-2150 Meters
350-140 Kilocycles

Medium Wave Band
187-588 Meters
1600-510 Kilocycles

Short Wave Band
16.5-56.5 Meters
18.2-5.3 Megacycles

MODEL 62-269

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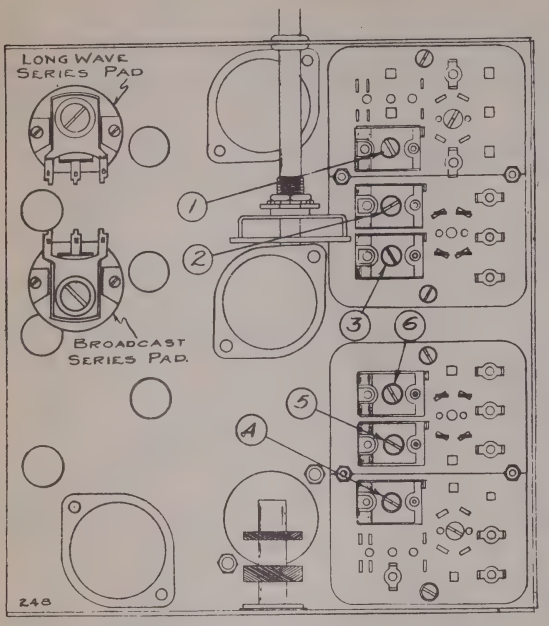

FIG. 2—BOTTOM VIEW (Showing Trimmers)

7-Tube Including Cathode-Ray Tuning Indicator 3-Band A. C. Superheterodyne Receiver

190-280 Volts 50 Cycles A. C.

POWER SUPPLY:

This receiver is normally supplied with a transformer for operation on 50 cycles (may be higher in frequency, not lower) and with a primary designed for operation on 190-280 volts.

Mains transformer is provided with two taps, one for voltages 190-240 volts another for voltages 240-280 volts. These taps are accessible upon removing plate fastened with two wing nuts to back of chassis.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25 and 50 cycles and with primary taps for 108, 127, 150, 225 and 260 volts (see illustrations).

Should the receiver be equipped with a special transformer, connect primary tap on voltage terminal which corresponds as nearly as possible to the actual mains voltage.

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 230 volts on the primary of the power transformer.

With special transformers select primary tap nearest to actual mains voltage at time voltage measurements are to be made.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS

Dummy Antennas

The following dummy antennas are used in aligning the receiver, and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast and long wave)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

TEST FREQUENCIES USED

	Kilocycles	Meters
I. F.	465	645.1
Long Wave	150	2000
	350	860
	325	925
Broadcast	600	500
	1400	214
	1600	187
Short Wave	6000	50.0
	17000	17.6
	18200	16.5

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 6F5 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used

CAUTION:

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the four bolts by which it is fastened.

ALIGNING I.F. TRANSFORMERS

(465 K.C.) (645.1 Meters)

Part No. 108-73 Output I.F. Transformer.
Part No. 108-74 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position, (center of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

(a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-73) to resonance.

(b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6L7 and adjust input I.F. transformer (No. 108-74) to resonance.

(c) With oscillator still connected to 6L7, readjust output I.F. transformer (108-73) if necessary.

ALIGNMENT PROCEDURE

The following adjustments to be made after the I.F.'s ave been aligned as explained above.

SHORT WAVE BAND ALIGNMENT:

16.5 Meters (18.2 Mc.) to 56.5 Meters (5.3 Mc.)

With band changing switch in the short wave position, extreme right of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

(a) Set external oscillator to 16.5 meters (18.2 Mc.) and adjust short wave oscillator trimmer (adjustment number 3, see Fig. 2) to resonance.

(b) Re-set external oscillator to 17.6 meters (17.0 Mc.) and pick up signal by rotating gang condenser. Adjust short wave antenna trimmer (adjustment number 6) to resonance.

(c) Re-set external oscillator to 50 meters (6.0 Mc.) and check for sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MEDIUM OR BROADCAST BAND ALIGNMENT:

588 Meters (510 K.C.) to 187 Meters (1600 K.C.)

With band changing switch in the medium wave position, center of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:

(a) Set external oscillator to 187 meters (1600 K.C.) and adjust medium wave oscillator trimmer to resonance (adjustment number 2; see bottom view of coil assembly. Fig. 2.).

(b) Re-set external oscillator to 214 meters (1400 K.C.), rotate variable gang condenser and pick up signal. Adjust medium wave antenna trimmer (Adjustment number 5) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)

(c) Re-set external oscillator to 500 meters (600 K.C.), and adjust medium wave series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 2.)

(d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

(e) Check for tracking and sensitivity at 300 meters (1000 K.C.) Under no circumstances bend plates of variable condenser sections to correct tracking.

IMPORTANT: This band must be completely rechecked after the long wave band has been adjusted.

LONG WAVE BAND ALIGNMENT:

860 Meters (350 K.C.) to 2150 Meters (140 K.C.)

With band changing switch in the long wave position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:

(a) Set external oscillator to 860 meters (350 K.C.), and adjust long wave oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly. Fig. 2.)

(b) Re-set external oscillator to 925 meters (325 K.C.), rotate variable gang condenser and pick up signal. Adjust long wave antenna trimmer (Adjustment number 4) to resonance.

(c) Re-set external oscillator to 2000 meters (150 K.C.), and adjust long wave series pad to resonance by rotating condenser to approximately 2000 meters, rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 2.)

(d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

IMPORTANT: This band must be completely rechecked after the medium wave band has been rechecked.

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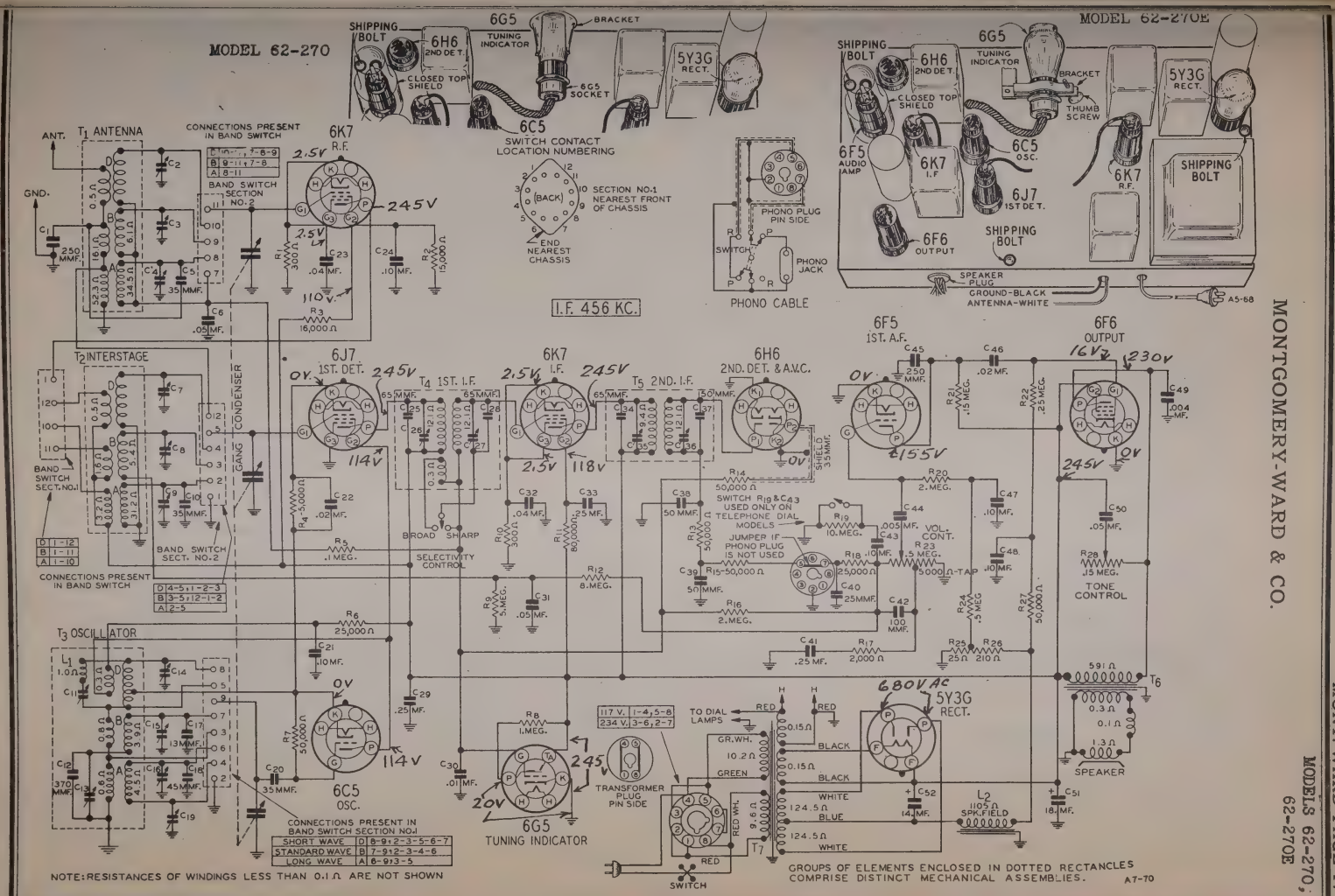
MODEL 62-270
MODEL 62-270E
SHIPPING BOLT
6H6 2ND DET.
CLOSED TOP SHIELD
6G5 TUNING INDICATOR
BRACKET
6G5 SOCKET
5Y3G RECT.
6C5 OSC.
6K7 I.F
6J7 1ST DET.
6F5 AUDIO AMP
6F6 OUTPUT
6K7 R.F.
THUMB SCREW
SHIPPING BOLT
SPEAKER PLUG
GROUND-BLACK
ANTENNA-WHITE
A5-68
SWITCH CONTACT LOCATION NUMBERING
SECTION NO.1 NEAREST FRONT OF CHASSIS
END NEAREST CHASSIS
PHONO PLUG PIN SIDE
PHONO JACK
PHONO CABLE
I.F. 456 KC.
ANT.
GND.
T1 ANTENNA
CONNECTIONS PRESENT IN BAND SWITCH
BAND SWITCH SECTION NO.2
T2 INTERSTAGE
CONDENSER
GANG
BAND SWITCH SECT. NO.1
BAND SWITCH SECT. NO.2
CONNECTIONS PRESENT IN BAND SWITCH
T3 OSCILLATOR
T4 1ST. I.F.
T5 2ND. I.F.
T6
T7
L1
L2
BROAD
SHARP
SELECTIVITY CONTROL
SWITCH R18 & C43 USED ONLY ON TELEPHONE DIAL MODELS
JUMPER IF PHONO PLUG IS NOT USED
VOL. CONT.
TONE CONTROL
SPEAKER
SPK. FIELD
TO DIAL LAMPS
117 V. 1-4,5-8
234 V. 3-6,2-7
TRANSFORMER PLUG PIN SIDE
SWITCH
CONNECTIONS PRESENT IN BAND SWITCH SECTION NO.1
SHORT WAVE D 8-9-1-2-3-5-6-7
STANDARD WAVE B 7-9-1-2-3-4-6
LONG WAVE A 6-9-3-5
6J7 1ST DET.
6K7 I.F.
6H6 2ND DET. & A.V.C.
6F5 1ST. A.F.
6F6 OUTPUT
6K7 R.F.
6C5 OSC.
6G5 TUNING INDICATOR
5Y3G RECT.
680V AC
NOTE: RESISTANCES OF WINDINGS LESS THAN 0.1 Ω ARE NOT SHOWN
GROUPS OF ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
A7-70

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MODELS 62-270,62-270E ALIGNMENT

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator With a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

In sets using a pointer or any other type of dial mechanism, it will be necessary to adjust the position of the indicator until it is at the 1500 KC mark

THIS NOTE "A" APPLIES TO MODEL 62-270

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I.F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C35) & (C36)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C26) & (C27)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE A							
380 KC	Range A	200 mmf.	380 KC	Antenna Lead	Oscillator Range A (C16)	Turn Rotor to Full Open	Adjust to Maximum Output
350 KC	Range A	200 mmf.	350 KC	Antenna Lead	Int. Range A (C9) Antenna Range A (C4)	Turn Rotor to Max. Output	Adjust to Maximum Output
165 KC	Range A	200 mmf.	165 KC	Antenna Lead	165 KC (C19)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C15)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	Ant. Range B (C3) Int. Range B (C8)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C13)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
19,800 KC	Range D	400 Ohm	19,800 KC	Antenna Lead	Oscillator Range D (C14)	Turn Rotor to Full Open	Adjust to Maximum Output
16,000 KC	Range D	400 Ohm	16,000 KC	Antenna Lead	Ant. Range D (C2) Int. Range D (C7)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
6000 KC	Range D	400 Ohm	6000 KC	Antenna Lead	6000 KC (C11)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—Loosen the two set screws in the hub of the film drum assembly pulley. Turn the film drum until it is at the 1500 KC mark on the dial and then tighten the two pulley set screws. (On later models, the film drum can be turned without loosening the set screws.)

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

Special Note on Calibration—Movie Dial Sets

If, after following the above procedure, the red line on the screen does not intersect the proper call letters when a station is tuned in, proceed as follows:

(1) Tune in any station between 530 KC and approximately 900 KC on the dial. After the station is tuned in, adjust the position of the film drum, as explained above under Note A, until the line on the screen crosses the call letters of the station tuned in. Modify this adjustment if necessary until all stations between *530 KC and approximately 900 KC* are tuned in with some part of their call letters touching the vertical line on the screen.

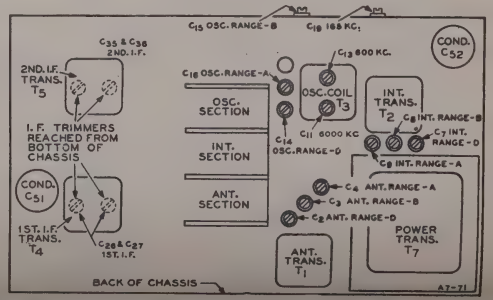
(2) Set the signal generator for exactly 1500 KC. Turn the tuning knob until the line on the screen is at the 1500 KC mark. Then adjust the oscillator Range B trimmer until the signal is tuned in to maximum output.

(3) Adjust the antenna and interstage Range B trimmers to maximum output at 1500 KC.

(4) Check the 600 KC adjustment for maximum output.

Calibration should now be substantially correct over the entire dial. If it is not, repeat the above procedure.

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.



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Replacing and Positioning the Dial Lamp

Caution—If a new lamp is required, use only a No. 81 lamp, Wards catalogue No. 61-8204.

Turn the radio off and turn the band switch to the standard wave position.

Remove the lamp housing by unscrewing and removing the two screws which hold this housing in place—See Fig. 1.

Remove the old lamp from the housing. It will be necessary to depress the contact plug retaining spring which will be seen in the narrow slot near the upper end of the housing and pull the plug out a slight amount from the housing, in order to remove the lamp. Replace the lamp and push the plug down until the locking spring snaps into place.

Replace the lamp housing by means of the two screws, but do not tighten these screws yet.

Turn the radio on.

Then grasp the top of the lamp housing assembly and move it up or down until the image on the screen is clearest and the lines are horizontal. The effect of having the lamp assembly too high or low is shown in the illustration in the instruction book. Tighten the two screws.

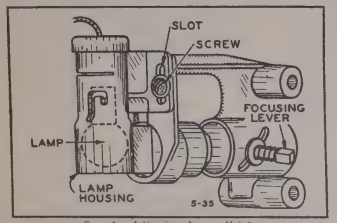

Fig. 1—Adjusting Lamp Height

Calibrating the Radio

To calibrate the movie dial radios, tune in a station of known frequency between 530 and 900 KC. In the early models loosen the two set screws in the hub of the film drum pulley. Turn the film drum until it is at the correct kilocycle mark on the dial scale and then tighten the pulley set screws.

In the case of later models, the film drum is held in position by a friction washer which will be seen under the drum. In these models, the film drum can be turned without loosening the set screws.

Replacing Film

Turn the band switch to the standard wave position. Then remove the lamp housing (See article "Replacing and Positioning the Dial Lamp").

Unscrew and take out the six screws spaced around the edge of the film drum casting. Then carefully lift the edge of the film nearest the back of the chassis. At the same time, lower the opposite edge of the film and slide it in toward the center of the film drum casting. (On two band radios, it will be necessary to lift the lens assembly as high as it will go while removing the film.) When the film clears the lens, it may be lifted out.

To replace the film, reverse the above procedure Make certain that the entire lower edge of the film rests on the shoulder near the bottom inside the film drum. The radio is calibrated as described in the article under that name in this manual.

Adjusting Height of Image on Screen

The image height should be so adjusted that the complete image for each band will appear on the screen.

If any portion of the image on any band is cut off, turn the radio on and turn the band switch to the 2nd short wave (green) position. Loosen the two set screws of the lever arm on the band switch shaft. This lever arm is connected to the bakelite strip which in turn moves the lamp assembly height mechanism.

Turn the tuning knob until the high frequency end (22.0 MC) of the band is reached. Move the lever arm until the megacycle line is lined up with the letter "W" of the word "West" at either side of the glass screen. Tighten the set screws.

The image height should then be correct for the other two bands.

Replacing Film Drum Cable

Remove the screen panel as follows: Unhook spring on end of cord from condenser drive drum This can be done with a pair of long nose pliers. Then remove the cord from the drive drum and drive shaft. The other end of the cord may be left fastened to the drive drum. Take out the glass screen by loosening the two screws which hold it in place. Then remove the four screws which hold the panel in place. There are two at the bottom and two under the projector compartment. The panel may now be taken off. It is not necessary to remove the tone and volume indicator cords or collars.

Remove the old film drum cable, unsoldering it from pulley "F" at point "S" on early models, or from the pin on later models—See Fig. 2.

Close the gang condenser completely and arrange to hold it in this position while replacing the cable.

Now insert one end of the new cable in hole "B" of condenser drive drum "A" which will be in the position shown in Fig. 2. Bring the cable down and around ½ turn in the film cable groove in the drum, progressing in a clockwise direction, passing it over pulley "C."

Extend the cable horizontally toward the back of the chassis passing it through the groove on the left side of pulley "D" and through the groove on the right side of pulley "E." (See Fig. 2 view from front.)

Place pulley "F" in the position shown in the back view in Fig. 2, with the slot "H" nearly parallel with the back of the chassis. Continue the cable from pulley "E" to the slot on the right side (from back) of pulley "F" keeping the cable in the upper part of the groove in the pulley. The cable should rest on about ⅛ inch of the pulley surface before entering slot "G."

Insert the cable in slot "G" and continue down and out through slot "H" at point "K." If pulley "F" is the later type, wrap the cable once around the pin as shown at "J" in Fig. 2.

Wind the cable one complete turn around pulley "F" keeping it below the cable on the right side and above the cable on the left side. Now extend the cable horizontally to pulley "L" and down to the film cable groove in condenser drive drum "A." To provide slack in cable, remove it from pulley "D" and then insert end of cable in slot "M." Replace cable on pulley "D." Care should be taken not to nick or make a sharp bend in the cable as it may be damaged.

Now solder the cable to the pin on pulley "F" on late models, or solder the cable to the pulley at point "S" on early models.

Replace the screen panel on the chassis. Also replace the drive cord according to the steps given in the article "Replacing Condenser Drive Cord," and calibrate the dial as explained in the article "Calibrating the Radio."

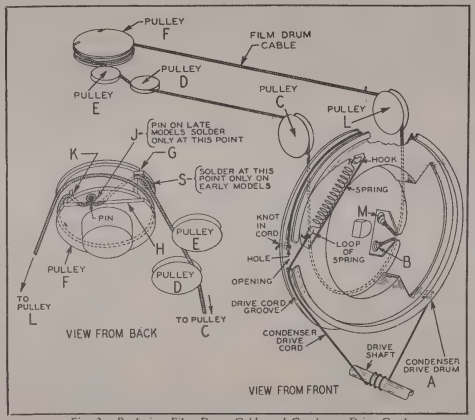

Fig. 2—Replacing Film Drum Cable and Condenser Drive Cord

Replacing Condenser Drive Cord

Remove the old cord and spring. Tie one end of the new cord to the spring. Turn the gang condenser until it is completely closed. This will bring the opening in the groove of the condenser drive drum to the left side (from front).

Insert the other end of the cord through the small hole on the edge of the drum near the opening in the groove—See Fig. 2. Tie a knot in the cord on the back side of the drum as illustrated. This knot should be tied so that the length of the cord from the hole in the drum to the point at which the cord is tied to the spring will be $16\frac{A}{16}$ inches.

Now open the gang condenser about ¾ of the way. (The illustration shows the position of the condenser drive drum with the gang condenser completely closed.). Stand the chassis on end so that the right side (from front) is up. Place the cord in the groove of the drum and bring the spring end of the cord down to the right side of the drive shaft. Wind the cord 3¼ turns on the drive shaft progressing toward the back of the chassis—See Fig. 2.

Bring the cord up to the drive drum and place it in the groove of the drum. Wind the cord approximately ½ turn around the drum, up to the opening in the groove. Using a pair of long nose pliers, place the loop on the spring over the hook in the drum.

The cord wound on the drive shaft should be in line with the condenser drive drum when the condenser is half open.

FOR FURTHER DATA ON MOVIE DIAL DRIVE, SEE VOL. VIII

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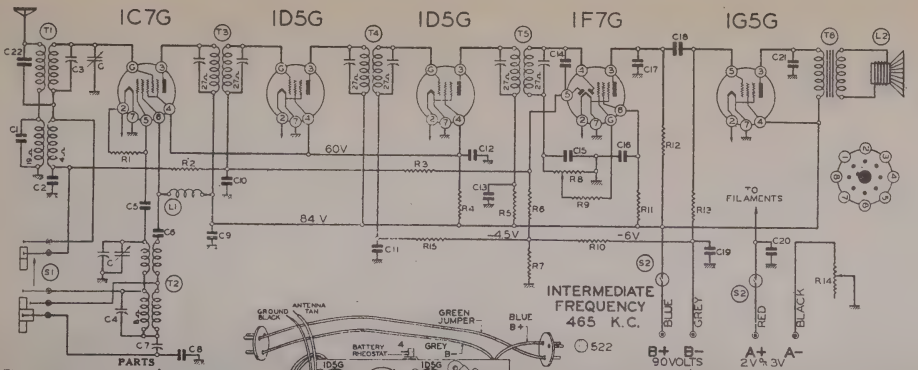

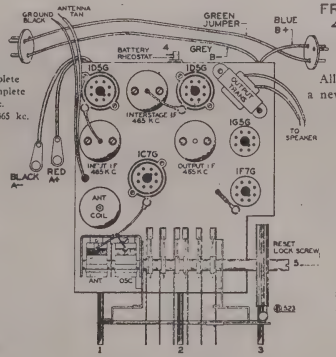

FIG. 1—TOP VIEW

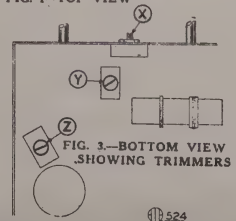

FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

PARTS

T1	111-99	BC - SW Antenna coil complete
T2	110-80	BC - SW Oscillator coil complete
T3	108-116	Input I.F. Complete - 465 kc.
T4	108-78C	Interstage I.F. Complete - 465 kc.
T5	108-79C	Output I.F. Complete
T6	105-69	Output Transformer
L1	123-3	I.F. "B" Choke

RESISTORS

R1	130-20	100M ohm - 1/3 w. 20%
R2	130-20	100M ohm - 1/3 w. 20%
R3	130-19	1 megohm - 1/3 w. 20%
R4	130-167	7500 ohm - 1/3 w. 20%
R5	130-85	3000 ohm - 1/3 w. 20%
R6	130-19	1 megohm - 1/3 w. 20%
R7	130-83	300 ohm - 1/3 w. 10%
R8	101-111	250M ohm - volume control
R9	130-12	50M ohm - 1/3 w. 20%
R10	130-168	100 ohm - 1/3 w. 10%
R11	130-19	1 megohm - 1/3 w. 20%
R12	130-11	250M ohm - 1/3 w. 20%
R13	130-19	1 megohm - 1/3 w. 20%
R14	101-112	3.2 ohm - Filament Rheostat
R15	130-19	1 megohm - 1/3 w. 20%

CONDENSERS

C	102-70	2 gang variable condenser
C1	129-40	.0001 mica 10%
C2	100-22	.05 x 200 v. 25%
C3	129-39	2-20 mmf. Adj. Cond.
C4	129-39	2-20 mmf. Adj. Cond.
C5	129-38	.00005 Mica 10%
C6	100-25	.002 x 600 v. 25%
C7	124-38	580 mmf. Working Capacity-Series Pad
C8	129-94	.003 minimum 2-1/2%
C9	100-50	.25 x 200 v. 20%
C10	100-86	.02 x 400 v. 25%
C11	100-59	.05 x 200 v. 25%
C12	100-50	.25 x 200 v. 20%
C13	100-20	.1 x 200 v. 25%
C14	129-3	.00002 Mica 20%
C15	129-60	.00015 Mica 20%
C16	100-30	.1 x 200 v. 25%
C17	129-21	.0002 Mica 20%
C18	100-17	.01 x 400 v. 25%
C19	119-52	25.0 mfd. 25 w.v.
C20	100-50	.25 x 200 v. 20%
C21	100-71	.004 x 600 v. 25%
C22	120-175	.000004 Coupling Capacity
L2	114-115	6" P.M. Speaker
S1	125-48	Band Switch
S2		Oil-on switch on volume control (D.P.D.T.)

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

All voltages as indicated on diagram, are measured with a new set of batteries.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I. F. TRANSFORMERS: (465 K.C.):

Part No. 108-79C Output I. F. Transformer
Part No. 108-78C Interstage I. F. Transformer
Part No. 108-116 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1 Top View).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to minimum capacity (plates out of mesh), make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 1D5G 2nd. I.F. Tube and adjust the output I.F. transformer (No. 108-79C) to resonance.

   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 1D5G 2nd. I.F. Tube to grid cap of 1D5G 1st. I.F. Tube and adjust interstage I.F. transformer (No. 108-78C) to resonance.

   (c) Move oscillator to grid cap of 1C7G and adjust input I.F. transformer (No. 108-116).

SHORT WAVE BAND ALIGNMENT:
5.5 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the antenna and ground leads, make the following adjustments:

   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator trimmer to resonance.

   This adjustment is the trimmer mounted on the top of front section of the variable gang condenser (see Fig. 1, top view).

   (b) Adjust short wave antenna trimmer (Adjustment "Z"), to resonance (see Fig. 3, bottom view).

BROADCAST BAND ALIGNMENT:
535 to 1750 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation and with external oscillator connected in series with "Dummy 2" to antenna and ground leads make following adjustments:

   (a) Set external oscillator and dial on radio to 1400 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment "Y"), (see bottom view of Chassis, Fig. 3). Tune gang condenser slowly back and forth while making this adjustment.

   (b) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment "X") to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the front flange of the chassis. (See bottom view of chassis, Fig. 3.)

   (c) Repeat adjustment "a" and "b" until sensitivity is at its maximum, also check to see that radio tunes to 1750 K.C.

   (d) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are six levers on the dial by means of which six stations may be selected,

Press down any one of the six levers. Holding it down, tune in by means of tuning knob No. 3 any one of your favorite stations. Turn the tuning knob very slowly back and forth until signal is clearest. The station will then be accurately tuned in. Adjust the volume by means of the volume control knob to the desired intensity.

Release this lever and press down any other lever. Hold this lever down and tune in by means of knob No. 3 another favorite station.

Follow this procedure until stations have been set on all the levers.

Rotate the tuning knob (No. 3) to the right (clockwise) as far as it will turn. Now remove from the right side of the cabinet the metal button, and, with a screw driver inserted through the hole, tighten the reset locking adjustment screw "5", (see Fig. 1). It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the levers. (Note: Reset Lock Screw "5" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, loosen the reset locking screw "5" four or five complete turns; select the new station as explained. (Note: If the dial mechanism works hard when setting up a new station for one of the automatic tuner levers, it is due to the locking screw being too tight. Loosen the reset locking screw "5" until the dial mechanism works freely with the tuner lever pressed down).

BE SURE TO RETIGHTEN THE RESET LOCK SCREW, otherwise the stations will not stay adjusted to the levers.

MONTGOMERY-WARD & CO.

MODEL 62-278

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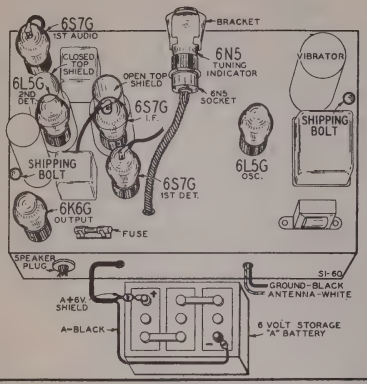
MODEL 62-278

MONTGOMERY-WARD & CO.



VOLTAGES AT SOCKETS

Volume and Tone Control: Maximum
Battery: 6.3 volts at battery.
Readings taken with 1000 Ohm-per-volt meter, 500 volt scale.
Antenna Shorted to Ground.
Position of Band Switch:Standard Wave.

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG AND GROUND(Unless Otherwise Indicated). PRONG No. 1	PRONG No. 2	PRONG No. 3	PRONG No. 4	PRONG No. 5	PRONG No. 6	PRONG No. 7	PRONG No. 8
6S7G	1st Det.....		6.1(1)	150	105	7		6.1(1)	7
6L5G	Osc.....		6.1(1)	80				6.1(1)	
6S7G	I.F.....		6.1(1)	150	105	2.5		6.1(1)	2.5
6L5G	2nd Det.....		6.1(1)					6.1(1)	
6S7G	Audio.....		6.1(1)	80	20			6.1(1)	
6K6G	Power.....		6.1(1)	145	150			6.1(1)	11
6N5	Tuning Indicator....	Plate to Ground 25		Target to Ground 150		Cathode to Ground 0		Across Heater 6.1	

(1) As read between terminals 2 and 7.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C19) & (C20)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C16) & (C17)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C7)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Antenna Range D (C2)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C8)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C9)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C5) 2nd Ant. Range B (C6)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C10)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

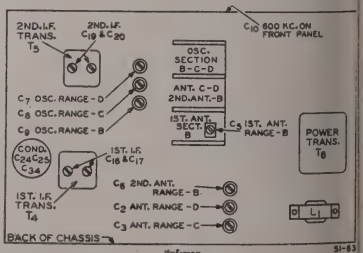
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—Loosen the pointer set screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image



RESISTORS

Carbon

Part No.	Code	Resistance	Wattage
A94104	R1	100,000 ohm	0.2
A94152	R2	1,500 ohm	0.2
B94503	R3	50,000 ohm	0.2
A94203	R4	20,000 ohm	0.2
A95254	R5	250,000 ohm	0.2
A94401	R6	400 ohm	0.2
A95205	R7	2 megohm	0.2
B94103	R8	10,000 ohm	0.2
A95503	R9	50,000 ohm	0.2
A94504	R11	500,000 ohm	0.2
A94603	R12	60,000 ohm	0.2
A95504	R13	500,000 ohm	0.2
A94471	R14	470 ohm	0.2
A95101	R16	100 ohm	0.2

Variable

2K1540 A95004	R10	.5 megohm	Volume Control and Switch.....
	R15	.15 megohm	Tone Control.....

CONDENSERS

Tubular

Part No.	Code	Capacitance	Voltage
45X80	C4	.05 mf.	180
45X220	C12	.00424 mf.	180
45X187	C14	.02 mf.	180
45X195	C13	.1 mf.	180
45X211	C18	.04 mf.	180
45X98	C23	.10 mf.	180
45X96	C26	.10 mf.	180
45X98	C27	.10 mf.	180
45X224	C28	.5 mf.	180
45X201	C29	.01 mf.	10**
45X135	C30	.8 mf.	180
45X93	C31	.10 mf.	180
45X187	C33	.02 mf.	180
45X212	C35	.04 mf.	360
45X111	C36	.002 mf.	300

Molded

47X69	C1	250 mmf.	
47X90	C4	1600 mmf.	
47X63	C13	55 mmf.	
47X56	C21	50 mmf.	
47X56	C22	50 mmf.	
47X65	C32	250 mmf.	
47X49	C37	7 mmf.	
47X61	C38	2000 mmf.	

Trimmer

17A73	(C2	2-25 mmf.	Antenna Range "D")
	C3	2-25 mmf.	Antenna Range "C")
	C6	2-25 mmf.	2nd Antenna Range "B")
	C5	1st Antenna Range "B" (Part of Gang Condenser)	
	C7	2-25 mmf.	Oscillator Range "D")
17A82	C8	2-25 mmf.	Oscillator Range "C")
	C9	2-25 mmf.	Oscillator Range "B")
17A61	C10	300-600 mmf.	600 KC Padder
17A57	(C16	50-120 mmf.)	1st I.F. Trimmers
	C17	50-120 mmf.)	
17A60	(C19	50-120 mmf.)	2nd I.F. Trimmers
	C20	85-185 mmf.)	

Electrolytic

45X229	(C24	18 mf.	150)
	C25	18 mf.	150) Dry
	C34	4.0 mf.	25)

Miscellaneous

14A78	3 Section Gang Condenser less Dial and Drive Assembly

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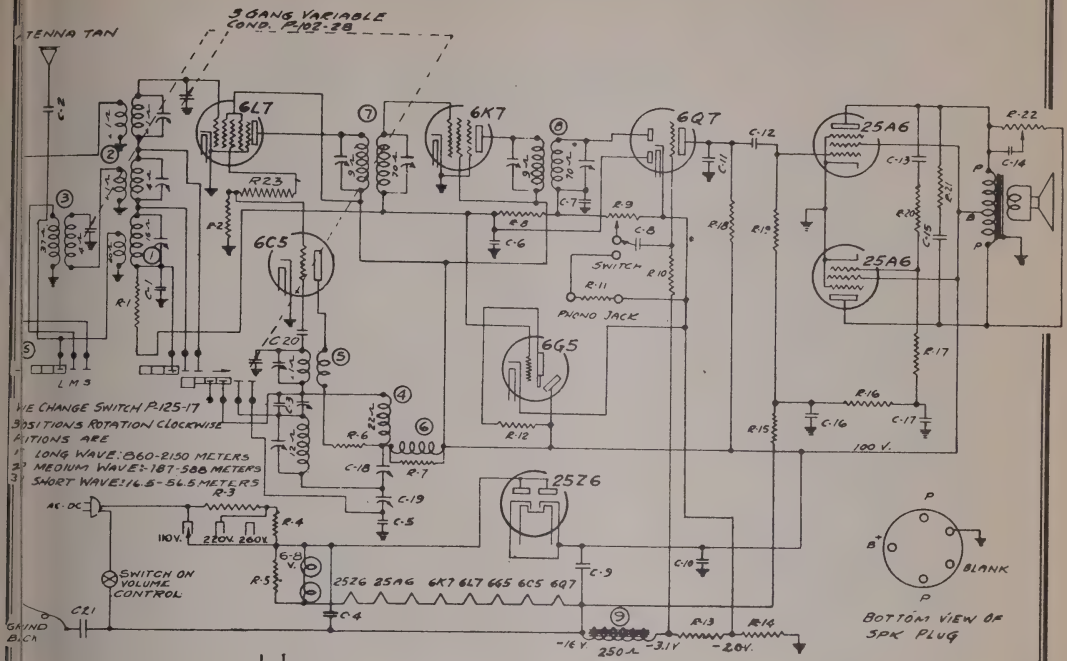
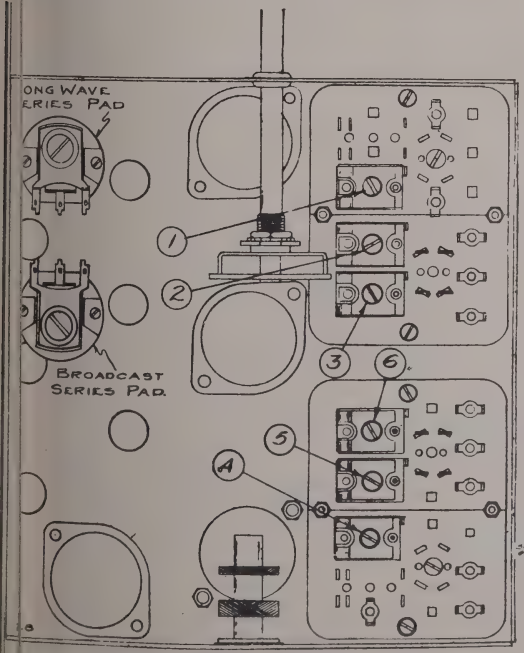
MODEL 62-281

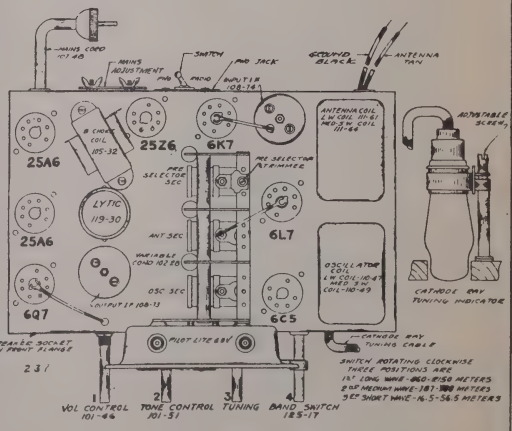
MONTGOMERY-WARD & CO.



I. F. FREQUENCY
465 K. C. (645 1 Meters)



IG. 2—BOTTOM VIEW (Showing Trimmers)



TOP VIEW—FIG. 1

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MODEL 62-281

MONTGOMERY-WARD & CO.

8-Tube Including Cathode-Ray Tuning Indicator 3-Band A. C.-D. C. Superheterodyne Receiver

110-220-260 Volts A. C. (Any Cycles) or D. C.

TUBES:

The tube complement of this chassis consists of the latest metal type tubes, which are interchangeable with "metal-glass" types, or glass tubes with octal bases.

The type and function of each tube is as follows:

1—Type 6L7 Pentagrid Mixer, First Detector.
1—Type 6C5 Oscillator.
1—Type 6K7 Remote Cut-Off Pentode, I. F. Amplifier (465 K.C.)
1—Type 6Q7 Duplex Diode Triode Second Detector, A.V.C. and First Audio.
2—Type 25A6 Output Pentodes in Push Pull.
1—Type 25Z6 High Vacuum Rectifier.
1—Type 6G5 Cathode-Ray Tuning Indicator.
(Note:—6G5 available in all glass only.)

POWER SUPPLY:

This receiver is supplied for operation on 110-220-260 volts A.C. (any cycle) or D.C.

Three taps are provided for mains voltages. These taps are accessible upon removing the plate fastened with two wing nuts to back of chassis.

Set the tap at the voltage supplied by the local power company.

This is important.

NOTE:

If set does not operate in one minute on Direct Current reverse plug in receptacle.

SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages as indicated on diagram are measured with 119 volt A.C. or D.C. mains.

With special mains voltages select tap nearest to actual mains voltage at time voltage measurements are to be made.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

ALIGNING INSTRUCTIONS
Dummy Antennas

The following dummy antennas are used in aligning the receiver, and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast and long wave)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

TEST FREQUENCIES USED

	Kilocycles	Meters
I. F.	465	645.1
Long Wave	150	2000
	350	860
	325	925
Broadcast	600	500
	1400	214
	1600	187
Short Wave	6000	50.0
	17000	17.6
	18200	16.5

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

CAUTION:

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the four bolts by which it is fastened.

ALIGNING I.F. TRANSFORMERS
(465 K.C.) (645.1 Meters)

Part No. 108-73 Output I.F. Transformer.

Part No. 108-74 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position, (center of its rotation), and with the variable condenser set to approxhmately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-73) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6L7 and adjust input I.F. transformer (No. 108-74) to resonance.
   (c) With oscillator still connected to 6L7, readjust output I.F. transformer (108-73) if necessary.

ALIGNMENT PROCEDURE

The following adjustments to be made after the I.F.'s have been aligned as explained above.

SHORT WAVE BAND ALIGNMENT:
16.5 Meters (18.2 Mc.) to 56.5 Meters (5.3 Mc.)

1. With band changing switch in the short wave position, extreme right of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Set external oscillator to 16.5 meters (18.2 Mc.) and adjust short wave oscillator trimmer (adjustment number 3, see Fig. 2) to resonance.
   (b) Re-set external oscillator to 17.6 meters (17.0 Mc.) and pick up signal by rotating gang condenser. Adjust short wave antenna trimmer (adjustment number 0) to resonance.
   (c) Re-set external oscillator to 50 meters (6.0 Mc.) and check for sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MEDIUM OR BROADCAST BAND ALIGNMENT:
588 Meters (510 K.C.) to 187 Meters (1600 K.C.)

1. With band changing switch in the medium wave position, center of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 187 meters (1600 K.C.) and adjust medium wave oscillator trimmer to resonance (adjustment number 2; see bottom view of coil assembly. Fig. 2.)
   (b) Re-set external oscillator to 214 meters (1400 K.C.), rotate variable gang condenser and pick up signal. Adjust medium wave antenna trimmer (Adjustment number 5) to resonance; adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 500 meters (600 K.C.), and adjust medium wave series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 2.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 300 meters (1000 K.C.). **Under no circumstances bend plates of variable condenser sections to correct tracking.**

IMPORTANT: This band must be completely rechecked after the long wave band has been adjusted.

LONG WAVE BAND ALIGNMENT:
860 Meters (350 K.C.) to 2150 Meters (140 K.C.)

1. With band changing switch in the long wave position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 860 meters (350 K.C.), and adjust long wave oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly. Fig. 2.)
   (b) Re-set external oscillator to 925 meters (325 K.C.), rotate variable gang condenser and pick up signal. Adjust long wave antenna trimmer (Adjustment number 4) to resonance.
   (c) Re-set external oscillator to 2000 meters (150 K.C.), and adjust long wave series pad to resonance by rotating condenser to approximately 2000 meters, rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 2.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

IMPORTANT: This band must be completely rechecked after the medium wave band has been rechecked.

LIST OF REPAIR PARTS

Part No.	Description	Circuit Diagram Reference
	CONDENSERS	
100-11	.01 x 400 Volt Tubular	C2, C8, C12, C13, C14
100-20	.1 x 200 Volt Tubular	C17
100-22	.05 x 200 Volt Tubular	C1
100-26	.02 x 400 Volt Tubular	C6
100-36	.01 x 1400 Volt Tubular (bare leads)	C21
100-39	.1 x 400 Volt Tubular (with bracket)	C4
100-43	.25 x 200 Volt Tubular (with bracket)	C16
100-44	.003 x 600 Volt Tubular	C15
119-30	Dual 20 mfd. Electrolytic Filter	C9, C10
129-12	.00025 Mica—Type MT—20%	C7, C11
129-39	.00005 Mica—Type MT—20%	C20
129-54	.003 Mica—Type MW—2½%	C5
129-67	.00004 Mica—Type MT—10%	C3
	RESISTORS	
106-30	100 ohm (R4), 40 ohm (R5) Metal Clad	R4, R5
130-4	3 Megohm—1/3W—20%—100V Carbon	R8, R10
130-31	250 M ohm—1/3W—20%—50V Carbon	R15, R16
130-12	5 M ohm—1/3W—20%—20V Carbon	R2, R7
130-1	.0 M ohm—1/3W—20%—20V Carbon	R21
130-20	100 M ohm—1/3W—10%—50V Carbon	R1, R11
130-27	50 ohm—1/3W—20%—3V Carbon	R6, R14
130-56	100 ohm—1/3W—20%—10V Carbon	R23
130-66	75 M ohm—1/3W—10%—50V Carbon	R17
130-100	150 M ohm—1/3W—20%—50V Carbon	R18
130-102	500 M ohm—1/3W—10%—50V Carbon	R19, R20
130-110	1 Megohm—1/10W—10%—100V Carbon	R12
130-128	20 ohm—1/3W—20%—10V Carbon	R13
	COILS	
108-73	Output I.F. Coil Assembly complete with can	8
108-88	Input I.F. Coil Assembly complete with can	7
110-46	Oscillator Choke coil	6
110-47	Long Wave Oscillator Coil Assembly, less can	4
110-49	Broadcast and Short Wave Oscillator Coil Assembly, less can	3
111-61	Long Wave Antenna Coil Assembly, less can	1
111-62	Antenna Preselector Coil Assembly	5
111-64	Broadcast and Short Wave Antenna Coil Assembly, less can	2
	SOCKETS	
121-8	Five Prong Socket—Marked "Spkr"	
121-12	Seven Prong Socket—Marked "6K7"	
121-17	Six Prong Socket—Marked "6C5"	
121-18	Seven Prong Socket—Marked "6L7"	
121-26	Seven Prong Socket—Marked "6Q7"	
121-31	Seven Prong Socket—Marked "25Z6"	
121-32	Seven Prong Socket—Marked "25A6"	
	SPEAKER	
114-49	Six Inch Permanent Magnet Dynamic	
	MISCELLANEOUS	
101-46	Volume Control and Switch (1 megohm)	R9
101-51	Tone Control (300 M ohm)	R22
102-28	Three Gang Variable Condenser	
105-32	250 ohm Filter Choke	R3
107-48	250 ohm Special Line Cord	
112-169	Phono-Radio Indicator Plate	
115-35	Antenna, Oscillator Shield	
115-54	Mains Cover Plate	
121-30	Three Prong Socket Assembly for Mains	
124-31	J. S. Long Wave Series Pad—300 mmf	C18
124-32	J. S. Broadcast Series Pad—565 mmf	C19
125-17	Band Switch	S
125-22	Phono-Radio Toggle Switch	
128-51	Small Wood Knob (with spring)	
133-24	Wing Nut for Mains Cover Plate (115-54)	
171-2	Phono Jack Assembly	

CATHODE RAY TUNING INDICATOR PARTS

107-49	Cable and Socket Assembly
112-158	Metal Oval Escutcheon
117-57	Holder and Clamp
130-110	1 Meg. Ohm—1/10 Watt—10%—100 Volt Carbon

DIAL PARTS LIST

ASSEMBLIES

117-41	Drive Bracket including: 1—No. 117-19—Tuning Shaft Bushing
117-66	Switch Disc and Link Assembly, including: 1—No. 117-12 —Switch Arm; 1—No. 117-35 —Bushing with Screws; 1—No. 117-40B—Switch Link; 3—No. 131-26 —Spring Washers; 3—No. 162-5 —Rivets; 1—No. 112-144 —Switch Dia.—Inc. Red Tape

DIAL PARTS ONLY

112-125	Drive Belt
112-143	Oval Escutcheon complete with Celluloid Crystal
112-178	Dial Scale comp. with Fastener, Pointer Disc. & Screw
113-147	Tuning Shaft
113-151	Pointer complete with Screw
132-156	Pilot Light Assembly
116-13	6.8 Volt T-51 Pilot Light
117-29A	Tuning Shaft Pulley
117-38	Stud, for take-up Spring
117-39	Pulley, for take-up Spring
130-14	Take-up Spring
184-9	Horse Shoe Washer
184-40	Rubber Grommet

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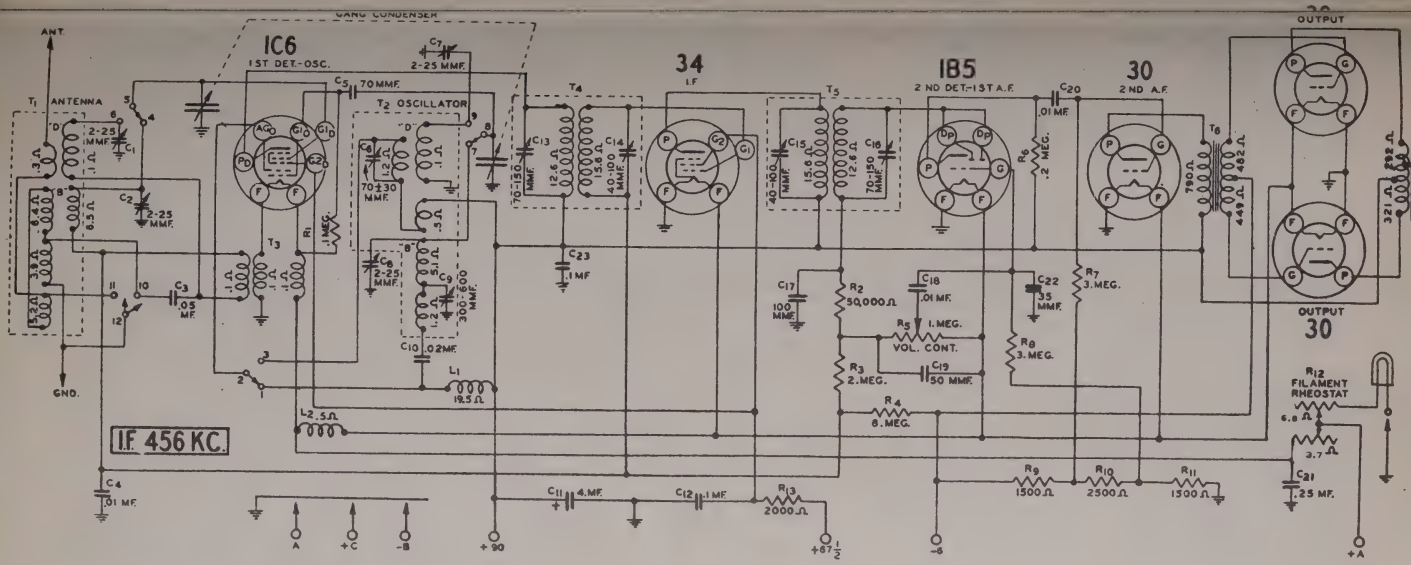


IN MODELS WHICH DO NOT HAVE THE FILAMENT RHEOSTAT THE "+A" CONNECTION IS MADE DIRECTLY TO THE "+A" LINE AND THE PILOT LAMP.

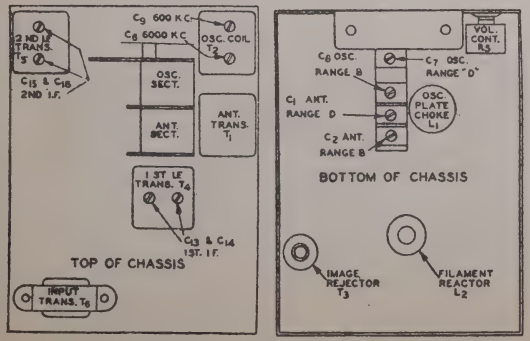
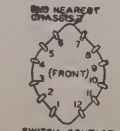


Fig. 7—Location of Trimmers

ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE "B"	POSITION 2 SHORT WAVE "D"
FRONT	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12
BACK		



TUBE ELEMENT LEGEND

F - Filament
P - Plate
G - Control Grid
G1 - Control Grid
G2 - Screen Grid
DP - Diode Plate
G1O - Control Grid (Osc.)
G1D - Control Grid (Det.)
G2O - Screen Grid (Det.)
AGO - Anode Grid (Osc.)
PD - Plate (Det.)

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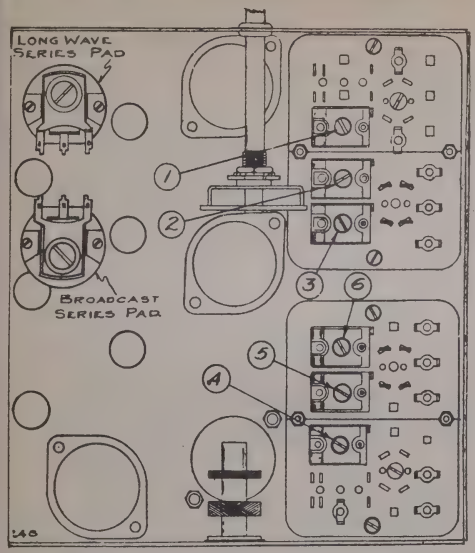

FIG. 3—BOTTOM VIEW (Showing Trimmers)

ALIGNING INSTRUCTIONS:

Dummy Antennas:

The following dummy antennas are used in aligning the receiver, and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Medium and long wave) — Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

TEST FREQUENCIES USED:

	Kilocycles	Meters
I. F.	465	645.1
Long Wave	150	2000
	350	860
	325	925
Medium Wave	600	500
	1400	214
	1600	187
Short Wave	6000	50.0
	17000	17.6
	18200	16.5

Resonance Indicator:

across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

CAUTION:

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the four bolts by which it is fastened.

ALIGNING I.F. TRANSFORMERS:

(465 K.C.) (645.1 Meters)

Part No. 108-73 Output I. F. Transformer.
Part No. 108-88 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view)

1. With volume control full on (the extreme right of its rotation), the band changing switch in the medium wave position, (center of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-73) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6L7 and adjust input I.F. transformer (No. 108-88) to resonance.
   (c) With oscillator still connected to 6L7, readjust output I.F. transformer (108-73) if necessary.

ALIGNMENT PROCEDURE:

The following adjustments to be made after the I.F.'s have been aligned as explained above.

SHORT WAVE BAND ALIGNMENT:

16.5 Meters (18.2 Mc.) to 56.5 Meters (5.3 Mc.)

1. With band changing switch in the short wave position, extreme right of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Set external oscillator to 16.5 meters (18.2 Mc.) and adjust short wave oscillator trimmer (adjustment number 3, see Fig. 3) to resonance.
   (b) Re-set external oscillator to 17.6 meters (17.0 Mc.) and pick up signal by rotating gang condenser. Adjust short wave antenna trimmer (adjustment number 6) to resonance.
   (c) Re-set external oscillator to 50 meters (6.0 Mc.) and check for sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MEDIUM BAND ALIGNMENT:

588 Meters (510 K.C.) to 187 Meters (1600 K.C.)

1. With band changing switch in the medium wave position, center of its rotation, and with gang condenser in its min-

FREQUENCY RANGE

350 to 140 K.C. (Kilocycles)	860-2150 Meters
1600 to 510 K.C. (Kilocycles)	187- 588 Meters
18.2 to 5.3 M.C. (Megacycles)	16.5-56.5 Meters

with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 187 meters (1600 K.C.) and adjust medium wave oscillator trimmer to resonance (adjustment number 2; see bottom view of coil assembly. Fig. 3.)
   (b) Re-set external oscillator to 214 meters (1400 K.C.), rotate variable gang condenser and pick up signal. Adjust medium wave antenna trimmer (Adjustment number 5) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 500 meters (600 K.C.), and adjust medium wave series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 300 meters (1000 K.C.) **Under no circumstances bend plates of variable condenser sections to correct tracking.**

IMPORTANT: This band must be completely rechecked after the long wave band has been adjusted.

LONG WAVE BAND ALIGNMENT:

860 Meters (350 K.C.) to 2150 Meters (140 K.C.)

1. With band changing switch in the long wave position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 860 meters (350 K.C.), and adjust long wave oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly. Fig. 3.)
   (b) Re-set external oscillator to 925 meters (325 K.C.), rotate variable gang condenser and pick up signal. Adjust long wave antenna trimmer (Adjustment number 4) to resonance.
   (c) Re-set external oscillator to 2000 meters (150 K.C.), and adjust long wave series pad to resonance by rotating condenser to approximately 2000 meters, rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

IMPORTANT: This band must be completely rechecked

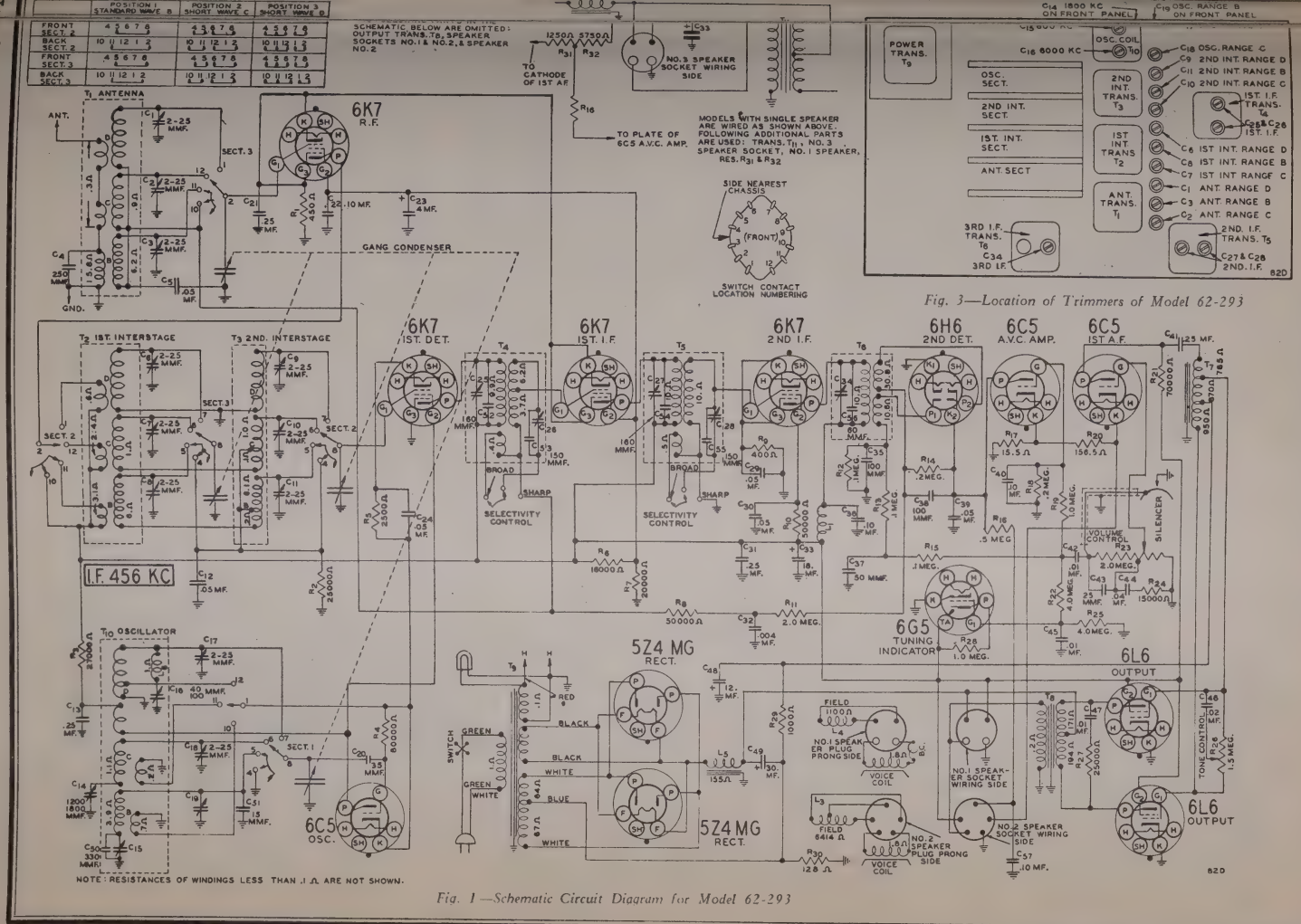

Fig. 3—Location of Trimmers of Model 62-293

Fig. 1—Schematic Circuit Diagram for Model 62-293

MODEL 62-271

MONTGOMERY-WARD & CO.

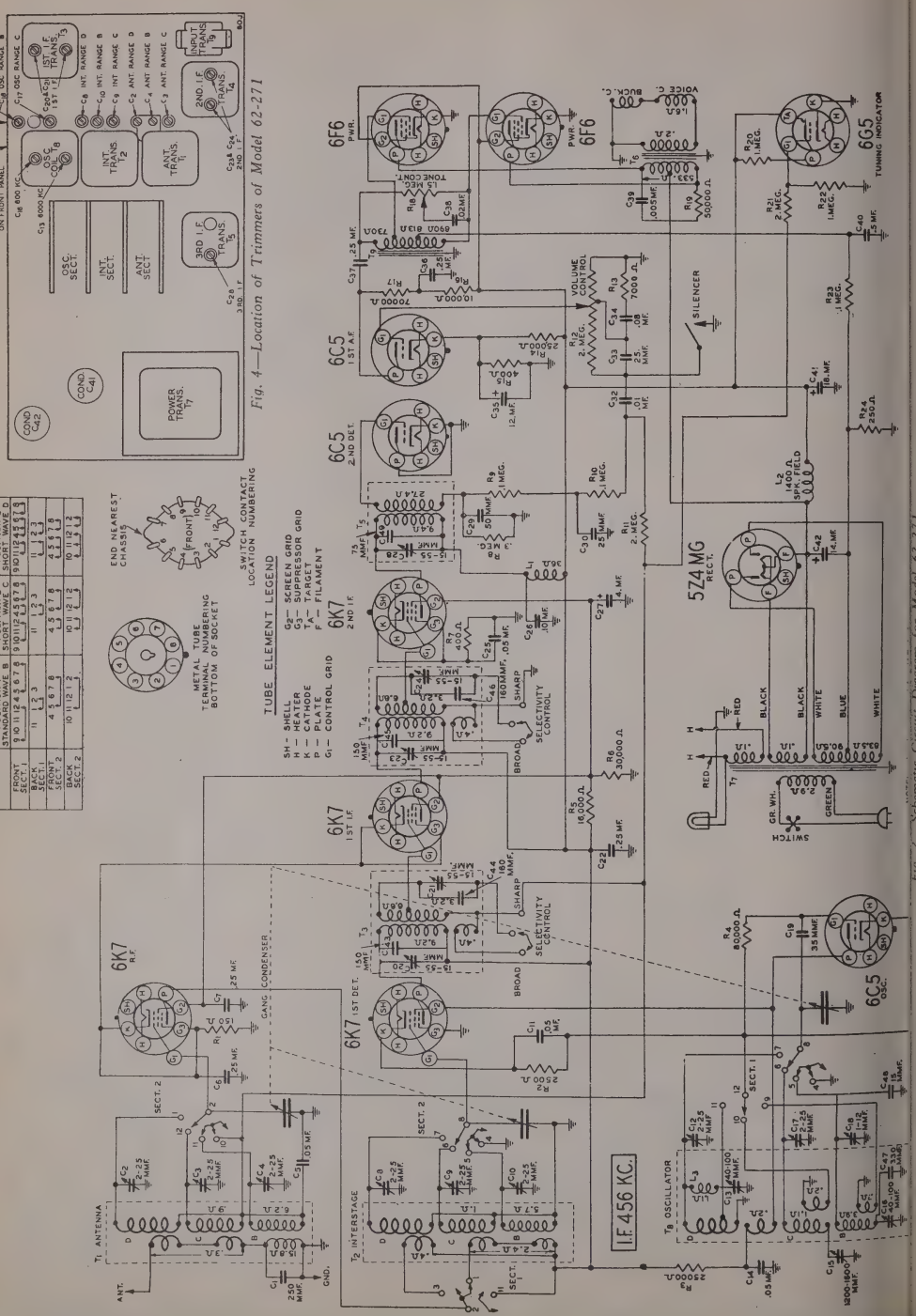

Fig. 4—Location of Trimmers of Model 62-271

Fig. 2—Schematic Circuit Diagram for Model 62-271

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Telephone Dial Assembly

The telephone dial assembly provides a means of pre-setting a number of broadcasting stations and tuning in these stations at any time by depressing a button and rotating the dial to a stop position.

The apparatus is mounted on a panel attached at the front of the chassis. An examination of this panel will clearly show the method of operation.

Silencer Circuit—A silencer circuit is provided which results in silent tuning between stations when using the telephone dial buttons.

When a telephone dial button is depressed, a connection is established between the ungrounded end of the volume control and the chassis ground. Refering to Fig. 5 it will be noted that contact is made between the line from the volume control, contact ring, contact washer arm (when button is depressed), spring and ring gear stud. Since the ring gear is at ground potential, this grounds the audio voltage and no signal will be heard until the button is released to break the contact.

It should be noted that the contact ring is part of the ring gear assembly, but is insulated from it.

Differences between Model 62-293, Telephone Movie Dial Radio and Models 62-313 and 62-413, Standard Movie Dial Radios.

The information contained in Vol.VIII covering Model 62-313 and the Movie Dial Drive, applies to the Telephone Movie Dial Radio, Model 62-293 with the following exceptions:

A silencer circuit which is described in the first article of this manual, has been added.

The location of the "B" range oscillator trimmer, has been changed to the front panel—See Fig. 3 of this manual.

Additional condensers have been added to the oscillator and I.F. coil assemblies.

The correct schematic circuit diagram is shown in Fig. 1 of this manual.

A planetary (two-speed) drive is not used.

A supplementary parts list appears in this manual.

Other differences between the telephone movie dial radios and the standard movie dial radios are:

The telephone dial assembly has been added as described

The band switch has been changed to take care of the new elevator assembly.

The selectivity control (high fidelity switch) has been separated from the tone control.

Differences between Model 62-271, Telephone Movie Dial Radio and Models 62-261, 62-311 and 62-411, Standard Movie Dial Radios.

All of the differences as described for the 13-tube set, Model 62-293, apply to the 11-tube set, Model 62-271, except that the data covering Model 62-261 will be found in Vol.IX, but the data covering the Movie Dial Drive will be found in Vol.VIII.

The correct schematic for Model 62-271 is shown in Fig. 2 and the correct trimmer locations in Fig. 4 on the same page.

Adjustments and Service Data

MODELS 62-271 AND 62-293

Noise When Tuning in a Signal with a Telephone Dial Button

As explained in the article on "Silencer Circuit" in this manual, no noise or signal should be heard when tuning in a signal with a telephone dial button until the button is released. If noise is heard while tuning

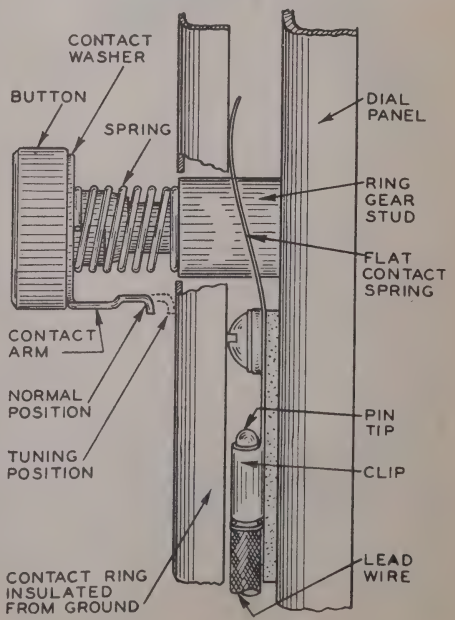

Fig. 5—Silencer Assembly

MODEL 62-271
MODEL 62-293

MONTGOMERY-WARD & CO.

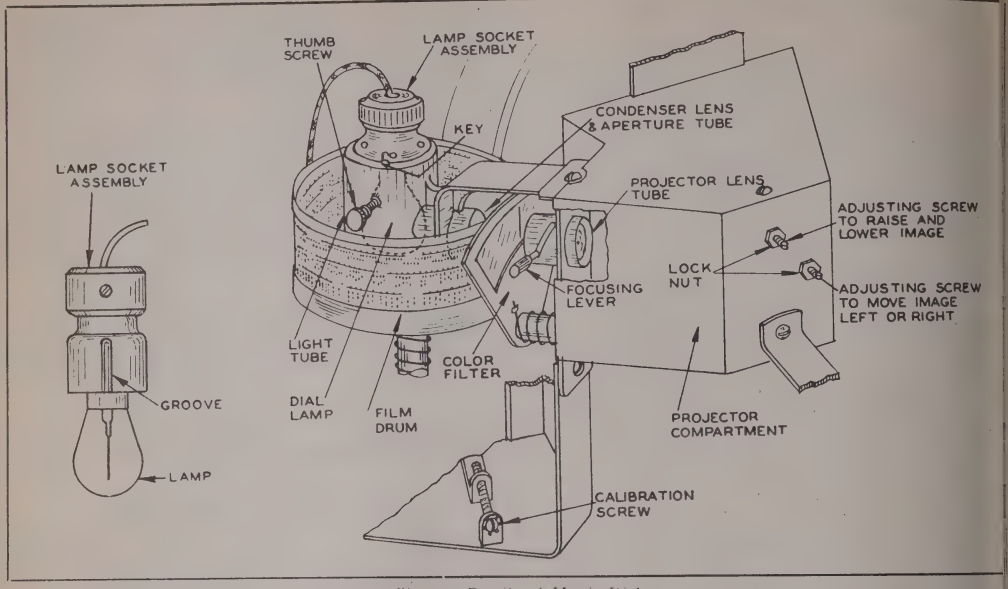

Fig. 6—Details of Movie Dial

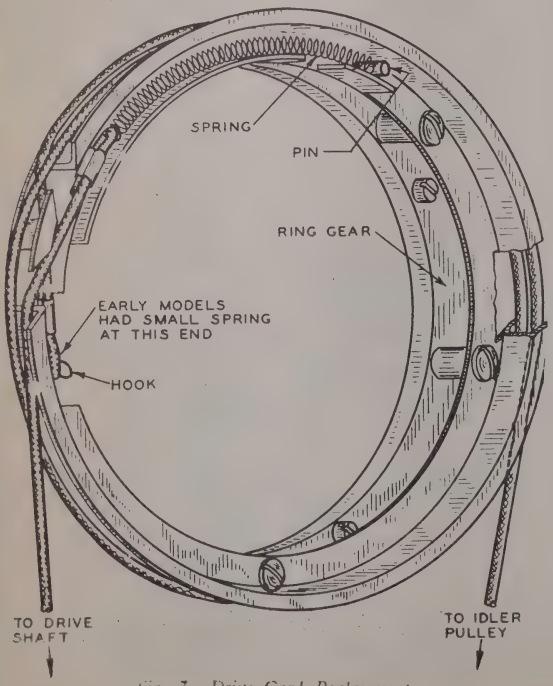

Fig. 7—Drive Cord Replacement

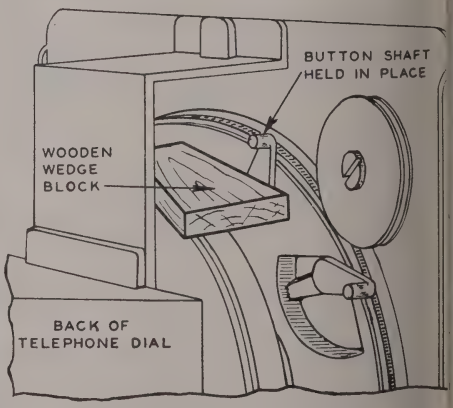

Fig. 8—Holding a Push Button Shaft in Place

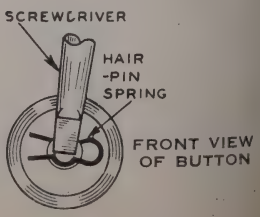

Fig. 9—Putting a Hairpin Spring on a Push Button Shaft

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in signal with one of these buttons, it can be cor-re d as follows:

Noise Occurs on All Buttons—This is probably du to a poor contact between the flat contact spring an the contact ring—See Fig. 5. Clean the flat con-ta spring and contact ring to insure a good elec-tri l connection. Ordinary cleaning fluid may be us l and will be effective in most cases in cleaning th surface without affecting the plating. If the co act is still not satisfactory, a piece of fine emery clo h may be used.

Noise Occurs on One Button Only—This is du to a poor contact between the ring gear stud, sp g, contact washer and contact ring—See Fig. 5. Cl n all of these items of the particular button to pr ide a good electrical connection in the same man-ne as mentioned above.

Te ephone Dial Drive Cord Slipping

the telephone dial drive cord slips on the drive sh t pulley, rub some rosin on this cord. This will re dy the condition in practically all cases.

Pc ition of Stop Pin

When the telephone dial panel is assembled to the ch sis, the gang condenser rotor should not com-ple ly open or close. The travel of the rotor in this re ect is controlled by the gang stop pin on the ring ge —See Fig. 10. This is necessary to protect the ga condenser in case the telephone dial is swung ra ly to either of the extreme positions. When the ga stop pin is properly set, it will serve as the stop at th extreme positions. If the rotor is seen to open co letely or close completely, the stop pin should be ulled back and re-set to overcome this condition.

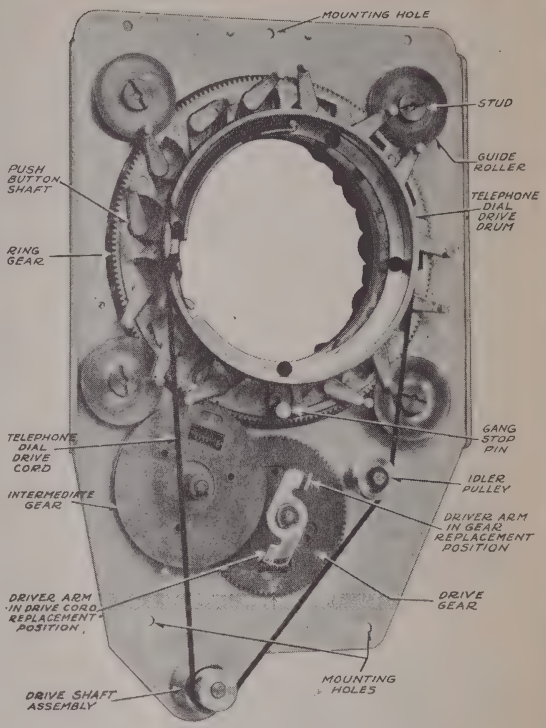

Fig. 10—Telephone Dial Panel Assembly

Gr asing and Oiling

fter a period of time, put some light grease on the tee of the ring gear and the teeth of the inter-me ate gear—See Fig. 10. Also use some light grease on he film drum shaft at the point where it passes thr ugh the film pulley (See Fig. 7, Manual No. 10 . Use a light oil in the drive shaft assembly be ing (See Fig. 10), care being taken not to get an on the drive cord.

Backlash Between Driver Arm and Spring Clamp on Condenser Drive Drum

If the telephone dial assembly turns an appreciable amount before the figures on the screen move, the driver arm (See Fig. 10) does not fit tightly in the spring clamp on the condenser drive drum. To remedy this condition, remove the telephone dial panel and bend the spring on the condenser drive drum so that the driver arm will fit tightly when pushed in. This spring can be bent by inserting the blade of a heavy screwdriver.

Replacing Parts

Re lacing Telephone Dial Panel Assembly

emove the chassis from the cabinet. Remove the esc tcheon, glass screen and rubber gasket by taking ou the 2 screws which hold this assembly in place.

emove the silencer cable from the silencer con-tac spring assembly. Take out the 2 screws from the bo om of the telephone dial panel and the screw, loc washers and rubber washer from the top of the telephone dial panel. **Caution—do not loosen any of the 4 guide roller screws.** Take off the telephone dial panel by pulling it away from the front of the chassis.

To replace this assembly, turn the condenser rotor so that the spring clamp of the condenser drive drum is at the top.

Turn the telephone dial assembly counter-clockwise (from front) until it no longer turns easily. Then

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...n the telephone dial assembly clockwise until the wide spacer has gone slightly past the bottom of the ...

Place the telephone dial panel assembly in position over the metal projector compartment. Insert the screw, 2 lockwashers and rubber washer in the center top hole of the telephone dial panel so that this screw goes in the tapped hole of the bracket of the metal projector compartment. Do not tighten this screw. Rotate the telephone dial slightly one way or the other until the driver arm of the drive gear (See Fig. 10) and the spring clip of the gang condenser drive drum line up properly. Push the telephone dial panel assembly into position so that the driver arm goes into the spring clip. This operation should be done carefully.

Replace the 2 screws at the bottom of the telephone dial panel. Tighten these screws and also the screw at the top. Insert the tip of the silencer cable in the clamp of the silencer contact spring assembly.

Replace the rubber gasket, glass screen and escutcheon assembly.

Replacing Telephone Dial Drive Cord

Remove the telephone dial panel assembly from the chassis in accordance with the instructions in the article in this manual on that subject.

Remove the old drive cord and drive cord tension spring. Turn the telephone dial until the notch on the ring gear lines up with the mark on the intermediate gear at the same time that the mark on the drive gear lines up with the arrow on the panel as shown in Fig. 10.

If, owing to the fact that the telephone dial has been rotated with the telephone dial drive cord off and with the panel removed from the chassis, these four marks do not line up readily, then it will be necessary to proceed as follows:

Turn the telephone dial until the mark on the drive gear and the arrow on the panel are in line and note the exact position of the notch of the ring gear. Then rotate the telephone dial several revolutions in a clockwise direction (from back of panel). Each time that the arrow on the panel and the mark on the drive gear are in line, the notch on the ring gear will have moved a very slight distance in respect to its previous position. Note these new positions of the notch on the ring gear each time that the arrow on the panel and the mark on the drive gear line up.

If (when the arrow on the panel and the mark on the drive gear line up) the notch on the ring gear is approaching the intermediate gear, continue to rotate the telephone dial in a clockwise direction until the notch on the ring gear lines up with the mark on the intermediate gear at the same time that the arrow on the panel and the mark on the drive gear are in line, as shown in Fig. 10.

If it is seen that the notch on the ring gear is going away from the intermediate gear (when the arrow on the panel and the mark on the drive gear are lined up), then rotate the telephone dial in a counter-clockwise direction until the notch on the ring gear lines up with the mark on the intermediate gear at the same time that the arrow on the panel lines up with the mark on the drive gear as shown in Fig. 10.

Then, after the gears have been lined up correctly as described above, rotate the telephone dial one complete revolution in a counter-clockwise direction (from back of panel). The driver arm of the drive gear will then be in the drive cord replacement position shown in Fig. 10.

Place one end of the drive cord on the hook which is inside the telephone dial drum—See Fig. 7. Bring the cord out through the upper opening in the drum. Wind the cord in a clockwise direction one and one-half turns around the drum progressing toward the back of the panel. Bring the cord over the drive shaft pulley (not over idler pulley at this time). Attach the spring to the free end of the cord and slip the loop of the spring over the pin in the slot of the telephone dial drum. Working back from the pin, lay this spring and cord in the slot and bring the cord out through the lower opening in the flange of the drum—See Fig. 7. Then place the cord over the idler pulley.

Replacing Film Drum Drive Cord

Remove the telephone dial panel assembly. Then follow the procedure indicated in the article, "Replacing Film Drum Drive Cord" in Movie Dial Manual No. 108, omitting paragraphs 1 and 10 of that article. Refer to Fig. 7 in that manual.

Replacing Gates

After a great amount of use one or both of the stop gates may be worn down and must be replaced. The old gates cannot be filed down. These gates are located on the front of the metal projector compartment below the opening for the glass screen. To take out the old gate, first remove the telephone dial panel. Take out the two pins which hold the gate in position. Disconnect the spring. After the spring has been attached to the new gate, put the new gate and pins in place and spread the pins. After this is done, be sure that the gate swings freely and that the spring still has sufficient tension to hold the gates definitely against their stop.

Replacing the Color Filter Semaphore

Follow the procedure indicated in the article, "Replacing Color Filter Semaphore" of Movie Dial Manual No. 108, omitting the 3rd and 10th paragraphs of that article.

Replacing a Telephone Dial Button or Button Shaft

A telephone dial button or button shaft may be put on or replaced without removing the chassis from the cabinet. Take out the celluloid disc and the station disc from the push button. Remove the hairpin spring which holds the button shaft in place at the front of the button. If the button shaft is broken, the old one should be removed and replaced at this time. Rotate the dial until the button shaft in question is approximately in the position shown in Fig. 8. This shaft must be held in place. This is done from the back of the cabinet with a wooden wedge block as shown.

Lay the cabinet back down against a chair so that it will be about 30 degrees from the vertical position.

Put the coil spring over the button shank and place this spring over the button shaft (from front of the radio). The adjusting tab should point toward the glass screen.

Hold the tab and rotate the button until the flat in the shank coincides with the flat on the shaft. Push the button all the way on.

Put the hairpin spring in place, as shown in Fig. 9, with the upper part in the slot near the end of the button shaft and the lower part over the end of the shaft. Place the blade of a screwdriver at the center of the lower part of the spring and push down until the spring snaps into place in the slot on the shaft. Remove the wedge block.

CAUTION—The different push button shafts must not be interchanged. If it is necessary to remove more than one push button, be sure to label each push button shaft so that it may be returned to its proper place.

Gear Assembly

The assembly of the ring gear, intermediate gear and drive gear (See Fig. 10) on the telephone dial panel is an involved procedure and, as a rule, can be accomplished successfully only by a man skilled in mechanical assembly.

In case one or more of the gears on this assembly becomes defective, it is suggested that the entire panel assembly be returned to the Repair Service Departments at Chicago or Oakland for reconditioning. However, for completeness, the following procedure is given for replacing these gears.

Replacing the Ring Gear

Remove the telephone dial panel assembly from the chassis (See "Replacing Telephone Dial Panel"). Take off the telephone dial drive cord. Take off the spreader spring of the intermediate gear (this spring eliminates lost motion or "back-lash" between the intermediate gear and the ring gear).

Label and number from 1 to 14 each push button shaft in a counter-clockwise direction starting with the shaft to the right of the gang stop pin (when the gang stop pin is at the bottom of the dial). Remove each push button, spring, and push button shaft —See Fig. 5. Unscrew the five screws which secure the telephone dial drive drum and take off this drum. Unscrew the four brass screws which hold the button spacer ring and contact ring assembly to the ring gear and remove the complete button spacer ring and contact ring assembly (it is not necessary to take off the contact ring from the button spacer ring).

Remove the two upper guide rollers (IMPORTANT—Be sure to exactly follow the instructions given in the article, "Replacing a Guide Roller"). The ring gear may then be removed.

CAUTION: Do not move the movable gear of the intermediate gear assembly in relation to the fixed gear.

Put the new ring gear in place observing ALL of the following items: Be sure that the arrow on the panel and the mark on the drive gear are in line. At the same time be sure that the mark on the intermediate gear and the notch in the ring gear are in line as shown in Fig. 10.

Replace the two upper guide rollers following exactly the procedure given in the article, "Removing and Replacing a Guide Roller." Reassemble the items to the ring gear assembly which were removed from it, care being taken that each push button shaft is put back in the same opening from which it was removed. Put on the spreader spring of the intermediate gear. Reassemble the drive cord and attach the telephone dial panel to the chassis.

Replacing the Intermediate and Drive Gears

Remove the telephone dial panel assembly from the chassis and take off the drive cord. Remove the spreader springs from both the intermediate and drive gears. Remove the two upper guide rollers following exactly the procedure given in the article, "Removing a Guide Roller." The complete telephone dial assembly with the ring gear may then be disengaged from the intermediate gear.

Take off the horseshoe washers from the shafts of the intermediate and drive gears. These gears may then be removed.

Before replacing the gears on the shafts, rotate the movable gear of the intermediate gear assembly in relation to the fixed gear, until the rectangular spring opening is at a maximum. Then turn the movable gear (in relation to the fixed gear) an amount equal to one tooth on the gear in such a direction that the two spring holders move toward each other and thus reduce the rectangular spring opening. Follow the same procedure for the two gears of the drive gear assembly.

It will be necessary to put on both the intermediate and drive gears at the same time. After they are both on their shafts, turn the drive gear so that the mark on the gear and the arrow on the panel are in line. Then raise the intermediate gear on its shaft and rotate it until the mark on the intermediate gear is in line with the center of the ring gear (when the ring gear is in its proper position). Replace the horseshoe washers.

Then re-engage the ring gear (being sure that the notch on the ring gear is in line with the mark on

Continued on next page

the intermediate gear at the same time that the arrow on the panel is in line with the mark on the drive gear). Replace the two upper guide rollers (as described in the article, "Replacing a Guide Roller"). Then put the spreader springs on the drive and intermediate gears. Replace the telephone dial drive cord and attach the telephone dial panel to the chassis.

Removing and Replacing a Guide Roller

If it is ever necessary to remove and replace any of the guide rollers, the following procedure should be used after the telephone dial panel, telephone dial drive cord and spreader spring for the intermediate gear have been removed.

Loosen the screw which holds the guide roller and stud to the telephone dial panel—See Fig. 10.

With the telephone dial panel face up, hold the stud of the guide roller so that it will not turn. Take out the screw. Remove the stud and the guide roller together, so that none of the twelve roller bearings which are between the stud and the guide roller will fall out.

In replacing the guide roller, first be sure that the stud and the twelve roller bearings are within the guide roller and that the head of the stud is against the flat side (not the side with the flange) of the guide roller. Then be sure that the notch in the ring gear is in line with the mark on the intermediate gear at the same time that the arrow on the panel is in line with the mark on the drive gear as shown in Fig. 10. Replace the stud and guide roller in the panel (panel face up) and replace the screw.

Put the spreader spring on the intermediate gear. Put on the telephone dial drive cord and attach the telephone dial panel to the chassis.

Model 62-271 Supplementary Parts List (Less Dial Assembly)

Parts listed in VOL. IX (Models 62-261, 62-311, 62-411) are used in Model 62-271 radios with the following changes:

The Following NEW PARTS are USED:

MISCELLANEOUS

Bin No.	Part No.	Description	Selling Price
	3A258	7 Prong Octal Base Socket (for 6K7, 6C5, 6F6)	$0.06
	3A259	5 Prong Octal Base Socket (for 5Z4MG)	.06
	*12A235	12" Dynamic Speaker Complete with Output Transformer (T8)	4.92
11538	10A103	Selectivity (Broad-Sharp) Control Knob	.20
	2A76	Selectivity (High Fidelity) Switch	.20
	2A76	2 Section, 3 Position Band Change Switch	.94
	4A67	Terminal Strip—2 Lug Insulated	.04

TRANSFORMERS AND COILS

Bin No.	Part No.	Code	Description	Selling Price
	9A751	T3	1st I.F. Transformer and Can Assembly	$1.32
	9A752	T4	2nd I.F. Transformer and Can Assembly	1.30
	9A753	T5	3rd I.F. Transformer and Can Assembly	.96
	9A760	T8	Oscillator Coil and Can Assembly	1.62

CONDENSERS

Bin No.	Part No.	Code	Description	Selling Price
	44X30	C42	14 mf. 450 Volt Wet Electrolytic Condenser	$0.46
10965	47X81	C19	35 mmf. Molded	.12
	47X83	C43	150 mmf. Molded	.18
	47X84	C44	160 mmf. Molded	.18
	47X84	C46	160 mmf. Molded	.18
	47X82	C47	330 mmf. Molded	.16
	47X87	C49	75 mmf. Molded Condenser	.16
	17A69	C13	40-120 mmf. Oscillator Padding Condenser (6000 KC Adjust.)	.20
		C16	40-100 mmf. Oscillator Padding Condenser (600 KC Adjust.)	
	17A68	C18	1-12 mmf. "B" Range Oscillator Trimmer	.10
	17A70	C20	15-55 mmf. 1st I.F. Trimmers	.20
		C21	15-55 mmf.	
	17A70	C23	15-55 mmf. 2nd I.F. Trimmers	.20
		C24	15-55 mmf.	
	17A71	C28	15-55 mmf. 3rd I.F. Trimmer	.12
	47X80	C48	15 mmf. Compensating Capacitor	.24
	14A69	3 Gang Condenser less Dial and Drive Assembly		1.98

RESISTORS

Bin No.	Part No.	Code	Description	Selling Price
	40X222	R19	1.5 Megohm Tone Control	$0.32

NOTE: C38 as listed in Manual No. 101 should be 46X202, .02 mf., 360 volt Tubular Condenser.

*This speaker may be used in place of 12A239 which is listed in Manual No. 101.

NOTE: The capacity of condenser C18 has been changed. This condenser is no longer a part of trimmer strip 17A45, but has been replaced by 17A68.

The Following Parts Shown in VOL. IX (Models 62-261, 62-311, 62-411) are NOT USED on the Model 62-271

MISCELLANEOUS

Bin No.	Part No.	Description	Selling Price
	3A211	6K7 Tube Socket	$0.08
	3A221	6C5 Tube Socket	.08
	3A210	6F6 Tube Socket	.08
	3A222	5Z4MG Tube Socket	.08
	2A52	2 Section, 3 Position Band Change Switch	.74

TRANSFORMERS AND COILS

Bin No.	Part No.	Code	Description	Selling Price
	9A493	T3	1st I.F. Transformer and Can Assembly	$0.94
	9A494	T4	2nd I.F. Transformer and Can Assembly	.94
	9A495	T5	3rd I.F. Transformer and Can Assembly	.76
	9A492	T8	Oscillator Coil and Can Assembly	1.42

CONDENSERS

Bin No.	Part No.	Code	Description	Selling Price
	44X10	C42	14 mf. 400 Volt Wet Electrolytic Condenser	$0.60
	17A35	C13	40-100 mmf. Range "B" Oscillator Padding Condenser	.22
		C16	300-600 mmf.	
	47X53	C19	35 mmf. Molded	.06
	17A30	C20	150-250 mmf. 1st I.F. Trimmers	.22
		C21	150-250 mmf.	
	17A30	C23	150-250 mmf. 2nd I.F. Trimmers	.22
		C24	150-250 mmf.	
	17A40	C28	70-150 mmf. 3rd I.F. Trimmers	.14
	47X72	C31	25 mmf. Molded	.06
	14A52	3 Gang Condenser less Dial and Drive Assembly		1.74

RESISTORS

Bin No.	Part No.	Code	Description	Selling Price
	40X213	R18	1.5 Megohm Tone Control and Selectivity Switch	$0.62

Parts listed in VOL. VIII (Models 62-313 and 62-413) are used in Model 62-293 radios with the following changes:

The Following NEW PARTS are USED:

MISCELLANEOUS

Bin No.	Part No.	Description	Selling Price
	3A258	7 Prong Octal Base Socket (for 6K7, 6H6, 6C5, 6L6)	$0.06

TRANSFORMERS AND COILS

Bin No.	Part No.	Code	Description	Selling Price
	9A729	T4	1st I.F. Transformer and Can Assembly	$1.32
	9A730	T5	2nd I.F. Transformer and Can Assembly	1.20
	9A731	T6	3rd I.F. Transformer and Can Assembly	1.16
	9A732	T10	Oscillator Coil and Can Assembly	1.66

CONDENSERS

Bin No.	Part No.	Code	Description	Selling Price
10979	46X98	C57	.10 mf. 180 Volts Tubular	$0.10
10965	47X81	C20	35 mmf. Molded	.12
	47X82	C50	330 mmf. Molded	.16
	47X84	C52	160 mmf. Molded	.18
	47X83	C53	150 mmf. Molded	.18
	47X84	C54	160 mmf. Molded	.18
	47X83	C55	150 mmf. Molded	.18
	47X85	C56	60 mmf. Molded	.16
	17A69	C15	40-120 mmf. Oscillator Padding Condenser (680 KC Adjust.)	.20
		C16	40-100 mmf. Oscillator Padding Condenser (6000 KC Adjust.)	
	17A68	C19	1-12 mmf. Range "B" Oscillator Trimmer	.10
	17A70	C25	15-55 mmf. 1st I.F. Trimmer	.20
		C26	15-55 mmf.	
	17A70	C27	15-55 mmf. 2nd I.F. Trimmers	.20
		C28	15-55 mmf.	
	17A71	C34	15-55 mmf. 3rd I.F. Trimmer	.12
	47X80	C51	15 mmf. Compensating Capacitor	.24
	14A67	4 Gang Condenser less Dial and Drive Assembly		2.38

RESISTORS

Bin No.	Part No.	Code	Description	Selling Price
11540	40X221	R26	1.5 Megohm Tone Control	$0.36

NOTE: The capacity of condenser C19 has been changed. This condenser is no longer a part of trimmer strip 17A52, but has been replaced by 17A68 as shown in "New Parts Used."

MISCELLANEOUS (Continued)

Bin No.	Part No.	Description	Selling Price
	3A259	5 Prong Octal Base Socket (for 5Z4MG)	.06
11538	10A103	Selectivity (Broad-Sharp) Control Knob	$0.20
	2A74	3 Section, 3 Position Band Change Switch	1.06
	2A75	Selectivity (High Fidelity) Switch	.20
	2A454	Complete Set of Rubber Mounting Cushions for Gang Condenser	.06
	4A67	Terminal Strip (Single Insulated Lug—with mounting strap)	.04
10887	4A18	Terminal Strip (2 Lugs Insulated—with mounting strap)	.04

The Following Parts Shown in VOL. VIII (Models 62-313, 62-413) are NOT USED on the Model 62-293.

MISCELLANEOUS

Bin No.	Part No.	Description	Selling Price
	3A233	6L6 Tube Socket	$0.08
	3A232	6H6 Tube Socket	.08
	3A221	6C5 Tube Socket	.08
	3A211	6K7 Tube Socket	.08
	3A222	5Z4 Tube Socket	.08
	2A57	3 Section, 3 Position Band Change Switch	.92

TRANSFORMERS AND COILS

Bin No.	Part No.	Code	Description	Selling Price
	9A515	T4	1st I.F. Transformer and Can Assembly	$0.92
	9A516	T5	2nd I.F. Transformer and Can Assembly	.82
	9A517	T6	3rd I.F. Transformer and Can Assembly	1.02
	9A514	T10	Oscillator Coil and Can Assembly	1.44

CONDENSERS

Bin No.	Part No.	Code	Description	Selling Price
	17A35	C15	300-600 mmf. Oscillator Padding Condenser	$0.22
		C16	40-100 mmf.	
	47X53	C20	35 mmf. Molded	.06
	17A30	C25	150-250 mmf. 1st I.F. Trimmers	.22
		C26	150-250 mmf.	
	17A30	C27	150-250 mmf. 2nd I.F. Trimmers	.22
		C28	150-250 mmf.	
	17A40	C34	40-150 mmf. 3rd I.F. Trimmer	.14
	14A50	4 Gang Condenser less Dial and Drive Assembly		2.30

RESISTORS

Bin No.	Part No.	Code	Description	Selling Price
	40X214	R26	1.5 Megohm Tone Control and Selectivity Switch	$0.62

Models 62-271 and 62-293 Telephone Movie Dial Replacement Parts (Complete List)

Bin No.	Part No.	Description	Selling Price
	4X156	Escutcheon for Glass Screen	$0.20
11542	58X175	Glass Screen	.10
11364	8X52	Rubber Gasket for Glass Screen	.08
	26A52	Telephone Dial and Drive Panel Assembly Complete (does not include any Movie Dial parts)	0.72
		The following items are included in the above Assembly but may be ordered separately:	
11543	25A133	Push Button and Tab ea.	.12
11544	28X109	Springs for Push Buttons doz.	.14
11545	28X111	Hair Pin Springs for Push Buttons doz.	.14
	26X238	Push Button Shafts ea.	.08
	25A124	Button Spacer Ring and Silencer Ring Assembly	.82
	24X252	Ring Gear Only (does not include Push Button Shafts)	.44
	24X264	Telephone Dial Drive Drum	.19
	26X244	Stop Pin (behind Wide Spacer)	.12
	28X112	Spring for Stop Pin doz.	.06
	24X257	Guide Roller Only (Upper) ea.	.18
	24X246	Guide Roller Only (Lower) ea.	.18
	20X140	Stud (1 required for each Guide Roller) ea.	.06
	20X147	Roller Bearings (12 required for each Guide Roller)	.06
	10X20	Telephone Dial Drive Cord Only (Black)	.24
	28X114	Tension Spring for Telephone Dial Drive Cord	.04
	25A112	Gear and Driver Arm Assembly less Spreader Spring	.24
	25A122	Intermediate Gear Assembly less Spreader Spring	.36
	28X102	Spreader Springs for Above Gears doz.	.10
	24X263	Drive Cord Idler Pulley	.06
	19X67	Horse Shoe Washers	.08
	26X243	Tuning Knob Shaft Only	.04
	20X151	Eight Ball Bearings in Retainer (Two sets used on above Shaft) ea.	.04
	29X74	Front Brass Bearing Race	.04
	29X73	Rear Brass Bearing Race and Drive Pulley	.06
	25X347	Telephone Dial Panel, Shafts and Bearing Housing Only (less Button Spacer and Ring Gear Assembly, Guide Rollers, Tuning Shaft Assembly and Drive Gears)	.58
	26A51	Silencer Contact Spring Assembly	.06
	25A120	Dial Bracket and Metal Projector Compartment Assembly Complete with Stop Gates and Spring	$1.06
	25X357	Left Stop Gate Complete with Pins (included in above Assembly)	.12
	25X358	Right Stop Gate Complete with Pins (included in above Assembly)	.12
	28X113	Spring for Stop Gates (included in above Assembly) doz.	.14
	25A114	Condenser Drive Drum Assembly	.24
	10X19	Film Drum Drive Cord Only (Phosphor-bronze)	.06
	28X104	Tension Spring for Film Drum Drive Cord	.04
	25A115	Film Drum Support Bracket and Pulley Assembly (does not include Film Drum Shaft)	.80
	26X242	Film Drum Shaft Assembly less Spring	.22
	28X110	Spring for Film Drum Shaft Assembly	.04
9382	12X57	Film Drum Assembly Including Clamping Plate	.56
	62-5517	Dial Lamp	.18
	7A42	Socket for Dial Lamp	.32
	25X295L	Lens, Light and Aperture Bracket less Aperture Cap	.44
	12X54	Aperture Cap	.06
	12X45	Condenser Lens	.50
10480	12X66	Projector Lens	.44
	29X77	Focusing Lever Assembly for Projector Lens	.06
11073	25A75	Color Filter Samaphore less Spring	.24
11526	28X62	Spring for Color Filter Samaphore	.04
	32X91B	Cardboard Projector Compartment	.04
	32X82	Cardboard Projector Compartment Shield	.04
	25X353	Mirror Support Bracket	.18
	26A53	Mirror Assembly	.20
10262	41X138	Mirror Only	.04
	25X354	Front Mounting Bracket for Gang Condenser	.30
	25A116	Drum Elevator Assembly complete less Ball Bearing	.30
11505	20X120B	Ball Bearing for Elevator	.10
11546	26A55	Complete Set of Station Call Letter Discs with 20 Celluloid Discs	.20

Prices Subject To Change Without Notice.

John F. Rider

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MODEL 62-271
MODEL 62-293

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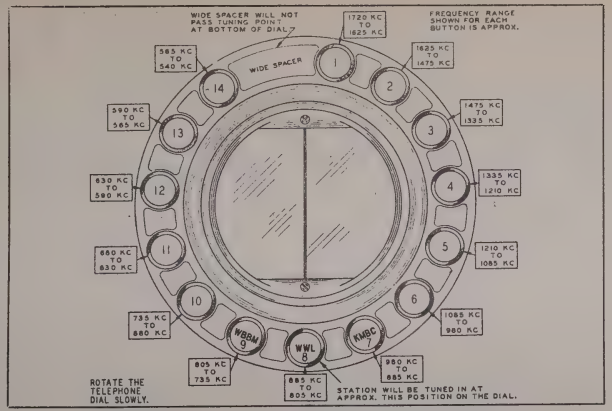
WIDE SPACER WILL NOT PASS TUNING POINT AT BOTTOM OF DIAL.
FREQUENCY RANGE SHOWN FOR EACH BUTTON IS APPROX.
WIDE SPACER
1720 KC TO 1625 KC
1625 KC TO 1475 KC
1475 KC TO 1335 KC
1335 KC TO 1210 KC
1210 KC TO 1085 KC
1085 KC TO 980 KC
980 KC TO 885 KC
885 KC TO 805 KC
805 KC TO 735 KC
735 KC TO 680 KC
680 KC TO 630 KC
630 KC TO 590 KC
590 KC TO 585 KC
585 KC TO 540 KC
WBBM 9
WWL 8
KMBC
ROTATE THE TELEPHONE DIAL SLOWLY.
STATION WILL BE TUNED IN AT APPROX. THIS POSITION ON THE DIAL.

Fig. 11—Telephone Dial Station Buttons

Setting the Telephone Dial Stations

Selecting the Stations to be Set

There are 14 buttons on the telephone dial by means of which 14 stations may be set.

Make a list of your favorite stations, those which you tune in regularly. Put down the frequencies of these stations. There may be 3, 5, 8 or any number up to and including 14 in this list.

If 2 (or more) of the stations in the list you have selected fall within the frequency range of one button, only one of them may be set on the telephone dial. The other station must be tuned in with the regular tuning knob.

Frequencies Covered by Each Button

In Fig. 11 are shown the telephone dial buttons. Each one is given a number so that it may be readily referred to.

The *approximate* frequency range of each button is shown in the rectangle. By approximate is meant that the range of the button may, on occasion, be 10 KC or 20 KC greater or less than the limits as shown. Any station within the *actual* range of a button may be set. Station WBBM, for example, with a frequency of 770 KC, falls within the frequency range of button No. 9 and can, therefore, be set on this button.

Although one frequency, for example 980 KC, is shown as the end of the range of two adjacent buttons, in this case 6 and 7, as a rule, it is possible to tune in a station of this frequency only on one of the two buttons. The proper button to use must be determined by trying both of them.

Procedure for Setting the Telephone Dial Buttons

COMPLETE PROCEDURE	CONDENSED PROCEDURE
1 — The selectivity control should be in the sharp position.	— Turn selectivity control to sharp.
2 — Select one of the stations from the list you have made out and carefully tune in this station with the tuning knob in the usual way using the tuning eye as a guide.	— Tune in station to be set.
3 — The button nearest the bottom center of the dial will be the proper one for the station which is tuned in. In Fig. 11 button No. 8 is the correct one for station WWL.	— Determine the proper button.
4 — The procedure necessary to set a button is simple and the steps are illustrated in Figs. 12 to 15. The normal position of the button and tab is shown in Fig. 12. Depress the button with the finger to the locked position, or until the tab is level with the shoulder of the spacer—See Fig. 13. While the button is thus depressed the tab may be easily moved to the right either with the fingers or with the point of a hard lead pencil inserted in the hole in the tab. It is then in the unlocked position—See Fig. 14. If the tab does not move to the right easily, push the button in or out slightly from the position shown until the groove is found.	— Push button to locked position and move tab to the right.
5 — IMPORTANT—The dial must not be turned during steps 4, 5 and 6, otherwise the station will be detuned. Hold the tuning knob with the hand not used for setting the button, to be sure the dial does not turn and then proceed with the instructions in the next paragraph. After the tab is to the right, the button should be grasped with the thumb and forefinger as shown in Fig. 15. Push the button all of the way in to the setting position and turn the button in either direction until it locks into place. A click will be heard and (with the button still pushed in) it will be impossible to turn the button further in either direction without turning the dial. After the click is heard, the button should be slowly released. When new, the buttons may be stiff and may not turn easily. NOTE: Occasionally one or more of the buttons on the dial may be set at the right point for a station when the radio is shipped from the factory. If this is the case, the click will not be heard and the button cannot be turned after it is pushed in to the setting position, indicating that it is already correctly locked in place.	— Push button to setting position and turn button until it locks in place. Release button slowly.
6 — Push the button one-half way in. It will then be in *the unlocked position*—See Fig. 14. (Do not push it all the way in to the setting position). Move the tab to the left with finger or pencil to the locked position—See Fig. 13. Then release the button; it will return to the normal position—See Fig. 12.	— Push button to unlocked position and move tab to the left. Release button.
7 — Punch the correct station disc from the sheet supplied and push the disc into the bottom of the button. It will fit into place at the bottom. It should be so pushed in that when the button is at the bottom of the dial the wording will be horizontal—See Fig. 11.	— Insert correct station disc.
8 — Push one of the clear celluloid discs into the bottom of the button over the station disc.	— Insert clear celluloid disc.

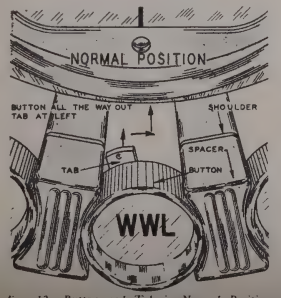

Fig. 12—Button and Tab in Normal Position

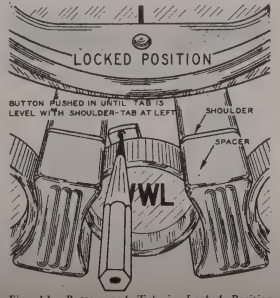

Fig. 13—Button and Tab in Locked Position

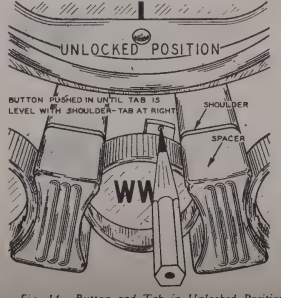

Fig. 14—Button and Tab in Unlocked Position

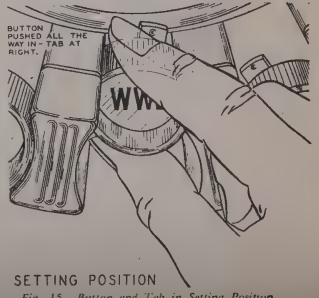

Fig. 15—Button and Tab in Setting Position

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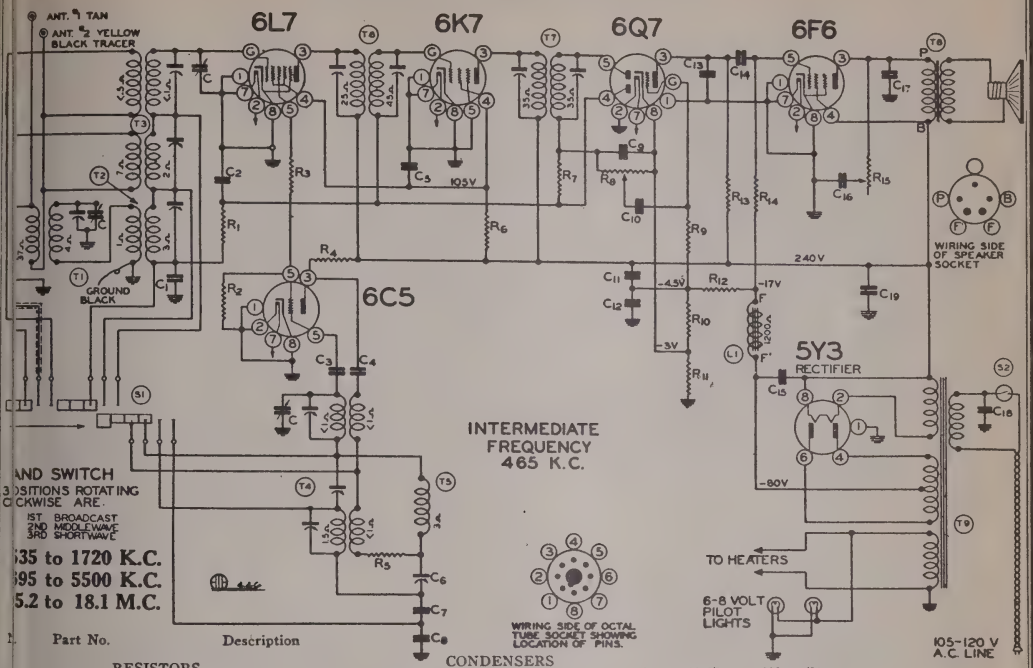
MONTGOMERY-WARD & CO.



Part No.	Description		Part No.	Description
	RESISTORS			**CONDENSERS**
130-103	100M ohm - 1/3 w.	C	102-60	3 gang variable
130-12	50M ohm - 1/3 w.	C1	100-22	.05 x 200
130-105	150 ohm - 1/3 w.	C2	100-26	.02 x 400
130-77	10M ohm - 1 watt	C3	129-39	.00005 Mica
130-27	50 ohm - 1/3 w.	C4	100-37	.003 x 600
130-34	19M ohm - 1 watt	C5	100-1	.1 x 400
130-4	3 meg - 1/3 w.	C6	124-40	.000715 W.C. Series Pad
101-93	1 meg volume control	C7	129-55	.0034 Mica
130-4	3 meg - 1/3 w.	C8	129-54	.003 Mica
106-26	32 ohm - resistor strip	C9	129-5	.0001 Mica
106-26	52 ohm - resistor strip	C10	100-26	.02 x 400
106-26	220 ohm - resistor strip	C11	119-45	8 mfd. - 400 w. v. lytic
130-103	100M ohm - 1/3 w.	C12	100-20	.1 x 200
130-102	500M ohm - 1/3 w.	C13	129-2	.0005 Mica
101-92	50M ohm - tone control	C14	100-11	.01 x 400
	R10, R11 and R12 in same unit	C15	119-45	8 mfd. 400 w. v. lytic
		C16	100-65	.015 x 600
		C17	100-37	.003 x 600
		C18	100-61	.02 x 600
		C19	100-11	.01 x 400

C11 and C15 in same unit

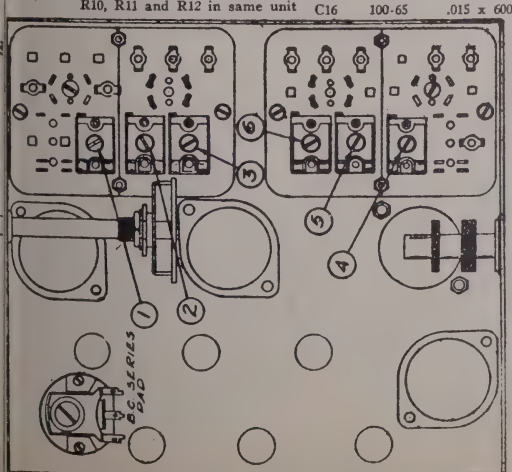
PARTS

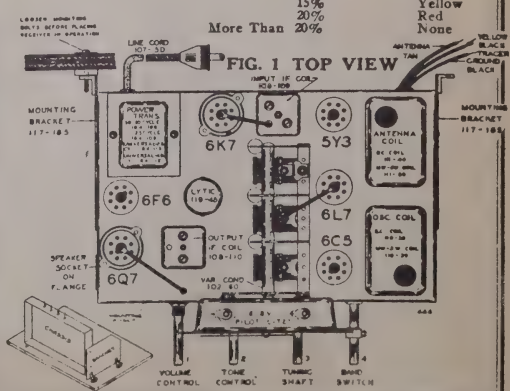
T1	111-51	Preselector Coil
T2	111-49	B. C. Antenna Coil Complete
T3	111-50	S.W. M.W. Antenna Coil complete
T4	110-39	S.W. M.W. Oscillator Coil complete
T5	110-38	B.C. Oscillator Coil complete
T6	108-109	Input I.F. Coil complete 465 kc.
T7	108-110	Output I.F. Coil complete 465 kc.
T8	114-85B	6" dynamic Speaker
T9	104-106	Power Transformer
L1		Speaker field 1200 ohm
S1	125-40	Wave band switch
S2		Off-On Switch on Volume Control

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance percent	Color of Dot
2½ %	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More Than 20%	None

The power consumption of this receiver is 75 watts.





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MODEL 62-296

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-110 Output I.F. Transformer
Part No. 108-109 Input I.F. Transformer
These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-110) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6L7 and adjust input I.F. transformer (No. 108-109) to resonance.

BROADCAST BAND ALIGNMENT:
535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly. Fig. 3.)
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

SHORT WAVE BAND ALIGNMENT:
5.2 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.2 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 17 megacycle signal appears near 16.1 megacycles.

MIDDLE WAVE BAND ALIGNMENT:
1695 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments.
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment number 2) and middle wave antenna (Adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5500 kilocycles and 1695 kilocycles for band coverage.
   (d) Recheck broadcast band alignment.

CHASSIS MODEL 62-503

DUMMY ANTENNAS: **(Serial No. 8A977900 and up)**

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-112B Output I.F. Transformer
Part No. 108-111B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with variable condenser in its minimum capacity position, plates entirely out of mesh, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-112B) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6A8G and adjust input I.F. transformer (No. 108-111B) to resonance.

SHORT WAVE BAND ALIGNMENT:
5.45 to 18.3 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 16 megacycles and connected in series with "Dummy 3" to the antenna and ground leads, make the following adjustments:
   (a) Move dial pointer to 16 megacycles and adjust short wave oscillator trimmer to resonance.
   This adjustment is the trimmer mounted on the top of rear section of the variable gang condenser (see Fig. 1, top view, adjustment number 7).
   (b) Adjust short wave antenna trimmer (Adjustment Number 3), to resonance (see Fig. 3, bottom view).

BROADCAST BAND ALIGNMENT:
535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground leads make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 1, see bottom view of chassis, Fig. 3).
   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (adjustment number 2), to resonance.
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 4), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "c" until sensitivity is at its maximum.
   (e) Set external oscillator to 2100 K.C. (Image of 1170 K.C.) and tune in the signal at 1170 K.C. on the dial. Adjust the wire capacitor, (Adjustment number 6) by twisting the two wires until a **Minimum** output is obtained on output meter.
   (f) Set external oscillator to 2630 K.C. (Image of 1700 K.C.) and tune in the signal at 1700 K.C. on the dial. Adjust the wire capacitor (Adjustment number 5), by moving the wire either toward or away from the coil winding until a **Minimum** output is obtained on output meter.
   (g) Repeat adjustments (e) and (f) until the sensitivity is at a **Minimum**.
   (h) Recheck the broadcast antenna trimmer (Adjustment number 2).
   (i) Recheck the short wave antenna trimmer (Adjustment number 3).

FOR OTHER DATA SEE INDEX

PROCEDURE FOR SETTING THE AUTOMATIC TUNER LEVERS:

Press down any one of the automatic tuner levers. Hold it down, and by means of the tuning knob No. 3, tune in very carefully the station you have selected for this lever. Turn the tuning knob very slowly back and forth until the signal is clearest. The station will then be accurately tuned in.

Release the lever and press down another automatic tuner lever. Hold it down and carefully tune-in the station indicated on the station call letter tab above this lever.

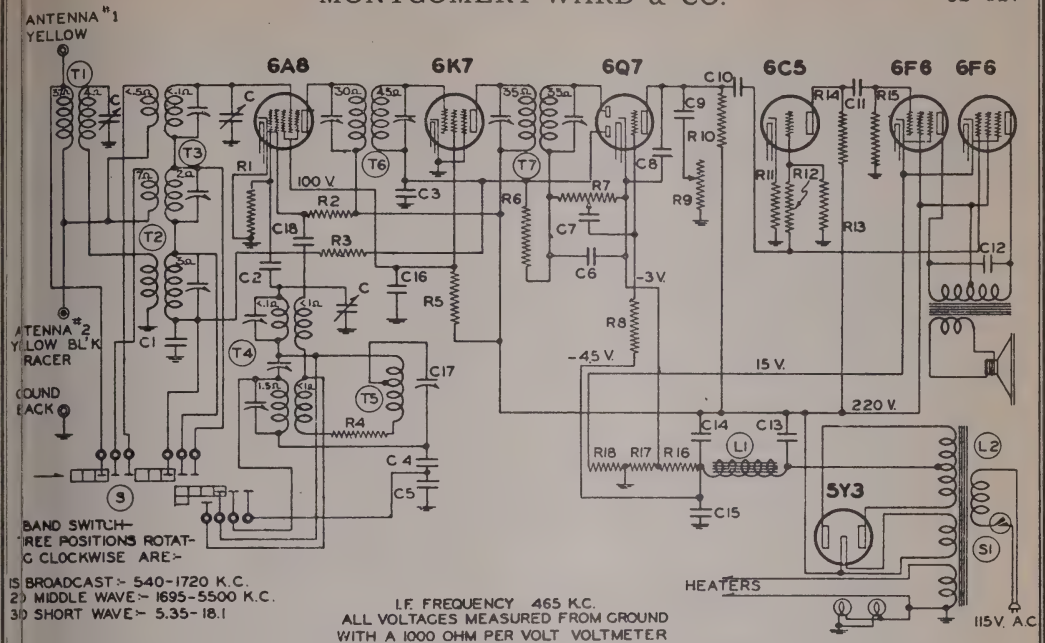
Follow this procedure until you have selected all of your favorite stations. Hold tuning knob securely with left hand to prevent it from turning and with a coin (half dollar), tighten the special locking screw ("C") in the center of the tuning knob, (See Fig. 1).

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, hold the tuning knob No. 3 securely and with a coin loosen the locking screw "C" one or two turns; select the new station as explained. **Be sure to retighten the locking screw,** otherwise the stations you have selected will not stay adjusted to the levers.

MODELS 62-300, 62-627

MONTGOMERY-WARD & CO.



PARTS

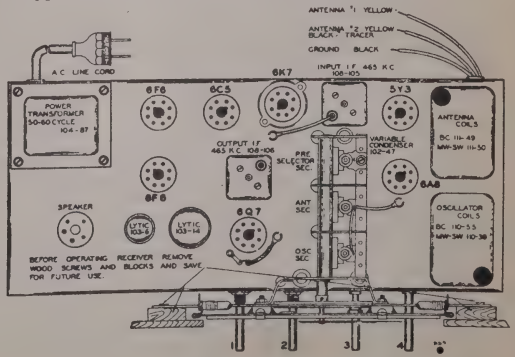
No.	Part No.	Description
		RESISTORS
R1	130-12	50M ohms - 1/3 w.
R2	130-48	15M ohms - 1/3 w.
R3	130-103	100M ohms - 1/3 w.
R4	130-27	50 ohms - 1/3 w.
R5	130-96	25M ohms - 1/2 w.
R6	130-4	3 megohm - 1/3 w.
R7	101-74	1 megohm - Volume Control
R8	130-4	3 megohm - 1/3 w.
R9	101-75	300M ohms - Tone Control
R10	130-100	150M ohms - 1/3 w.
R11	130-22	5M ohms - 1/3 w.
R12	130-163	400M ohms - 1/3 w.
R13	130-103	100M ohms - 1/3 w.
R14	130-12	50M ohms - 1/3 w.
R15	130-100	150M ohms - 1/3 w.
R16	106-37	20 ohms - Muter
R17	106-37	42 ohms - Muter
R18	106-37	250 ohms - Muter

NOTE: R16, R17 and R18 in one unit, No. 106-37

		CONDENSERS
C1	100-22	.05 x 200 v.
C2	129-39	.00005 Mica
C3	100-22	.05 x 200 v.
C4	129-55	.0034 Mica
C5	129-54	.003 Mica
C6	129-5	.0001 Mica
C7	100-11	.01 x 400 v.
C8	129-2	.0005 Mica
C9	100-57	.006 x 600 v.
C10	100-26	.02 x 400 v.
C11	100-26	.02 x 400 v.
C12	100-12	.003 x 600 v.
C13	103-6	8 mfd. x 350 v.
C14	103-14	16 mfd. x 250 v.
C15	100-20	.1 x 200 v.
C16	100-39	.1 x 400 v.
C17	124-35	Adjustable Padder - Working Capacity 740 mmf.
C18	100-12	.003 x 600 v.

C	102-47	One section of three gang condenser
T1	111-51	B.C. Pre-Selector
T2	111-49	B.C. Antenna Coil Assembly
T3	111-50	MW - SW Antenna Coil Assembly
T4	110-39	MW - SW Oscillator Coil Assembly
T5	110-55	B.C. Oscillator Coil Assembly
T6	108-105	Input I.F. - 465 kc.
T7	108-106	Output I.F. - 465 kc.
L1	114-66	6" Speaker (Field Resistance 900 ohms)
L2	104-87	Power Transformer (60 cycle) 115 volts
S	125-17	Band Switch
S1	101-74	On-off Switch on volume control.

1—Type 6A8G—Pentagrid mixer, first detector and oscillator.
1—Type 6K7 Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6Q7G duplex diode triode second detector, A.V.C. and audio.
1—Type 6C5 Inverter stage.
2—Type 6F6G—pentode push-pull output amplifier.
1—Type 5Y3G high vacuum rectifier.



Vol. Control On-Off Switch | Tone Control | Tuning Control | Band Switch

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MODELS 62-300, 62-627

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SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to measured with 115 volts on the primary of the power transformer.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-106 Output I.F. Transformer
Part No. 108-105 Input I.F Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-106) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6A8G and adjust input I.F. transformer (No. 108-105) to resonance.

BROADCAST BAND ALIGNMENT:

540 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly. Fig. 3)
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

SHORT WAVE BAND ALIGNMENT:

5.35 to 18.1 Megacycles

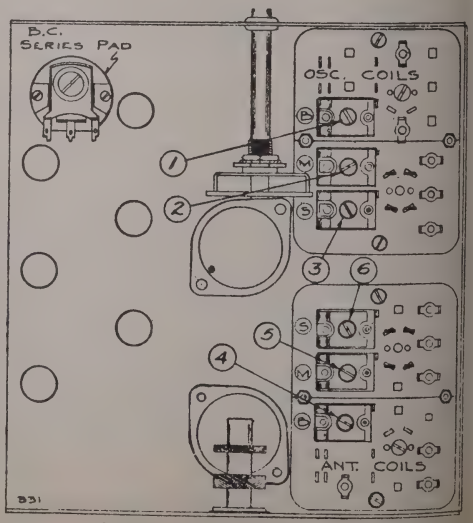
1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

1690 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment number 2) and middle wave antenna (Adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.
   (d) Recheck broadcast band alignment.



-BOTTOM VIEW SHOWING TRIMMERS

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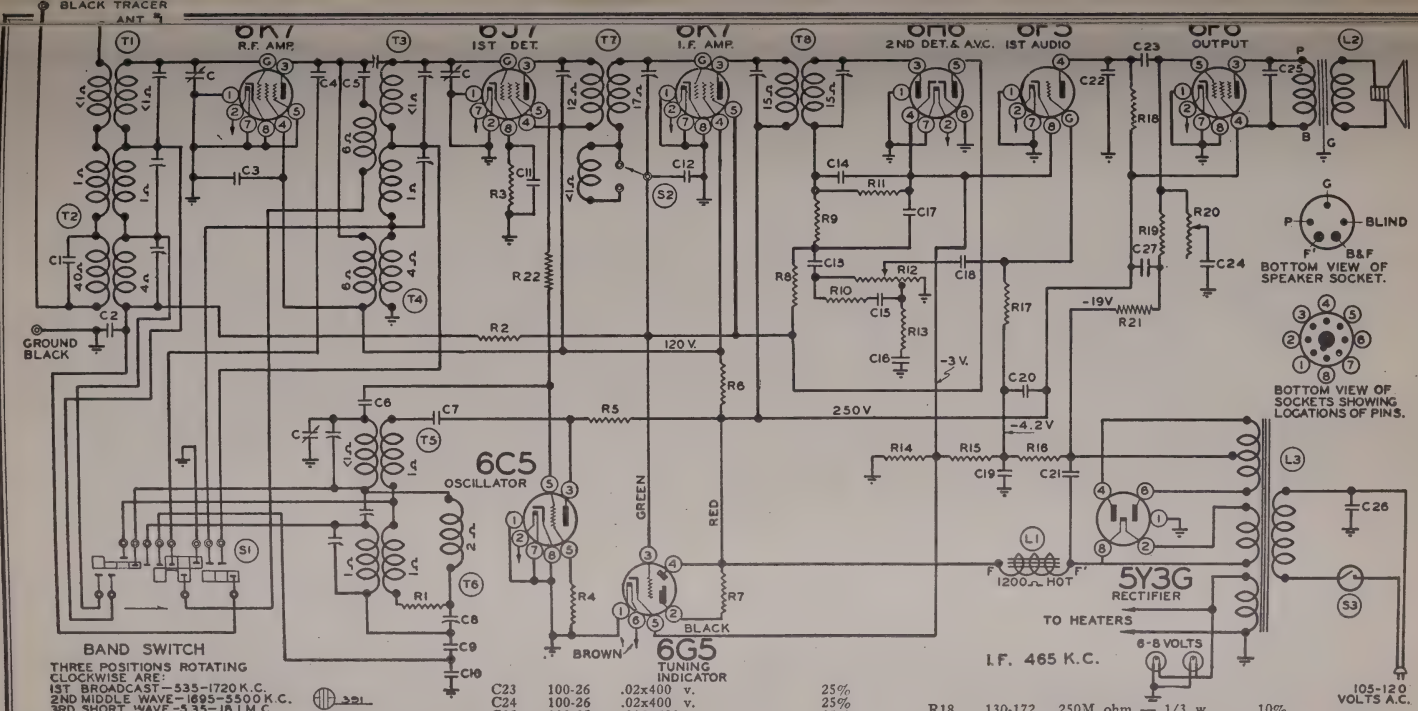
MODELS 62-319, 62-329, 62-409, 62-419
Above Serial 7F69620



C	102-40	3 gang variable condenser	
C1	129-40	.0001 Mica	10%
C2	100-9	.05x200 v.	25%
C3	100-53	.25x400 v.	20%
C4	129-59	.0003 Mica	5%
C5	129-38	.00005 Mica	10%
C6	129-67	.00004 Mica	10%
C7	100-25	.002x600 v.	25%
C8	124-35	Series Pad—740 mmf. w. c.	
C9	129-70	.004 Mica	2½%
C10	129-71	.002 Mica	2½%
C11	100-20	.1x200 v.	25%
C12	100-26	.02x400 v.	25%
C13	100-9	.05x200 v.	25%
C14	129-39	.00005 Ceramicon	20%
C15	129-12	.00025 Mica	20%
C16	100-9	.05x200 v.	25%
C17	129-38	.00005 Mica	10%
C18	100-22	.05x200 v.	25%
C19	100-20	.1x200 v.	25%
C20	103-12	8. x 275 w.v. Regulating lytic	
C21	103-13	8. x 400 w.v. lytic	
C22	129-60	.00015 Mica	20%
C23	100-26	.02x400 v.	25%
C24	100-26	.02x400 v.	25%
C25	100-25	.002x600 v.	25%
C26	100-61	.02x600 v. Bakelite	
C27	100-1	.1x400 v.	20%

RESISTORS

R1	130-105	150 ohm — 1/3 w.	20%
R2	130-20	100M ohm — 1/3 w.	20%
R3	130-159	2500 ohm — 1/3 w.	10%
R4	130-52	50M ohm — 1/3 w.	20%
R5	130-77	10M ohm — 1 w.	20%
R6	130-160	10M ohm — 2 w. Wire Wound	10%
R7		1 megohm — 1/10 w. in tuning indicator socket	
R8	130-4	3 megohm — 1/3 w.	20%
R9	130-111	100M ohm — 1/10 w.	20%
R10	130-52	50M ohm — 1/3 w.	20%
R11	130-171	500M ohm — 1/10 w.	20%
R12	101-60	1 megohm Volume Control	
R13	130-167	7500 ohm — 1/3 w.	20%
R14	106-42	55 ohm	
R15	106-42	20 ohm	
R16	106-42	240 ohm	
R17	130-19	1 megohm — 1/3 w.	20%
R18	130-172	250M ohm — 1/3 w.	10%
R19	130-172	250M ohm — 1/3 w.	10%
R20	101-61	100M ohm — Tone Control	
R21	130-172	250M ohm — 1/3 w.	10%
R22	130-60	100 ohm — 1/3 w.	20%

R11, R9 and C14 are in output I.F. Can
R14, R15 and R16 in same unit.

PARTS

T1	111-67	M.W. S.W. Antenna Coil Assembly
T2	111-68	B.C. Antenna Coil Assembly
T3	109-32	M.W. S.W. R.F. Coil assembly
T4	109-33	B.C. R.F. Coil Assembly
T5	110-53	M.W. S.W. Oscillator Coil Assembly
T6	110-52	B.C. Oscillator Coil Assembly
T7	—108-107	Input I.F. Coil assembly—465 kc.
T8	—108-108	Output I.F. Coil Assembly—465 kc.
L1		1200 ohm speaker field
L2	114-87	10" Dynamic Speaker—20" Cord
	114-79	8" Dynamic Speaker — 12" Cord
	114-80	6" Dynamic Speaker — 12" Cord
L3	—104-80	Power Transformer
S1	125-25	Band Switch
S2	—	Hi-Fi Switch on tone control
S3	—	On-Off switch on volume control

MODELS 62-319,62-329, 62-409,62-419

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DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-108 Output I.F. Transformer
Part No. 108-107 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis

1. With volume control full on, (the extreme right of its rotation), the wave changing switch in the broadcast position, (extreme left of its rotation), the tone control in the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-108) to resonance.

   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6J7 and adjust input I.F. transformer (No. 108-107) to resonance.

BROADCAST BAND ALIGNMENT:
535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground leads make following adjustments:

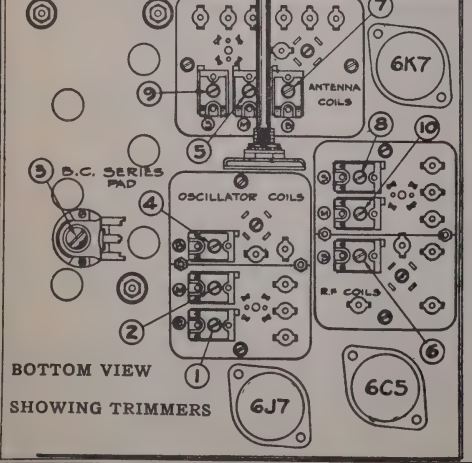
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 4; see bottom view of coil assembly, Fig. 3.)

   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast R.F. trimmer (adjustment number 6) and broadcast antenna trimmer (adjustment number 7), to resonance.

   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 3), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)

   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

   (e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**



BOTTOM VIEW SHOWING TRIMMERS

SHORT WAVE BAND ALIGNMENT:
5.35 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the antenna and ground leads, make the following adjustments:

   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator trimmer (adjustment number 1) to resonance.

   (b) Adjust short wave R.F. trimmer (adjustment number 8), and short wave antenna trimmer (adjustment number 9), to resonance.

   (c) Re-set external oscillator and check set at 18.1 megacycles and 6 megacycles for band coverage and sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 17 megacycle signal can be tuned in not only at 17 on the dial but also at approximately 16.1 megacycles.

MIDDLE WAVE BAND ALIGNMENT:
1695 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5 megacycles and connected in series with "Dummy 3" to the antenna and ground leads make the following adjustments:

   (a) Move dial pointer to 5 megacycles and adjust middle wave oscillator trimmer (adjustment number 2) to resonance.

   (b) Adjust middle wave R.F. trimmer (adjustment number 10), and middle wave antenna trimmer (adjustment number 5), to resonance.

   (c) Re-set external oscillator and check sensitivity at 1800 kilocycles.

   (d) Recheck broadcast band alignment.

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MODEL 62-341

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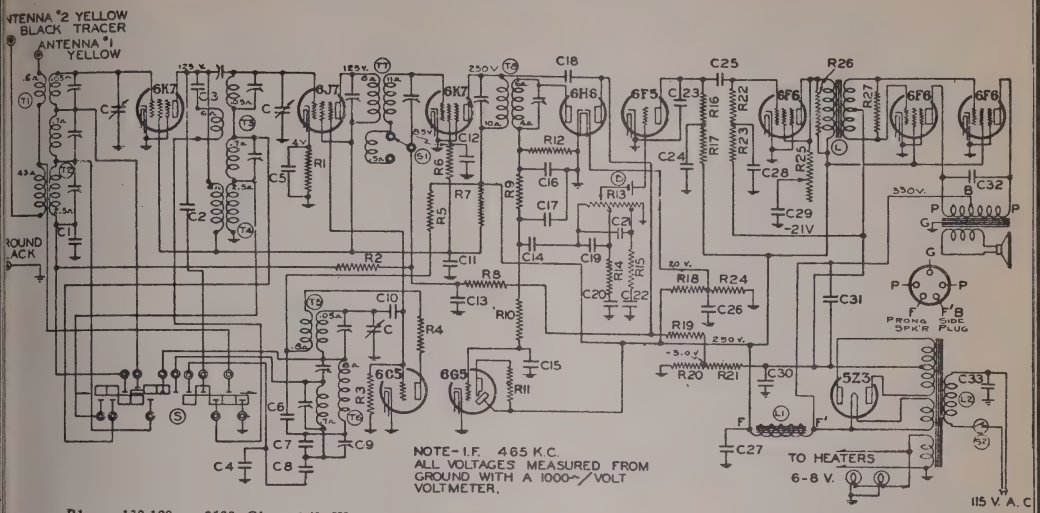
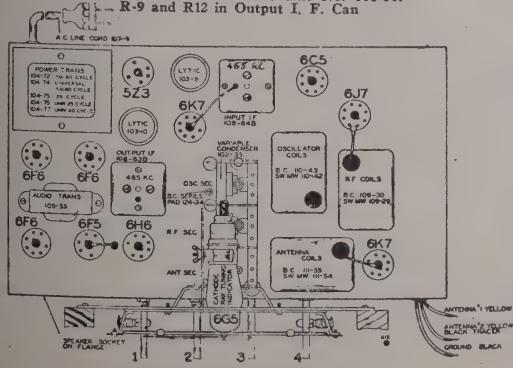


R1	130-129	2500 Ohm—1/3 Watt—10%—Carbon
R2	130-20	100M Ohm—1/3 Watt—20%—Carbon
R3	130-12	50M Ohm—1/3 Watt—20%—Carbon
R4	130-60	100 Ohm—1/3 Watt—20%—Carbon
R5	130-77	10M Ohm—1 Watt—20%—Carbon
R6	130-76	30M Ohm—1/3 Watt—20%—Carbon
R7	130-88	10M Ohm—2 Watt—20%—Wire Wound
R8	130-19	1 Megohm—1/3 Watt—20%—Carbon
R9	130-111	100M Ohm—1/3 Watt—20%—Carbon
R10	130-4	3 Megohm—1/3 Watt—20%—Carbon
R11	130-110	1 Megohm—1/10 Watt—10%—Carbon
R12	130-186	250M Ohm—1/10 Watt—20%—Carbon
R13	101-36	1 Megohm—Volume Control
R14	130-22	5M Ohm—1/3 Watt—20%—Carbon
R15	130-85	3M Ohm—1/3 Watt—20%—Carbon
R16	130-20	100M Ohm—1/3 Watt—20%—Carbon
R17	130-20	100M Ohm—1/3 Watt—20%—Carbon
R18	130-130	100M Ohm—½ Watt—10%—Carbon
R19	130-3	500M Ohm—1/3 Watt—20%—Carbon
R20	106-31	30 Ohm—Muter
R21	106-31	175 Ohm—Muter
R22	130-45	250M Ohm—1/3 Watt—20%—Carbon
R23	130-45	250M Ohm—1/3 Watt—20%—Carbon
R24	130-82	10M Ohm—1/3 Watt—10%—Carbon
R25	101-40	5000 Ohm—Tone Control
R26	130-131	20M Ohm—½ Watt—10%—Carbon
R27	130-21	20M Ohm—1/3 Watt—20%—Carbon

Note—R-20 and R21 in one unit No. 106-31.
R-9 and R12 in Output I. F. Can



Vol. Control On-Off Switch | Tone Control | Tuning Control | Band Switch and High Fidelity Sw.

FIG. 1—TOP VIEW

C1	100-9	.05x200 Volt—25%
C2	129-59	.0003 Mica—5%—MT-O
C3	129-39	.00005 Mica—20%—MT-O
C4	129-69	.0023 Mica—2½%—MT-O
C5	100-9	.05x200 Volt—25%
C6	100-13	.05x400 Volt—25%
C7	129-57	.0005 Mica—5%—MT-O
C8	129-55	.0034 Mica—2½%—MT-O
C9	124-34	200 Mmf. Working Cap. Adjustable
C10	129-31	.000025 Mica—15%—MT-O Pad.
C11	100-41	.25x400 Volt—20%
C12	100-11	.01x400 Volt—25%
C13	100-9	.05x200 Volt—25%
C14	100-22	.05x200 Volt—25%
C15	100-11	.01x400 Volt—25%
C16	129-39	.00005 Ceramicon—20%
C17	129-60	.00015 Mica—20%—MT-O
C18	129-3	.00002 Mica—20%—MT-O
C19	129-2	.0005 Mica—20%—MT-O
C20	100-22	.05x200 Volt—25%
C21	129-60	.00015 Mica—20%—MT-O
C22	100-22	.05x200 Volt—25%
C23	129.5	.0001 Mica—20%—MT-O
C24	100-1	.1x400 Volt—25%
C25	100-13	.05x400 Volt—25%
C26	100-19	.006x600 Volt—25%
C27	103-8	14 Mfd.—400 Volt—Elecrolytic
C28	100-20	.1x200 Volt—25%
C29	100-45	.1x600 Volt—25%
C30	100-20	.1x200 Volt—25%
C31	103-10	30 Mfd. — 450 Volt — Electrolytic
C32	100-32	.0005x1000 Volt—20%
C33	100-61	.02x600 Volt—Bakelite Micamold

Note—C16 in Output I. F. Can.

B1	116-22	Bias Cell
C	102-35	One Section of Three Gang Condenser
T1	111-54	MW and SW Antenna Coil Assem.
T2	111-55	Broadcast Antenna Coil Assem.
T3	109-29	MW and SW R.F. Coil Assem.
T4	109-30	Broadcast R.F. Coil
T5	110-42	MW and SW Osc. Coil Assem.
T6	110-43	Broadcast Osc. Coil Assem.
T7	108-64B	Input I. F. Coil—465 KC.
T8	108-63B	Output I. F. Coil—465 KC.
L	105-33	Andio Transformer
L1	114-47	Speaker (Field Resistance 1225 Ohm)
L2	104-72	Power Transformer (50-60 Cycle)
S	125-18	Band Switch
S1		Fidelity Switch on Tone Control
S2		On-Off Switch on Volume Control

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MODEL 62-341

MONTGOMERY-WARD & CO.

BAND	DIAL SCALE	FREQUENCY RANGE
Broadcast	Outer Scale	535 to 1720 K.C. (Kilocycles)
Middle Wave	Center Scale	1690 to 5300 K.C. (Kilocycles)
Short Wave	Inner Scale	5.3 to 18.1 M.C. (Megacycles)

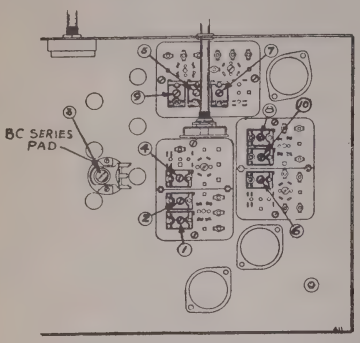

FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

ALIGNING INSTRUCTIONS:

CAUTION:

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the four bolts by which it is fastened.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of the multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS (465 K.C.)

Part No. 108-63B Output I. F. Transformer
Part No. 108-64B Input I. F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view Fig. 1).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, located between the two I.F. transformers, and adjust the output I.F. transformer 108-63B to resonance.

   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6J7 and adjust input I.F. transformer (108-64B) to resonance.

   (c) With oscillator still connected to 6J7, re-adjust output I.F. transformer if necessary.

BROADCAST BAND ALIGNMENT:
535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 600 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:

   (a) Adjust broadcast series pad (adjustment number 3) to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the 108-63 output I.F. transformer. See top view, Fig. 1.

   (b) Re-set external oscillator to 1400 K.C., move dial pointer to 1400 K.C. and adjust oscillator (adjustment number 4), R.F. (adjustment number 6) and antenna (adjustment number 7) to resonance. See bottom view for location of these adjustments, Fig. 3.

   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

   (d) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser to correct tracking.**

SHORT WAVE BAND ALIGNMENT:
5.3 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 1), short wave R.F. (adjustment number 8) and short wave antenna (adjustment number 9) to resonance.

   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 18.3 megacycle can be tuned in not only at 18.3 on the dial, but also at approximately 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:
1690 to 5300 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5 M.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:

   (a) Rotate condenser, pick up signal and adjust middle wave R.F. (adjustment number 10), middle wave antenna (adjustment number 5) and middle wave oscillator (adjustment number 2) to resonance.

   (b) Re-check broadcast alignment and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17 M.C. short wave and 5 M.C. middle wave adjustments.

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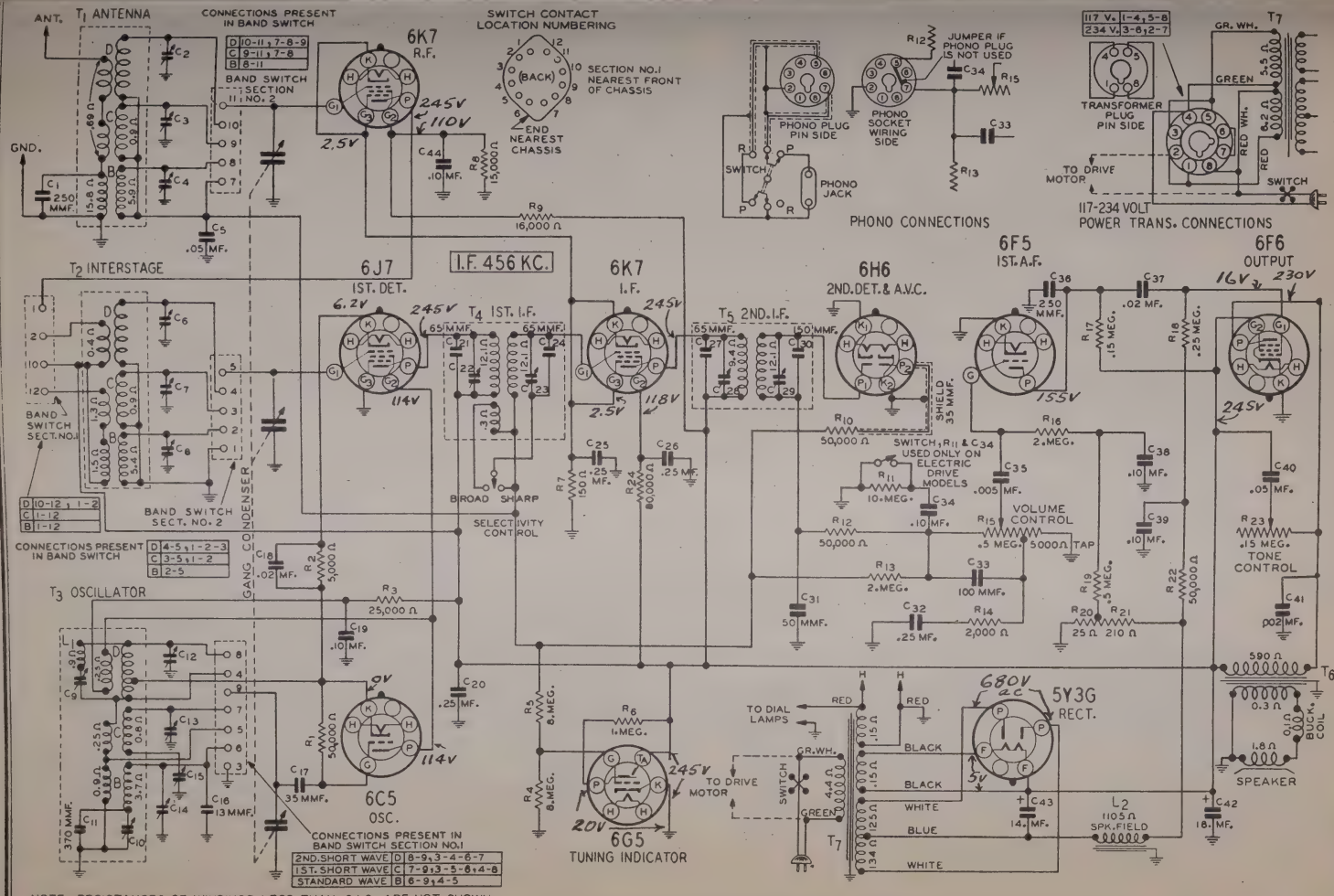

FOR VOLTAGE AND SOCKET SEE 62-270

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ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator With a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I.F.		•					
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C28) & (C29)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C22) & (C23)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C14)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	Ant. Range B (C4) Int. Range B (C8)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C10)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C13)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3) Int. Range C (C7)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C15)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C12)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Ant. Range D (C2) Int. Range D (C6)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C9)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

In sets using the moving beam of light indicator, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until the beam is at the 1500 KC mark on the dial. Retighten the screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

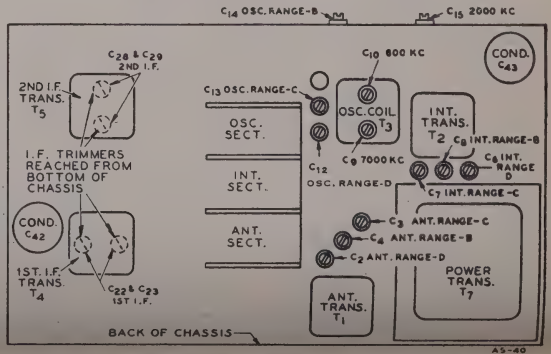
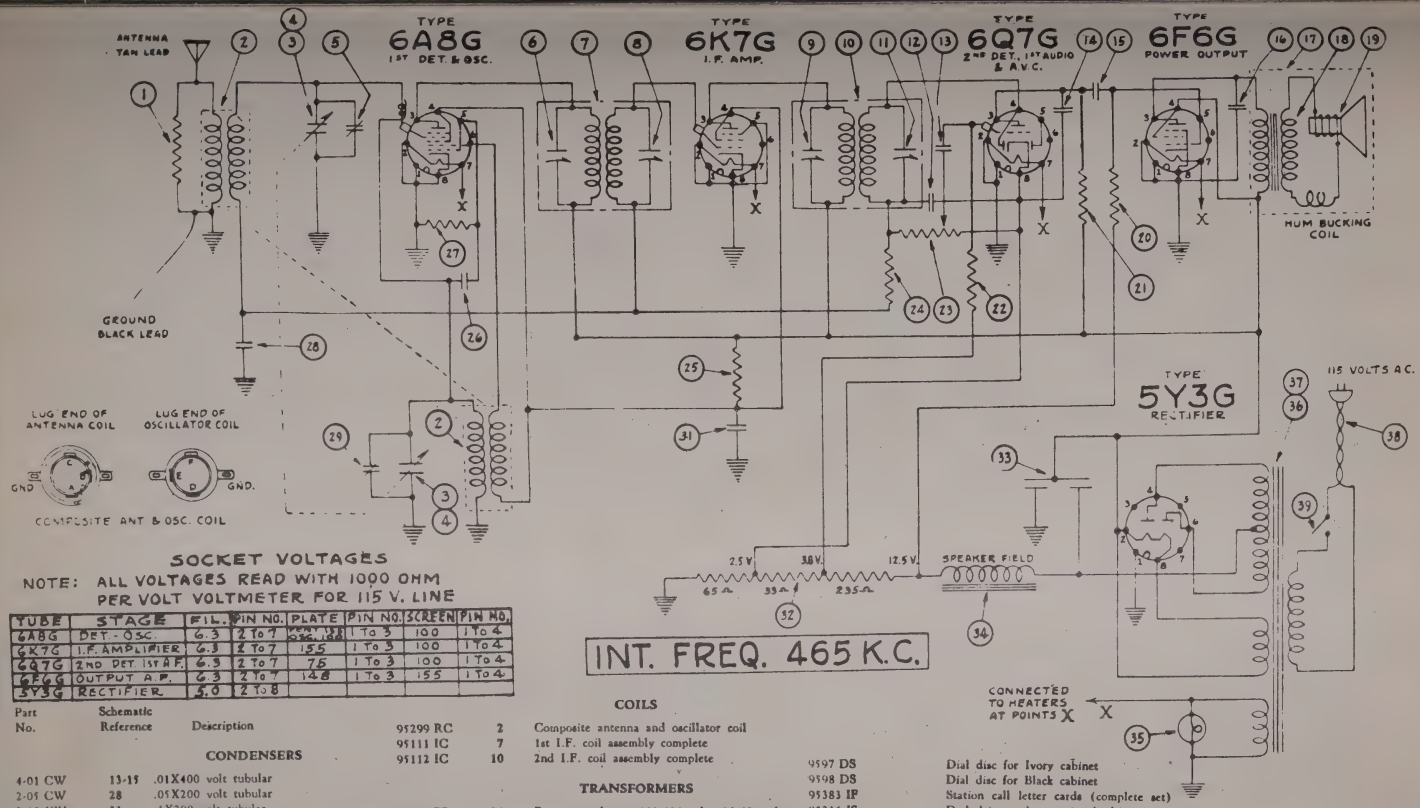


Fig. 3—Location of Trimmers



SOCKET VOLTAGES

NOTE: ALL VOLTAGES READ WITH 1000 OHM PER VOLT VOLTMETER FOR 115 V. LINE

TUBE	STAGE	FIL.	PIN NO.	PLATE	PIN NO.	SCREEN	PIN NO.
6A8G	DET.-OSC.	6.3	2 To 7	250 To 285	1 To 3	100	1 To 4
6K7G	I.F. AMPLIFIER	6.3	2 To 7	155	1 To 3	100	1 To 4
6Q7G	2ND DET. 1ST A.F.	6.3	2 To 7	75	1 To 3	100	1 To 4
6F6G	OUTPUT A.F.	6.3	2 To 7	148	1 To 3	155	1 To 4
5Y3G	RECTIFIER	5.0	2 To 8				

Part No.	Schematic Reference	Description
		CONDENSERS
4-01 CW	13-15	.01X400 volt tubular
2-05 CW	28	.05X200 volt tubular
2-10 CW	31	.1X200 volt tubular
6-005 CW	16	.005X600 volt tubular
9542 CM	12-26	.00025 mica
9513 CM	14	.0001 mica
9567 CE	33	5.X250 volt-dual electrolytic
		RESISTORS
1033 RE	1	10 M ohm—½ watt—10% carbon
4743 RE	20	470 M ohm—½ watt—10% carbon
2243 RE	21	220 M ohm—½ watt—10% carbon
3353 RE	22-24	3300 M ohm—½ watt—10% carbon
4723 RE	25	4.7 M ohm—½ watt—10% carbon
4733 RE	27	47 M ohm—½ watt—10% carbon
95140 RE	32	65 ohm, 33 ohm, 235 ohm metal clad resistor
		COILS
95299 RC	2	Composite antenna and oscillator coil
95111 IC	7	1st I.F. coil assembly complete
95112 IC	10	2nd I.F. coil assembly complete
		TRANSFORMERS
95113 TR	36	Power transformer 105-120 volts, 50-60 cycles
95142 TR	37	Power transformer 105-120 volts, 25 cycles
		SPEAKER
9568 SK	17	Speaker assembly (1700 ohm field)
		MISCELLANEOUS
9550 VR	23-39	1 meg, volume control and switch
9563 CG	3	Two gang variable condenser
95148 CB	38	Line cord and plug
9510 LP	35	6-8 volt dial light
9595 DS		Dial disc for Walnut cabinet
9597 DS		Dial disc for Ivory cabinet
9598 DS		Dial disc for Black cabinet
95383 IF		Station call letter cards (complete set)
95216 IS		Dial drive and mounting bushings
9584 KA		Cabinet (Black)
9585 KA		Cabinet (Walnut)
9586 KA		Cabinet (Ivory)
95137 KN		Knob for Black cabinet
95138 KN		Knob for Walnut cabinet
95139 KN		Knob for Ivory cabinet
95121 PL		Bottom plate
97160 PR		Dial drive cord (sold by the yard)
9539 SP		Dial drive cord spring
954 WN		Dial disc celluloid window (per dozen)
9531 PU		Dial drive pulley
956 SO		Octal base tube socket
9533 SO		Dial lamp socket assembly

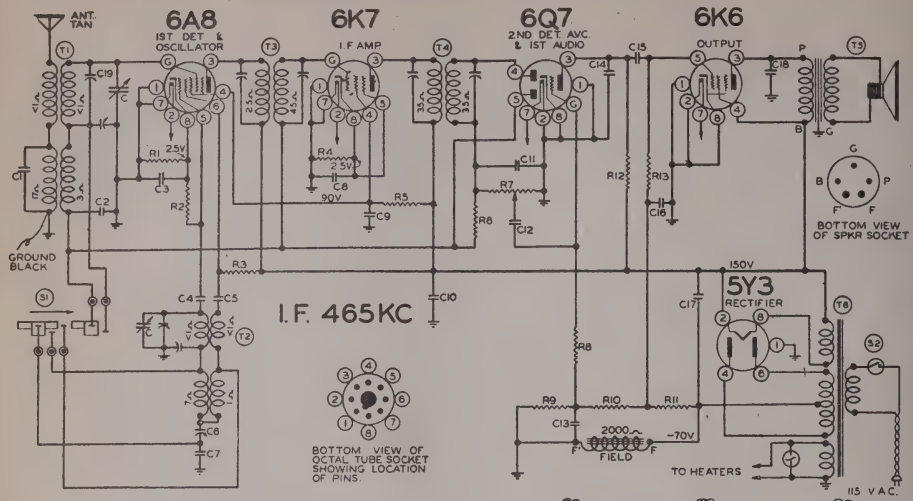
CONVENTIONAL ALIGNMENT. SEE SPECIAL SECTION OF RIDER'S VOL. VIII.

MODELS 62-355, 62-365, 62-375

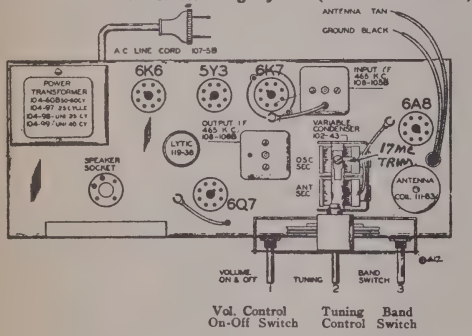
MODELS 62-380, 62-383

MONTGOMERY-WARD & CO.

CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION



BAND	FREQUENCY RANGE
Broadcast	1720 to 535 Kilocycles (174-560 Meters)
Short Wave	18.1 to 5.5 Megacycles (16.5-54.5 Meters)



Vol. Control On-Off Switch | Tuning Control | Band Switch

FIG. 1—TOP VIEW

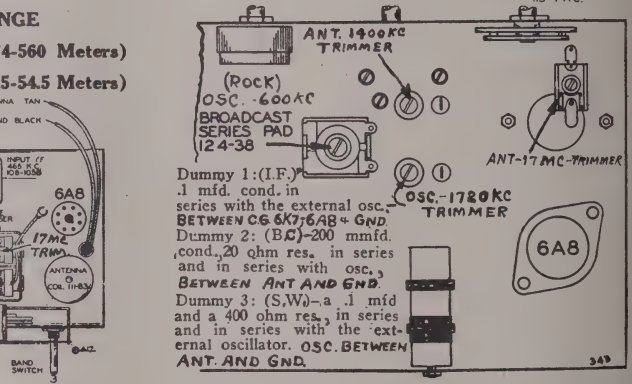

ANT. 1400KC TRIMMER
(ROCK) OSC. 600KC
BROADCAST SERIES PAD 124-38
ANT-17 MC-TRIMMER
OSC.-1720KC TRIMMER
6A8
Dummy 1: (I.F.) .1 mfd. cond. in series with the external osc. BETWEEN CG. 6K7 & 6A8 & GND.
Dummy 2: (B.C.)-200 mmfd. cond., 20 ohm res. in series and in series with osc. BETWEEN ANT AND GND.
Dummy 3: (S.W.)-a .1 mfd and a 400 ohm res. in series and in series with the external oscillator. OSC. BETWEEN ANT. AND GND.

FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

RESISTORS

R1	130-83	300 ohm - 1/3 w. 10%
R2	130-12	50M ohm - 1/3 w. 20%
R3	130-17	10M ohm - 1/3 w. 20%
R4	130-93	450 ohm - 1/3 w. 10%
R5	130-49	15M ohm - 1/3 w. 20%
R6	130-4	3 megohm - 1/3 w. 20%
R7	101-71	1 megohm Volume control
R8	130-4	3 megohm - 1/3 w. 20%
R9	130-176	20M ohm - 1/3 w. 10%
R10	130-80	150M ohm - 1/3-w. 10%
R11	130-46	800M ohm - 1/3 w. 10%
R12	130-9	200M ohm - 1/3 w. 20%
R13	130-3	500M ohm - 1/3 w. 20%

CONDENSERS

C	102-43	2 gang variable Condenser
C1	129-5	.0001 Mica
C2	100-22	.05 x 200 v. - 25%
C3	100-20	.1 x 200 v. - 25%
C4	129-39	.00005 - 20% - Mica
C5	100-23	.002 x 600 v. - 20%
C6	124-38	600 mmf. Series Pad. Adj.
C7	129-54	.003 - 2½% Mica
C8	100-20	.1 x 200 v. - 25%
C9	100-1	.1 x 400 v. - 50 - 10%
C10	119-38	5.0 mfd. - 250 w. v. 'Lytic
C11	129-5	.0001 - 20% Mica
C12	100-11	.01 x 400 v. - 25%
C13	100-20	.1 x 200 v. - 25%
C14	129-2	.0005 - 20% Mica
C15	100-26	.02 x 400 v. - 25%
C16	100-20	.1 x 200 v. - 25%
C17	119-38	5.0 mfd. - 250 w.v. 'Lytic
C18	100-37	.003 x 600 v. - 10%
C19	124-39B	2 - 25 mmf. Adj. Cond.

PARTS

T1	111-83	Ant. Coil
T2	110-66	Osc. Coil
T3	108-105B	Input I.F. - 465 kc.
T4	108-106B	Output I.F. - 465 kc.
T5	114-61	6" Dynamic speaker
T6	104-60B	Power Transformer
S1	125-37	Wave Band Switch
S2		On-off switch on volume control

The Issue "B" of this chassis has a 0.05-mf, 400-volt condenser in parallel with the 5-mf condenser, C-10. This new condenser has a Part No. 100-13 and is identified as C-20.

The unidentified trimmer condenser connected between the lower end of the secondary of T-1 and ground has been given a schematic number, C-21. The unidentified trimmer between the lower end of the oscillator primary (T-2) and ground is C-22. C-21 has a range from 1 to 10 mmf and C-22 from 2 to 20 mmf. Both these condensers are in the same unit, the part number of which is 124-30C.

These two trimmers being in the same unit change the bottom layout of the chassis shown The adjustment nearer the trimmer marked "ANT-17 MC-TRIMMER" in the layout is the 1400-kc antenna trimmer, C-21, and the one nearer the broadcast series padder is the 1720-kc oscillator trimmer, C-22.

These changes apply to receivers having a serial number above 8E-189200.

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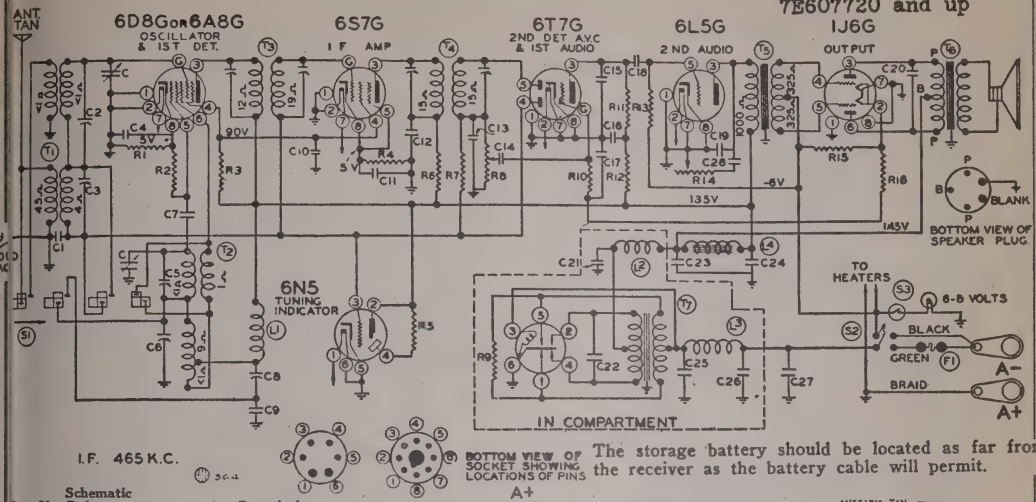
MONTGOMERY-WARD & CO.

MODELS 62-356, 62-446, 62-466. Serial No. 7E607720 and up



I.F. 465 K.C.

The storage battery should be located as far from the receiver as the battery cable will permit.

Part No.	Schematic Reference	Description
		CONDENSERS
BE100-11	C14, C17	.01 x 400 Volt Tubular
BE100-14	C21	.1 x 200 Volt Tubular
BE100-20	C1, C4, C10, C11, C12, C16 C27	.1 x 200 Volt Tubular
BE100-25	C19, C20	.002 x 600 Volt Tubular
BE100-26	C18, C28	.02 x 400 Volt Tubular
BE100-34	C22	.005 x 1200 Volt Tubular
BE100-35	C25, C26	.5 x 200 Volt (Oval Type)
BE119-41	C23, C24	8-4 MFD. 200 W. V. Lytic Filter
BE124-32	C8 C5, C6	Series Padder Condenser
BE124-30	C2, C3	Dual Ceramic Padder Condenser
BE129-5	C13	.0001 Mica — Type MT — 20%
BE129-12	C15	.00025 Mica — Type MT — 20%
BE129-39	C7	.00005 Mica — Type MT — 20%
BE129-54	C9	.003 Mica — Type MW — 2½%
		RESISTORS
BE130-12	R2	50M Ohm—1/3 Watt—20%—Carbon
BE130-19	R10, R16	1 Meg Ohm—1/3 Watt—20%—Carbon
BE130-20	R11, R12	100M Ohm—1/3 Watt—20%—Carbon
BE130-31	R4, R6	1500 Ohm—1/3 Watt—20%—Carbon
BE130-38	R7, R13	2 Megohm—1/3 Watt—20%—Carbon
BE130-54	R1	500 Ohm—1/3 Watt—20%—Carbon
BE130-84	R9	200 Ohm—1/3 Watt—20%—Carbon
BE130-149	R3	15M Ohm—1/3 Watt—20%—Carbon
BE130-158	R15	16 Ohm—1 Watt—5% Wire Wound
		COILS
BE B-108-92B	T4	Output I. F. Coil Assembly complete with can
BE B-108-93B	T3	Input I. F. Coil Assembly complete with can
BE B-110-61	T2	Broadcast and Short-wave Oscillator Coil Assembly complete with can
BE B-111-77	T1	Broadcast and Short-wave Antenna Coil Assembly complete with can
		CHOKE COILS
BE105-19	L3	"A" Choke Coil
BE B-105-30D	L4	Filter Choke (400 Ohms)
BE105-35	L1, L2	R. F. "B" Choke Coil
		TRANSFORMERS
BE B-104-62C	T7	Power Transformer for Vibrator
BE B-105-36B	T5	Input Audio Transformer
		SOCKETS
BE121-6		Six Prong Socket Marked "V1B"
BE121-8		Five Prong Socket Marked "SPKR"
BE121-43		Seven Prong Octal Socket Marked "6S7"
BE121-44		Eight Prong Octal Socket Marked "6D8"
BE121-45		Seven Prong Octal Socket Marked "6L5"
BE121-46		Eight Prong Octal Socket Marked "6T7"
BE121-64		Eight Prong Socket Marked "1J6"
		SPEAKER
BE114-64	T6	Eight inch P. M. Dynamic Speaker
		MISCELLANEOUS
BE101-81	R8, S2	Volume Control and Switch (500M Ohm)
BE101-82	R14	Tone Control (100M Ohm)
BE102-50B C		Two Gang Variable Condenser
BE107-61		28 in. Battery Cable (less fuse receptacle)
BE107-62C		4 in. Battery Cable (with fuse receptacle)
BE115-49		Goat Type Tube Shield with Clamp
BE115-74		Shield Can for 119-41 Filter Condenser

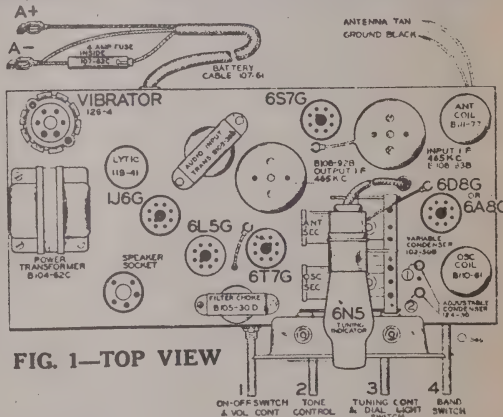


FIG. 1—TOP VIEW

FOR ALIGNMENT SEE INDEX

BE112-288 (S3) Dial Drive Housing and Pilot Light Switch Assembly including:
1—No. 117-41A Dial Housing
1—No. 117-19 Tuning Shaft Bushing
1—No. 112-162 Tuning Shaft
1—No. 117-86 Drive Pulley
1—No. 127-29 Extruded Washer
1—No. 131 56 Steel Washer
1—No. 127-28 Insulated Washer
1—No. 131-55 Spring Washer
2—No. 127-30 Contact Insulated Washers
2—No. 127-5 Fibre Bushings
2—No. 131-87 S-90 Rivets
2—No. 131-57 No. 6200 Lugs.

BE107-38 Pilot Light Socket Complete
BE107-97 6-8 Volt Pilot Light (Bayonet Base)
BE112-151 Dial Pointer with 132-19 Screw and 117-62 Washer

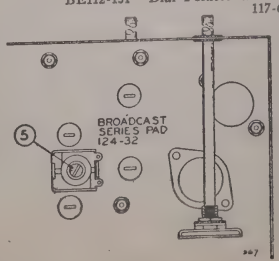


FIG. 3—BOTTOM VIEW

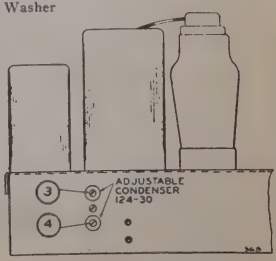


FIG. 4—REAR VIEW

MODELS 62-356,62-446,62-466
MODEL 04WG-569B

MONTGOMERY-WARD & CO.

MODELS 62-356,62-446,62-466

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.)

Part No. B108-92B Output I.F. Transformer
Part No. B108-93B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view—Fig. 1, page 2).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser in its minimum capacity position, plates entirely out of mesh, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer No. B-108-92B to resonance.
   (b) Move oscillator output clip from grid of 6S7G to grid cap of 6A8G and adjust input I.F. transformer (No. B-108-93B to resonance.
   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (B-108-92B) if necessary.

BROADCAST BAND ALIGNMENT:

535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground leads make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 2; see top view of chassis, Fig. 1).
   (b) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 5), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis; Fig. 3).
   (c) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; (See rear view of chassis; Fig. 4, for location of this adjustment).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. Under no circumstances bend plates of variable condenser sections to correct tracking.

SHORT WAVE BAND ALIGNMENT:

5.6 to 18.1 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator trimmer (Adjustment number 1), to resonance; (see Fig. 1, top view).
   (b) Adjust short wave antenna trimmer (Adjustment Number 3), to resonance; (see Fig. 4 rear view).
   (c) Check for tracking and sensitivity at 10 megacycles and 6 megacycles.

MODEL 04WG-569B

SPEAKER

When ordering parts for speakers, specify part number of speaker and letters preceding part number stamped on the speaker.

Bin No.	Part No.	Description	Selling Price
	12A356	5" P.M. Dynamic Speaker	$2.30
		Cone & Voice Coil Assembly for above Speaker	.76
		Output Transformer for above Speaker	.76
	14X262	Screen for above Speaker	.06

GENERAL

	10A312	Tuning Control Knob	.06
	10A313	Volume Control Knob	.06
	4X383	Escutcheon for Tuning Control Knob	.10
	4X384	Escutcheon for Volume Control Knob	.10
	3A303	Tube Socket—Octal (8 prong)	.06
10083	30X44	Grid Clip Doz.	.06
	32X174	Tube Shield	.06
	13X401	"A" Battery Cable and Plug Assembly	.06
	13X386	"B" Battery Cable and Plug Assembly	.14
	13X328	Line Cord and Plug Assembly	.18
	2A183	AC-DC—Battery Switch	.16
	4X382	Escutcheon for AC-DC—Battery Switch	.06
	2A181	AC-DC Automatic Line Switch	.20
	2A175	Economizer Switch	.10
	28X265	Phosphor Bronze Ground Plate (for 2nd I.F. Can)	.06
	28X56	Clamp Buttons (To hold Bottom Plate to Chassis) Doz.	.06
	37X192	Trip Lever for AC-DC Automatic Line Switch	.06

TRANSFORMERS AND COILS

Bin No.	Part No.	Code	Description	Selling Price
	9A1277		Loop Aerial Assembly less Trimmer Condenser	$0.40
	9A1278	T1	Oscillator Coil Assembly	.22
	9A1279	T2	1st I.F. Transformer and Can Assembly	.82
	9A1280	T3	2nd I.F. Transformer and Can Assembly	.72
		T4	Output Transformer (See "Speaker")	

CONDENSERS

TUBULAR

Bin No.	Part No.	Code	Capacitance	Voltage	Selling Price
	46X269	C5	.04 mf.	360	$0.06
	46X253	C6	.05 mf.	180	.06
	46X257	C7	.10 mf.	240	.06
	46X299	C8	.04 mf.	240	.06
10979	46X254	C9,C22	.10 mf.	180	.06
	46X267	C10	.02 mf.	180	.06
	46X273	C17,C18	.005 mf.	180	.06
	46X274	C19	.005 mf.	360	.06
	46X307	C21	.10 mf.	300	.10

MISCELLANEOUS

		C1	Part of Gang Condenser		
	17A110	C2	1-12 mmf.	Trimmer	.06
	47X142	C3	150 mmf.	Molded	.06
	47X57	C4,C15,C16	100 mmf.	Molded	.06
	17A146	C11	70-150 mmf.	1st I.F. Trimmer	.16
		C12	40-100 mmf.		
	17A137	C13	50-120 mmf.	2nd I.F. Trimmer	.18
		C14	85-185 mmf.		
	45X280	C20A	40 mf.	150) Dry Electrolytic	.60
		C20B	40 mf.	150 (2 used on 25 Cycle	
		C20C	200 mf.	35) Models)	
	14A124		2 Section Gang Condenser complete with Drive Pulley		$1.06

RESISTORS

CARBON

Bin No.	Part No.	Code	Resistance	Wattage	Selling Price
10425	B85204	R1,R5	200,000 Ohm	0.5	$0.06
	B85403	R2	40,000 Ohm	0.5	.06
	B85205	R3	2 Megohm	0.5	.06
11116	B85305	R4,R11,R13	3 Megohm	0.5	.06
	B84171	R6	170 Ohm	0.5	.08
	B84122	R7	1,200 Ohm	0.5	.08
	B84901	R8	900 Ohm	0.5	.08
	B85200	R9	20 Ohm	0.5	.06
11037	B85105	R12	1 Megohm	0.5	.06
10081	B85250	R16	25 Ohm	0.5	.06
11222	B85252	R17	2,500 Ohm	0.5	.06
	B85505	R18	5 Megohm	0.5	.06

MISCELLANEOUS

	34X284	R10	500,000 Ohm	Volume Control and On-Off Switch	.46
	43X102	R14	2,450 Ohm	5 Wire Wound	.24
	43X93	R15	515 Ohm	12 Wire Wound	.24
	43X104	R20	1,400 Ohm	12 Wire Wound (25 Cycle Models only)	.30

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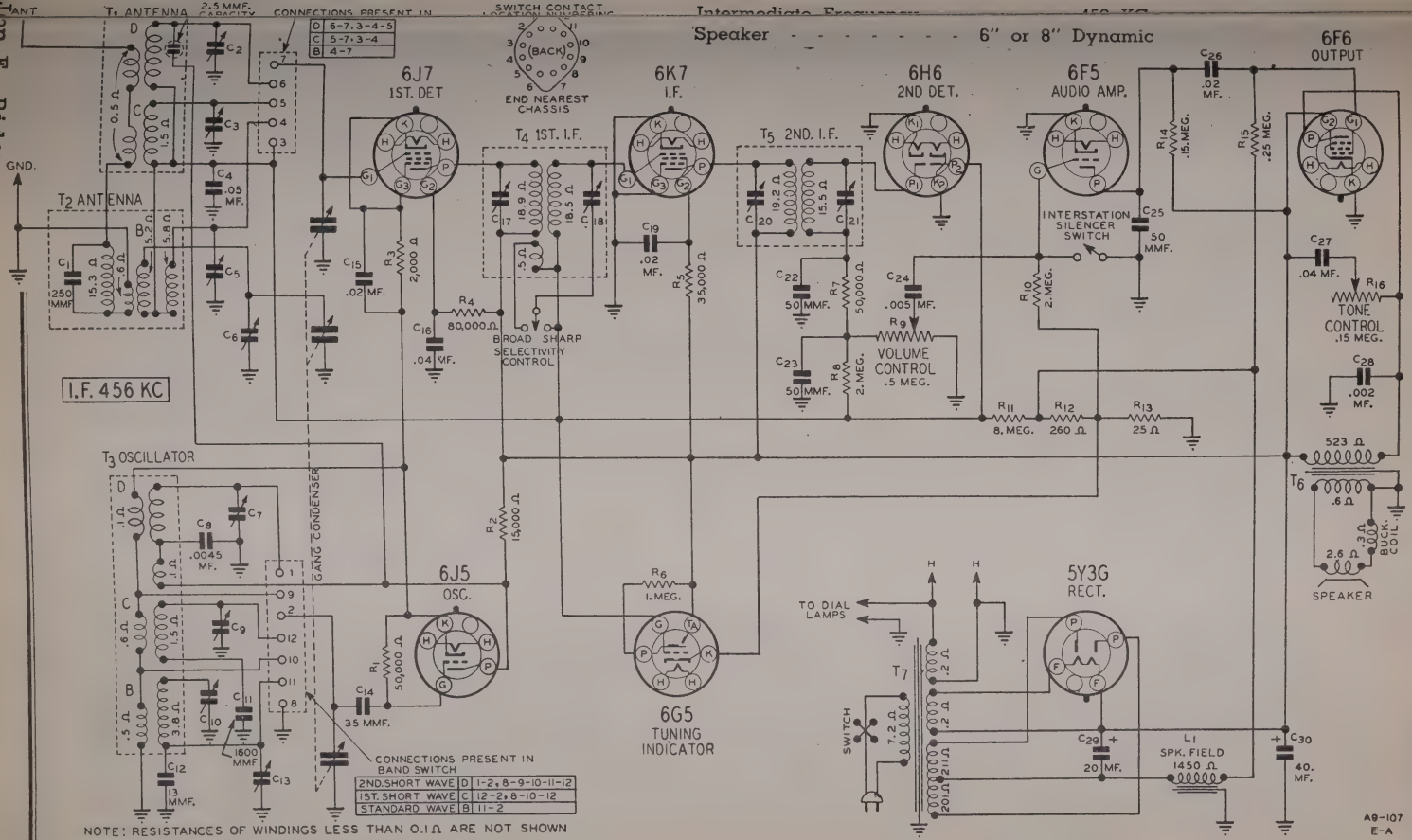

MONTGOMERY-WARD & CO. MODELS 62-358, 62-368, 62-448, 62-458

MONT.-WARD PAGE 14-103

A9-107
E-A

Power Consumption - 60 Watts (At 117 volts 60 cycles)

Power Output - - - 1.0 Watts Undistorted
2.0 Watts Maximum

Selectivity - - 38 KC at 1000 times Signal
(Sharp)

Tuning Frequency Range

B Range	528	1830 KC.
C Range	1810	6350 KC.
D Range	6300	22000 KC.

Sensitivity

B Range	12 Microvolts Average
C Range	15 Microvolts Average
D Range	20 Microvolts Average

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ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

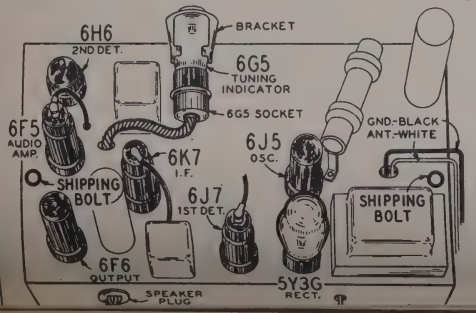
STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C20) & (C21)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C17) & (C18)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C13)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C6) 2nd Ant. Range B (C5)	Turn Rotor to Max. Output	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C10)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note A
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C9)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C7)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Antenna Range D (C2)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note A

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.



Replacing Drive Belt

If the old belt is not broken, it may be cut before removing. Withdraw the six small rivets spaced around the edge of the celluloid dial cover by pushing them out with a flat, hard object from the back of the dial, being careful not to bend the dial frame. Take off the celluloid cover.

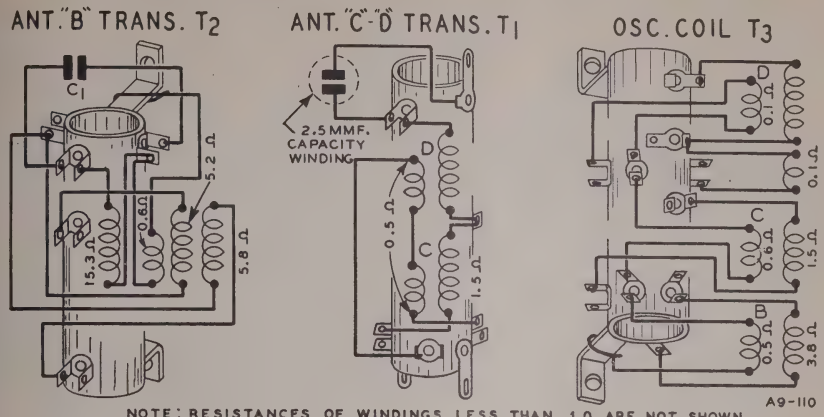
Turn the push button assembly so that the pointer is at the top of the dial. Hold the new belt flat and loop it over the pointer. Then pass the portion of the belt that is behind the pointer under the inside edge of the dial scale. CAUTION—Do not scratch or fingermark the dial scale. Continue pulling the belt through toward the back of the dial scale behind the dial scale. Loop the belt around the large drive drum keeping it in the groove nearest the back edge of the drum.

Place the chassis on its back. Loosen the two set screws in the small pulley on the tuning knob shaft. Pull the shaft in toward the inside of the chassis far enough so that it does not extend beyond the edge of the small pulley. Tighten one of the set screws in the pulley temporarily. Start the belt on the pulley and by turning the shaft slightly and pushing on the belt where it contacts the pulley, the belt will fall into the groove properly. Loosen the set screw which had been temporarily tightened, pull the shaft all the way toward the front of the chassis, and tighten both set screws. To prevent end play of the shaft, be sure the pulley fits flush against the back of the tuning knob shaft bracket.

With a small screw driver and a long nose pliers, pull the belt tension pulley toward the right (from front of chassis) until the spring pushes the pulley against the outer edge (or right side) of the belt.

MONTGOMERY-WARD & CO.

MODELS 62-358,62-368,
62-448,62-458



NOTE: RESISTANCES OF WINDINGS LESS THAN .1 Ω ARE NOT SHOWN.

Fig. 4—Coil Terminal Arrangement and D.C. Resistance of Windings

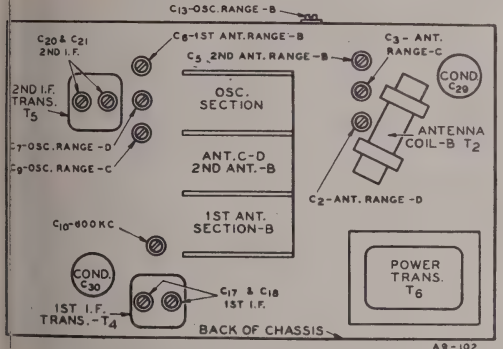


Fig. 3—Location of Trimmers

Twenty-Five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

Fig. 6—Octal Tube Terminal Numbering (bottom of socket).

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum — Antenna Shorted to Ground
Readings taken with a 1000 Ohm-per-volt meter — Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
)7	1st Det.	0	6.1(1)	168	125	3.5		6.1(1)	3.5
5	Osc.	0	6.1(1)	100				6.1(1)	
K7	I.F.	0	6.1(1)	168	100	0		6.1(1)	0
6	2nd Det.	0	6.1(1)		0			6.1(1)	0
5	Audio	0	6.1(1)		90			6.1(1)	0(2)
6	Power	0	6.1(1)	155	170	12(3)		6.1(1)	0
3G	Rectifier	0	4.8(4)						4.8(4)

5	Tuning Indicator	Plate to Ground 20	Target to Ground 170	Cathode to Ground 1.3	Across Heater 6.1 A.C.

A.C. voltages read across heater terminals 2 and 7. Bias (1.3 volts) as read across R13.

(3) Bias as read across R12 and R13.

(4) A.C. voltage as read across filament terminals 2 and 8.

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MODEL 62-270E Replacement Parts List

RETAIL STORES: Order any parts from Repair Service Department at Chicago or Oakland, on Repair Parts Order Form No. 19567. Order by part number and description.

Return defective parts to Repair Service Department only.

There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts please be sure to mention the model number and this large letter.

MISCELLANEOUS

SOCKETS

Part No.	Description	Selling Price
3A263	Tube Socket—Octal (8 prong)	$0.08
3A256	Tube Socket—Octal (7 prong)	.08
3A261	Tube Socket—Octal (5 prong)	.06
3A267	Speaker Socket	.08
3A266	Phono Socket—Octal (4 prong)	.06
3A252	Dual Keyway Socket (8 prong)—Universal Transformer Connections	.08
6A214	Plug (4 prong) used with above Socket	.12
13X295	Tuning Eye Tube Socket and Cable Assembly	.26

SPEAKERS

When ordering parts for speakers, specify part number of speaker, and letter preceding part number stamped on the speaker.

12A290	10" Dynamic Speaker Complete with Output Trans. (T6) Cone and Voice Coil for above Speaker Output Transformer only (T6)	4.30 2.26 .18
12A285	8" Dynamic Speaker Complete with Output Trans. (T6) Cone and Voice Coil for above Speaker Output Transformer only (T6)	3.70 1.84 .18

KNOBS

10A112	Selectivity Control Knob	.10
10A78	Tone Control Knob	.08
10A77	Volume Control Knob	.08
10A76	Band Switch Knob	.10
10A75	Tuning Control Knob	.08

GENERAL

8X23	Rubber Cushions (Chassis Mounting)	.04
2X38	Felt Washers (Used behind Knobs) Doz.	.04
32X50	Tube Shield (Closed Top)	.08
32X51	Tube Shield Base	.04
30X64	Grid Clip only Doz.	.06
2A93	Band Change Switch	.80
2A78	Selectivity Switch	.20
6A53	Terminal Strip (3 Lugs Insulated—Mounting Hole used)	.04
13X80	Line Cord & Plug Assembly	.28
13X214	Antenna and Ground Lead Assembly	.14
4A68	Terminal Strip (3 Lugs Insulated—Mounting foot used)	.04
25A71	Tuning Eye Tube Clamp Assembly	.20

TRANSFORMERS AND COILS

Part No.	Code	Description	Selling Price
9A863	T1	Antenna Transformer and Can Assembly	$1.20
9A864	T2	Interstage Transformer and Can Assembly	1.16
9A865	T3	Oscillator Coil and Can Assembly	1.98
9A782	T4	1st I.F. Transformer and Can Assembly	1.16
9A777	T5	2nd I.F. Transformer and Can Assembly	1.12
	T6	Output Transformer only (See "Speakers")	
53X161	T7	117-234 Volt, 40-60 Cycle, Universal Power Trans.	3.90
53X160	T7	117 Volt, 25 Cycle Power Transformer	4.06
53X159	T7	117 Volt, 60 Cycle Power Transformer	2.40

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	Selling Price
46X90	C4	.05 mf.	180	$0.08
46X105	C21	.10 mf.	360	.10
46X187	C22	.02 mf.	180	.08
46X211	C23	.04 mf.	180	.06
46X181	C24	.10 mf.	240	.08
46X121	C29	.25 mf.	360	.14
46X124	C30	.01 mf.	180	.08
46X80	C31	.05 mf.	180	.08
46X211	C32	.04 mf.	180	.06
46X121	C33	.25 mf.	360	.14
46X197	C41	.25 mf.	180	.12
46X147	C44	.005 mf.	360	.08
46X202	C46	.02 mf.	360	.08
46X98	C47	.10 mf.	180	.10
46X98	C48	.10 mf.	180	.10
46X114	C49	.004 mf.	600	.08
46X108	C50	.05 mf.	600	.10

ELECTROLYTIC

44X11	C51	18 mf.	300	.....	.52
44X10	C52	14 mf.	400	.....	.40

Prices Subject to Change Without Notice.

MOLDED

Part No.	Code	Capacitance	Selling Price
47X69	C1	250 mmf.	$0.08
47X93	C5	35 mmf.	.08
47X93	C10	35 mmf.	.08
47X94	C18	45 mmf.	.08
47X56	C38	50 mmf.	.06
47X56	C39	50 mmf.	.06
47X72	C40	25 mmf.	.06
47X57	C42	100 mmf.	.06
47X65	C45	250 mmf.	.08

TRIMMER

17A73	C2	2-25 mmf. Antenna Range "D"	.16
	C3	2-25 mmf. Antenna Range "B"	
	C4	2-25 mmf. Antenna Range "A"	
	C7	2-25 mmf. Interstage Range "D"	
17A73	C8	2-25 mmf. Interstage Range "B"	.16
	C9	2-25 mmf. Interstage Range "A"	
17A69	C11	40-100 mmf. Oscillator 600 KC	.20
	C13	40-120 mmf. Oscillator 600 KC	
17A76	C14	2-25 mmf. Oscillator Range "D"	.12
	C16	2-25 mmf. Oscillator Range "A"	
17A68	C15	1-12 mmf. Oscillator Range "B"	.10
17A66	C19	100-200 mmf. 165 KC Padder	.12
17A70	C26	15-55 mmf.	1st I.F. Trimmers .20
	C27	15-55 mmf.	
17A70	C35	15-55 mmf.	2nd I.F. Trimmers .20
	C36	15-55 mmf.	

MISCELLANEOUS

47X89	C12	370 mmf. Iron Clad	.14
47X80	C17	13 mmf. Compensating Capacitor	.24
47X81	C20	35 mmf. Iron Clad	.12
47X91	C25	65 mmf. Iron Clad	.12
47X91	C28	65 mmf. Iron Clad	.12
47X91	C34	65 mmf. Iron Clad	.12
47X63	C37	150 mmf. Iron Clad	.18
14A70	3 Section Gang Condenser less Dial and Drive Assembly		2.18

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	Selling Price
A94301	R1	300 Ohm	0.2	$0.08
C94153	R2	15,000 Ohm	1.0	.08
D94163	R3	16,000 Ohm	2.0	.16
A94502	R4	5,000 Ohm	0.2	.08
A95104	R5	100,000 Ohm	0.2	.06
C94253	R6	25,000 Ohm	1.0	.08
A94503	R7	50,000 Ohm	0.2	.06
A95105	R8	1 Megohm	0.2	.06
A94505	R9	5 Megohm	0.2	.08
A94301	R10	300 Ohm	0.2	.08
B95803	R11	80,000 Ohm	0.5	.06
A94805	R12	8 Megohm	0.2	.08
A95503	R13	50,000 Ohm	0.2	.06
A95503	R14	50,000 Ohm	0.2	.06
A95503	R15	50,000 Ohm	0.2	.06
A95205	R16	2 Megohm	0.2	.06
A94202	R17	2,000 Ohm	0.2	.08
A95253	R18	25,000 Ohm	0.2	.06
A95205	R20	2 Megohm	0.2	.06
A95154	R21	150,000 Ohm	0.2	.06
A95254	R22	250,000 Ohm	0.2	.06
A95504	R24	500,000 Ohm	0.2	.06
A95503	R27	50,000 Ohm	0.2	.06

WIRE WOUND

43X83	R25	25 Ohm	0.25	.16
	R26	210 Ohm	2.0	

VARIABLE

36X236	R23	.5 Megohm Volume Control and On-Off Switch	.48
40X223	R28	.15 Megohm Tone Control	.32

PHONO ATTACHMENT PARTS

Part No.	Description	Selling Price
13X298	30" Phono Cable Assembly Complete (Includes Plug, Double-Tip Phono Jack, Switch, and Knob)	$1.22
6A218	Plug (8 Prong) only of Phono Cable	.08
3A12	Phono Jack only of Phono Cable	.06
2A50	Phono Switch only of Phono Cable	.34
10A90	Knob only of Phono Cable	.10

DIAL AND DRIVE ASSEMBLY

DIAL AND DRIVE PARTS WILL BE FOUND IN SPECIAL MOVIE DIAL AND DRIVE DATA. SEE INDEX

MODELS 62-358,62-368, 62-448,62-458 Replacement Parts List

MISCELLANEOUS

SOCKETS

Bin No.	Part No.	Description	Selling Price
	3A261	Tube Socket—Octal (5 prong)	$0.06
	3A256	Tube Socket—Octal (7 prong)	.08
	3A263	Tube Socket—Octal (8 prong)	.08
	3A267	Speaker Socket (4 prong)	.08
	13X319	Tuning Eye Tube Socket and Cable Assembly	.22

SPEAKERS

When ordering parts for speakers, specify part number of speaker and letter preceding part number stamped on speaker.

12A303	6" Dynamic Speaker complete with Output Transformer (T6)	2.36
	Cone and Voice Coil Assembly for above Speaker	.66
	Output Transformer only (T6)	.60
12A302	8" Dynamic Speaker complete with Output Transformer (T6)	2.78
	Cone and Voice Coil Assembly for above Speaker	.66
	Output Transformer only (T6)	.60

KNOBS

11381	10A77	Volume Control Knob	.08
11382	10A78	Tone Control Knob	.08
11384	10A75	Tuning Control Knob	.08
11385	10A76	Band Switch Knob	.10
11048	10A112	Selectivity Control Knob	.10

RESISTORS

CARBON

Bin No.	Part No.	Code	Resistance	Wattage	Selling Price
11068	A94503	R1	50,000 Ohm	0.2	$0.08
11054	B94153	R2	15,000 Ohm	0.5	.08
11027	A94202	R3	2,000 Ohm	0.2	$0.08
11549	A94803	R4	80,000 Ohm	0.2	.08
11189	A94353	R5	35,000 Ohm	0.2	.08
11188	A95105	R6	1 Megohm	0.2	.06
11068	A95503	R7	50,000 Ohm	0.2	.06
11066	A94205	R8	2 Megohm	0.2	.08
11086	A95205	R10	2 Megohm	0.2	.06
11277	A94805	R11	8 Megohm	0.2	.08
	C94261	R12	260 Ohm	1.0	.08
11331	A94250	R13	25 Ohm	0.2	.06
11050	A95154	R14	150,000 Ohm	0.2	.06
10971	A95254	R15	250,000 Ohm	0.2	.06

VARIABLE

10900	36X235	R9	.5 Megohm	Volume Control .44
10905	40X223	R16	.15 Megohm	Tone Control .32

DIAL AND DRIVE ASSEMBLY

Bin No.	Part No.	Description	Selling Price
	15A115	Telephone Dial Assembly Complete less Dial Lamps and Sockets, Gang Condenser, Gang Condenser and Dial Assembly Mounting Bracket	$6.02
10716	8X42	Drive Belt	.12
	25X442	Mounting Bracket for Gang Condenser and Dial Assembly	.16
	20X39	Hex Shoulder Stud to Mount Above Bracket to Chassis	.04
	20X201	Stud for Mounting Dial Assembly to Front of Chassis Doz.	.12
	6X8	Rubber Grommets (Used with above Studs) Doz.	.08
		Dial Lamp—No. 51 Mazda	.10
	7A59	Dial Lamp Socket (Upper Mounting)	.06
	7A46	Dial Lamp Socket (Lower Mounting)	.06
	26A56	Station Call Letter Discs and 25 Celluloid Discs	.16

GENERAL

Bin No.	Part No.	Description	Selling Price
	6A68	Terminal Strip (3 lugs Insulated)	$0.04
	2A104	Selectivity Switch	.24
	2A103	Band Change Switch	.46
	25X378	Clamp Bracket for Tuning Eye Tube	.06
10565	8X23	Rubber Cushion (Chassis Mounting)	.04
	25X414	Chassis Mounting Foot (Rear)	.04
	25X375	Chassis Mounting Foot (Front)	.04
10003	30X64	Grid Clip only Doz.	.06
10826	13X214	Antenna and Ground Lead Assembly	.14
	13X80	Line Cord and Plug Assembly	.28
10884	2X38	Felt Washers (Used behind Knobs) Doz.	.04

TRANSFORMERS AND COILS

Bin No.	Part No.	Code	Description	Selling Price
	9A900	T1	Antenna Transformer Assembly "C" and "D" Range	$0.52
	9A899	T2	Antenna Coil Assembly "B" Range	.92
	9A901	T3	Oscillator Coil Assembly	1.00
	9A902	T4	1st I.F. Transformer and Can Assembly	.80
	9A903	T5	2nd I.F. Transformer and Can Assembly	.44
		T6	Output Transformer only (See "Speakers")	
	53X170	T7	117 Volt, 60 Cycle Power Transformer	1.74
	53X171	T7	117 Volt, 25 Cycle Power Transformer	3.08

CONDENSERS

TUBULAR

Bin No.	Part No.	Code	Capacitance	Voltage	Selling Price
11387	46X80	C4	.05 mf.	180	$0.08
	46X220	C8	.0045 mf.	180	.08
10927	46X187	C15	.02 mf.	180	.08
10943	46X222	C16	.04 mf.	240	.08
11490	46X223	C19	.02 mf.	240	.06
10890	46X147	C24	.005 mf.	360	.08
10927	46X202	C26	.02 mf.	360	.08
10943	46X212	C27	.04 mf.	360	.08
10934	46X100	C28	.002 mf.	600	.08

ELECTROLYTIC

10044	44X37	C29	20 mf.	290	Wat	.36
10045	44X38	C30	40 mf.	200	Wat	.36

MOLDED

Bin No.	Part No.	Code	Capacitance	Voltage	Selling Price
10928	47X69	C1	250 mmf.		$0.08
	47X90	C11	1600 mmf.		.10
10049	47X53	C14	35 mmf.		.06
10625	47X56	C22	50 mmf.		.06
10625	47X56	C23	50 mmf.		.06
10625	47X56	C25	50 mmf.		.06

TRIMMER

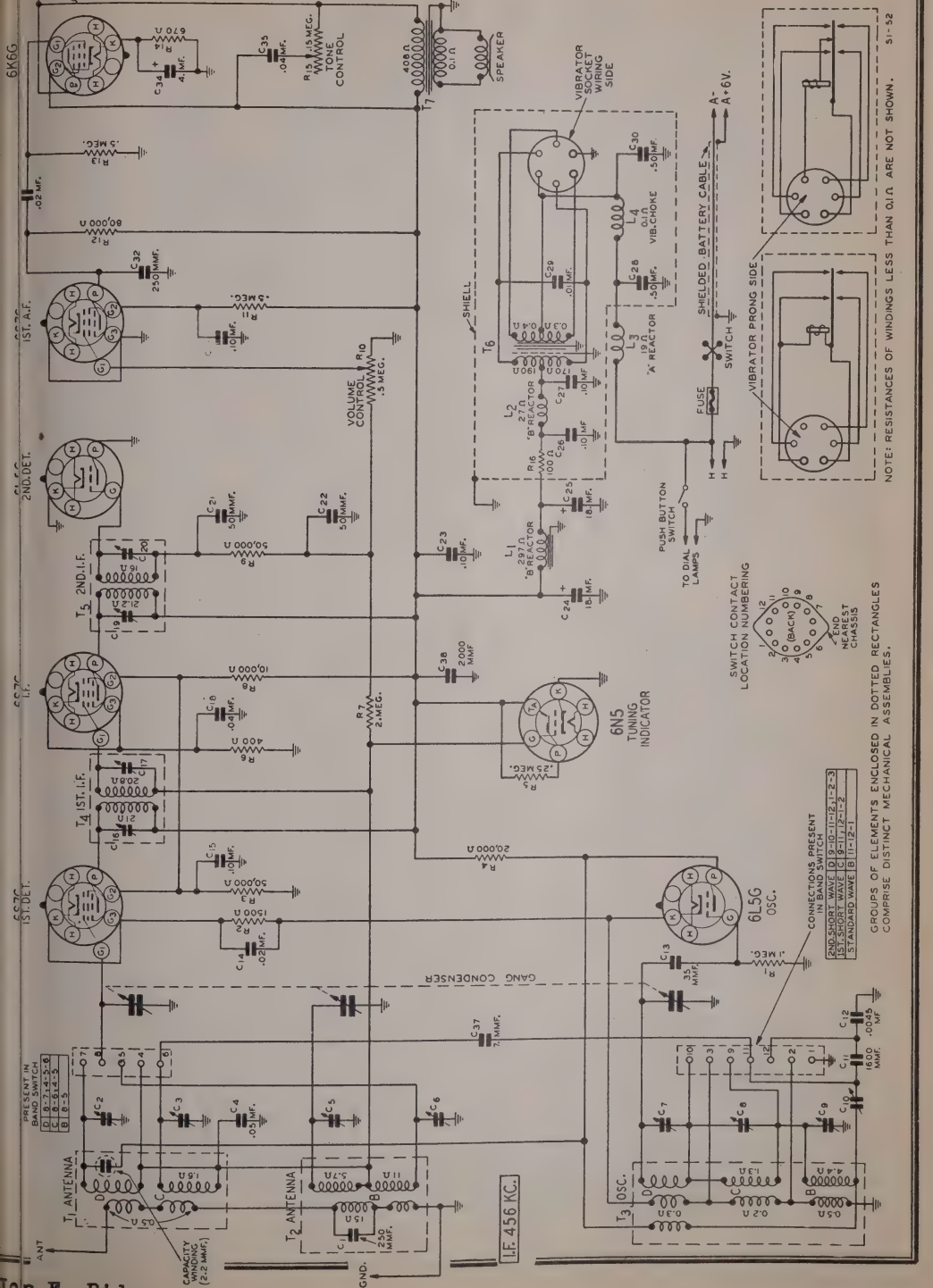
17A73	C2	2-25	mmf.	Antenna Range "D"
	C3	2-25	mmf.	Antenna Range "C"
	C5	2-25	mmf.	2nd Antenna Range "B"
	C6	2-25	mmf.	1st Antenna Range "B"
17A73	C7	2-25	mmf.	Oscillator Range "D"
	C9	2-25	mmf.	Oscillator Range "C"
17A81	C10	300-600	mmf.	600 KC Padder
17A68	C13	1-12	mmf.	Oscillator Range "B"
17A57	C17	50-120	mmf.	1st I.F. Trimmers
	C18	50-120	mmf.	
17A80	C20	50-120	mmf.	2nd I.F. Trimmers
	C21	85-185	mmf.	

MISCELLANEOUS

47X80	C12	13 mmf. Compensating Capacitor	.24
14A82	3 Section Gang Condenser less Dial and Drive Assembly		1.74

MONTGOMERY-WARD & CO.

MODEL 62-359



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ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C19) & (C20)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C16) & (C17)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C7)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Antenna Range D (C2)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C8)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C9)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C5) 2nd Ant. Range B (C6)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C10)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—Loosen the pointer set screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

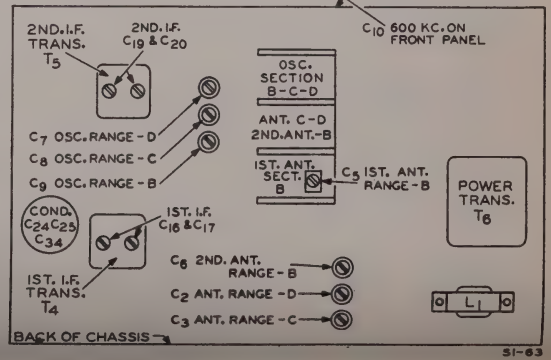


Fig. 2.—Schematic Circuit Diagram

ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

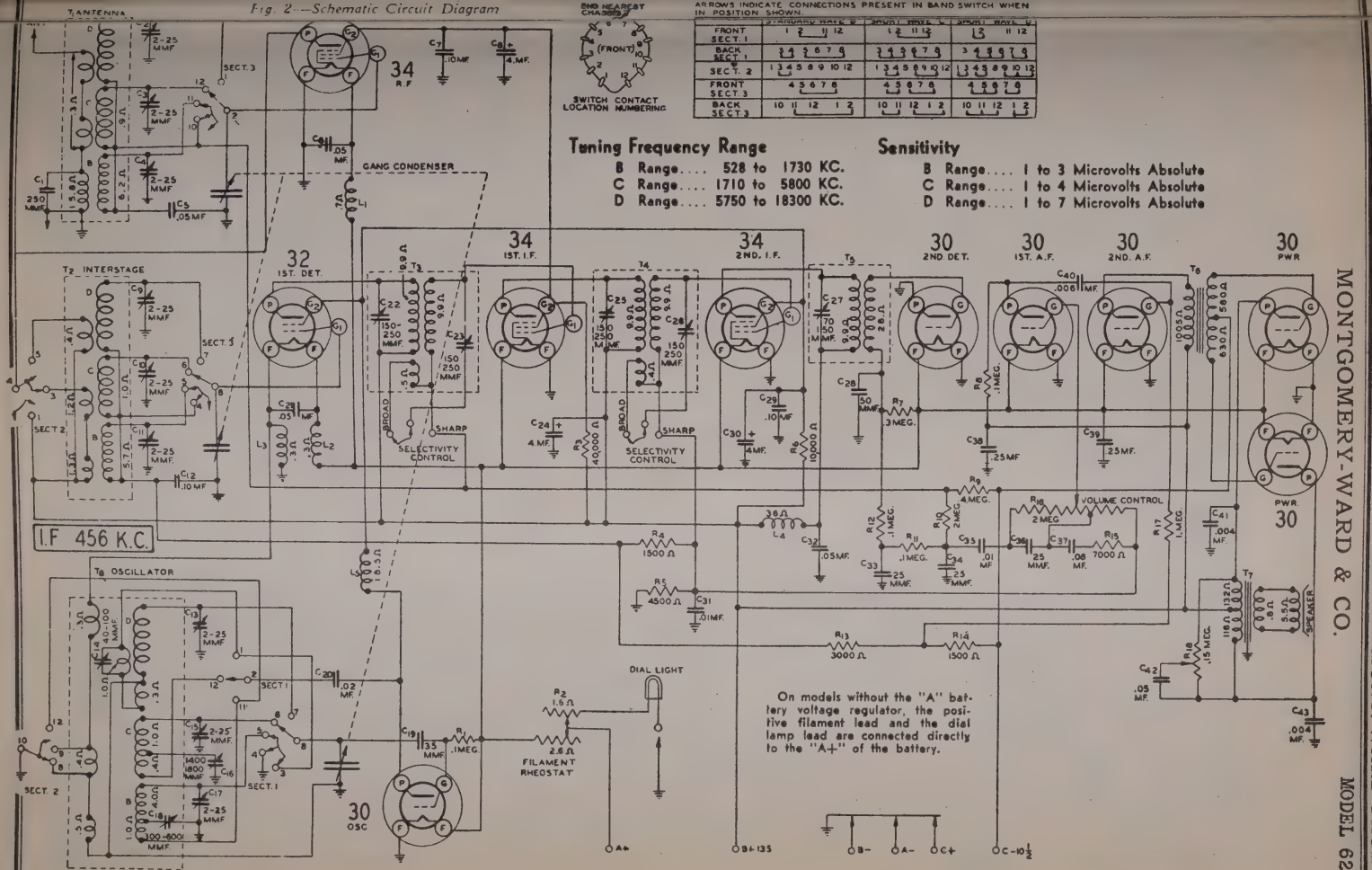
	BROADCAST WAVE B	SHORT WAVE C	SHORT WAVE D
FRONT SECT. 1	1 2 11 12	1 2 11 12	13 11 12
BACK SECT. 1	1 2 6 7 8	1 2 3 6 7 8	1 2 3 6 7 8
SECT. 2	1 3 4 5 8 9 10 12	1 3 4 5 8 9 10 12	1 3 4 5 8 9 10 12
FRONT SECT. 3	4 5 6 7 8	4 5 6 7 8	4 5 6 7 8
BACK SECT. 3	10 11 12 1 2	10 11 12 1 2	10 11 12 1 2

Tuning Frequency Range

B Range.... 528 to 1730 KC.
C Range.... 1710 to 5800 KC.
D Range.... 5750 to 18300 KC.

Sensitivity

B Range.... 1 to 3 Microvolts Absolute
C Range.... 1 to 4 Microvolts Absolute
D Range.... 1 to 7 Microvolts Absolute



On models without the "A" battery voltage regulator, the positive filament lead and the dial lamp lead are connected directly to the "A+" of the battery.

NOTE: RESISTANCES OF WINDINGS LESS THAN .1 OHM ARE NOT SHOWN.

September, 1936

MONTGOMERY-WARD & CO.

MODEL 62-412

MONTGOMERY-WARD & CO.

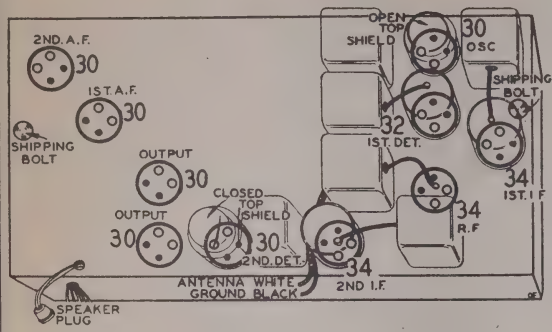


Fig. 7—Location of Tubes

VOLTAGES AT SOCKETS

Volume Control at Maximum Antenna Shorted to Grou
Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Contr Grid to Groun
34	R. F.	2.0	135	65	
32	1st Det.	2.0	135	90	6
30	Osc.	2.0	90		
34	1st I. F.	2.0	135	65	
34	2nd I. F.	2.0	135	90	4.5
30	2nd Det.	2.0			
30	1st A. F.	2.0	75		4.5
30	2nd A. F.	2.0	132		9
30	Power	2.0	135		10.5

(1) Volume control at minimum setting.
(2) As read from connection between R13 and R14, and groun

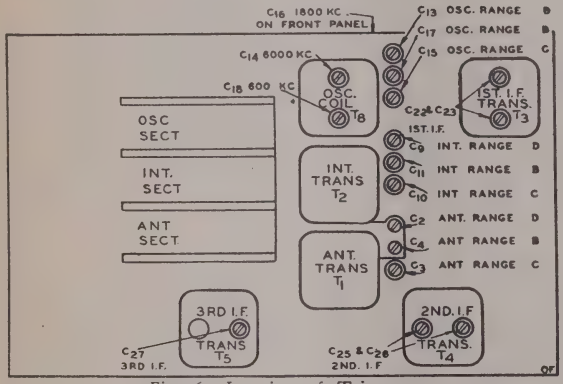


Fig. 6—Location of Trimmers

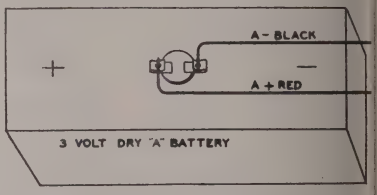


Fig. 4—3 V. Dry "A" Battery Connection

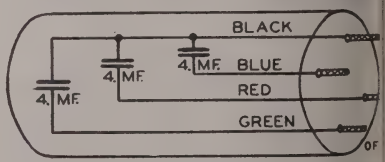


Fig. 9—Electrolytic Condenser Internal Connect

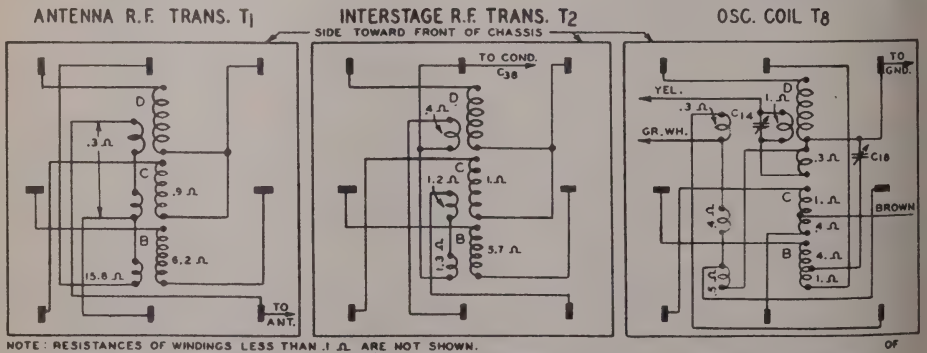


Fig. 8—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

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I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 6.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C17) until maximum output is obtained. The location of this trimmer is shown in Fig. 6.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the interstage Range B trimmer (C11) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 600 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Range C Alignment

CAUTION: When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 6000 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C13) until maximum output is obtained. See Fig. 6 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 1800 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C13) until maximum output is obtained. See Fig. 6 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage and antenna Range D trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and gears to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

MISCELLANEOUS

Referring to the 1st and 2nd I. F. transformers T3 and T4 in Fig. 2, it will be noted that there are coupling windings shown below the primaries in the illustration.

When the selectivity control is in the sharp position, the coupling windings are open circuited and the loose coupling which exists between the primary and secondary of these transformers results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

Across the volume control resistor R16 is a filter composed of condensers C36 and C37 and resistor R15. A tap connection near the low potential end of the volume control is connected between the two condensers. At high volume settings, the filter is not effective. At the low volume settings, as the movable arm approaches the tap, the higher frequencies are by-passed through condenser C37. Very high frequencies are transmitted through condenser C36 to compensate for the reduction of these frequencies. At low volume settings the low frequency amplitudes are increased as a result.

Models with the filament rheostat are connected as shown in Fig. 2. This rheostat permits the use of a 3 volt "A" battery. As shown in Fig. 2, there are two separate variable resistor one of which controls the filament voltage and the other the dial lamp voltage. In models which do not have the filament rheostat the "+A" connection is made directly to the "+A" line and the dial lamps.

Replacement Parts

SOCKETS

Part No.	Description	List Price
P-3A306	4 Prong Tube Socket (All Types)	$0.10

SPEAKERS

P-12A263	8" P.M. Dynamic Speaker complete with Output Trans	6.00
P-13A260	Speaker Cable and Socket Assembly	.45

KNOBS

Specify Name of Knob and Name and Model of Radio		
	Tone Control—Small Push-on Type	.15
	Volume Control—Small Push-on Type	.15
	Tuning Control—Large Push-on Type	.15
	Band Switch—Large Set-screw Type	.20

GENERAL

P-3X38	Felt Washers (Used behind Knobs)	ea.	.10
P-8X73	Rubber Chassis Mounting Cushions	ea.	.10
P-4A38	Terminal Strip (Single Lug Insulated—mounting foot to left of lug)		.10
P-4A42	Terminal Strip (Two Lugs Insulated—mounting hole in center)		.10
P-4A54	Terminal Strip (Five Lugs Insulated—Two Lugs Grounded)		.10
P-3A56	3 Section, 3 Position, Band Change Switch		1.75
P-3DX14	Grid Clip Only		.10
P-13X219	"A" "B" and "C" Battery Cable		1.15
P-13X214	Antenna and Ground Lead Assembly		.35
P-32X43	Tube Shield (Large)		.20
P-32X32	Tube Shield (Small—Open Top)		.15
P-32X30	Tube Shield (Small—Closed Top)		.10
P-32X18	Tube Shield Base (Large)		.10
P-32X30	Tube Shield Base (Small)		.10
P-25X221	Chassis Mounting Feet	ea.	.10
P-8X43	Rubber Mounting Cushions for Gang Condenser (front)	ea.	.10
P-8X44	Rubber Mounting Cushion for Gang Condenser (rear)		.10
P-8X45	Rubber Mounting Cushion for Gang Condenser (rear—under chassis base)		.10

TRANSFORMERS AND COILS

P-9A628	T1	Antenna Transformer and Can Assembly	$1.95
P-9A629	T2	1st I.F. Interstage Transformer and Can Assembly	1.95
P-9A631	T3	1st I.F. Transformer and Can Assembly	1.70
P-9A632	T4	2nd I.F. Transformer and Can Assembly	1.70
P-9A633	T5	3rd I.F. Transformer and Can Assembly	1.55
P-9DX11	T6	Input Transformer	2.10
P-9A264	T7	Output Transformer (Part of Speaker Assembly)	1.30
P-9A30	T8	Oscillator Coil and Can Assembly	3.75
P-9A599	L1	Filament Reactor	.60
	L5	"B" Reactor	
P-9A410	L2	Double Filament Reactor	.30
P-9A598	L4	2nd I.F. Plate Isolating Reactor	.70

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage	List Price
P-4AX80	C5	.02 mf.	180	$0.15
P-4AX80	C6	.05 mf.	180	.20
P-4AX98	C7	.1 mf.	180	.30
P-4AX195	C13	.01 mf.	180	.15
P-4AX187	C20	.02 mf.	180	.15
P-4AX80	C21	.05 mf.	180	.20
P-4AX98	C22	.1 mf.	180	.30
P-4AX124	C31	.01 mf.	180	.15
P-4AX80	C32	.05 mf.	180	.20
P-4AX120	C35	.01 mf.	360	.15
P-4AX176	C36	.02 mf.	180	.15
P-4AX117	C38	.15 mf.	180	.25
P-4AX117	C39	.25 mf.	180	.25
P-4AX101	C40	.006 mf.	600	.15
P-4AX174	C41	.004 mf.	600	.20
P-4AX119	C43	.05 mf.	360	.15
P-4AX114	C42	.004 mf.	600	

ELECTROLYTIC

P-4SX214	C8	4 mf.	180 Dry	1.15
	C24	4 mf.		
	C38	4 mf.		

MOLDED

Part No.	Code	Capacitance	Voltage	List Price
	C1	250 mmf.		.15
P-47X69	C19	35 mmf.		.10
P-47X66	C25	50 mmf.		.10
P-47X72	C33	25 mmf.		.10
P-47X72	C34	25 mmf.		.10
P-47X72	C36	25 mmf.		.10

TRIMMER

P-17A48 Trimmer Strip	C2	3-25 mmf.	Range "D" Antenna Trimmer
	C3	3-25 mmf.	Range "C" Antenna Trimmer
	C4	3-25 mmf.	Range "B" Antenna Trimmer
	C9	3-25 mmf.	Range "D" Interstage Trimmer
	C10	3-25 mmf.	Range "C" Interstage Trimmer
	C11	3-25 mmf.	Range "B" Interstage Trimmer
	C13	3-25 mmf.	Range "D" Oscillator Trimmer
	C16	3-25 mmf.	Range "C" Oscillator Trimmer
	C17	3-25 mmf.	Range "B" Oscillator Trimmer

See Part Number P-17A36 for replacement of any one section

P-17A38	C14	40-180 mmf.	6000 KC Oscillator Padding Condenser
	C18	300-600 mmf.	600 KC Oscillator Padding Condenser
P-17A47	C15	1400-1800 mmf.	1800 KC Oscillator Padding Condenser
P-17A38	C22	160-280 mmf.	1st I.F. Trimmer Condenser
	C23	160-250 mmf.	1st I.F. Trimmer Condenser
P-17A38	C28	150-250 mmf.	2nd I.F. Trimmer Condenser
	C26	150-250 mmf.	2nd I.F. Trimmer Condenser
P-17A48	C27	75-160 mmf.	3rd I.F. Trimmer Condenser
P-17A36	(To be used for replacement of any one section of Trimmer Strip P-17A48)		

MISCELLANEOUS

P-16A52	3 Gang Condenser Only (less Drive Mechanism and Dial Assembly)	3.40

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage	List Price
P-A9410†	R1	1 Megohm	.2	$0.15
P-A9402	R3	40,000 Ohm	.2	.15
P-A9412	R4	1,500 Ohm	.2	.15
P-A9482	R5	4,500 Ohm	.2	.15
P-B9410	R6	10,000 Ohm	.2	.15
P-A9430†	R7	.3 Megohm	.2	.15
P-A9106	R8	.1 Megohm	.2	.10
P-A9405	R9	4 Megohm	.2	.15
P-A9420	R10	2 Megohm	.2	.15
P-A9106	R11	.1 Megohm	.2	.10
P-A9106	R12	.1 Megohm	.2	.10
P-A9302	R13	3,000 Ohm	.2	.15
P-A9452	R14	1,500 Ohm	.2	.15
P-A9702	R15	7,000 Ohm	.2	.15
P-A9108	R17	1 Megohm	.2	.10

VARIABLE

Part No.	Code	Resistance	List Price
P-3AX220	R16	1 Megohm Tapped Volume Control and Switch	1.00
P-40X211	R18	.15 Megohm Tone Control and Selectivity Switch	1.10

DIAL AND DRIVE ASSEMBLY

DIAL ASSEMBLY

Part No.	Description	List Price
Specify Name and Model of Radio	Dial Assembly Complete with Dial Glass, Dial Plate, Small Pointers, Reflectors, Small Pointer Cords, Springs, Pulleys and Cables; and Bend-Indicator Less Large Station Pointer and Micrometer Pointer	3.85
See above	Dial Glass Only	1.45
P-38A128	Dial Assembly Mounting Plate, Includes Small Pointer Shafts and Pulleys, and Bend Indicator Assembly	1.45
P-38X297	Dial Assembly Support Brackets (Attached to Gang Condenser)	ea. .10
P-18X89	Large Station Pointer	.35
P-18X60	Micrometer Pointer	.10
P-18X87	Small Volume or Tone Control Pointer	ea. .10
P-9X16	Dial Cardboard	.10
P-11X61	Fibre Strip (At Bottom of Dial Glass)	.10
P-41X12	Dial Lamp Reflectors (At each side of Dial Plate)	ea. .10
P-7A27	Dial Lamp Sockets	ea. .10
P-7A40	Dial Lamps	ea. .40
P-29X20	18" Black Cord for Small Pointers	.40
	Brass Cadiers with Set Screws for Securing Small Pointer Cords to Shafts	ea. .10
P-38X44	Tension Springs for Small Pointer Cords	ea. .10
P-26X229	Small Pointer Shafts and Pulleys	ea. .10
P-17X15	Glass Dial Crystal	.35
P-28X58	Crystal Retaining Ring	.15
P-2A60	Dial Lamp Push Button Switch Assembly	.50

DRIVE ASSEMBLY

P-5A34	Planetary Assembly Complete with Hex Nut and Lock-washer (This is the unit mounted at the front of the chassis base and is integral with the tuning shaft)	1.2.
P-10X14	Black Tuning Drive Cord Only	.30
P-28X49	Tension Spring for Tuning Drive Cord	.10
P-28X269	Drive Assembly Bracket Only (Mounted on Gang Condenser)	.25
P-28X283	Rear Mounting Foot for Gang Condenser	.10
P-34X279	Drive Drum Assembly Complete with Gears, Micrometer and Main Pointer Shaft	1.35
P-28X84	Spreader Spring for Rotary Gear (Part of Above Assembly)	.10
P-28X83	Spreader Spring for Stationary Gear (Part of Above Assembly)	.10

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

Prices subject to change without notice

"A" Battery (Models with Voltage Regulator)

Models equipped with the voltage regulator on the back panel of the chassis may use any type of "A" battery delivering from 2 to 3 volts.

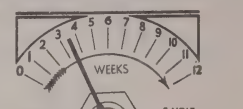


Fig. 5—"A" Battery Voltage Regulator

Batteries

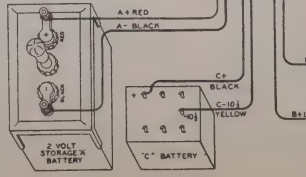
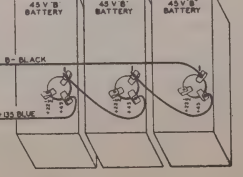


Fig. 3—"A", "B" and "C" Battery Connections



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MONT.-WARD PAGE 14-111
MODEL 62-412

MONTGOMERY-WARD & CO.

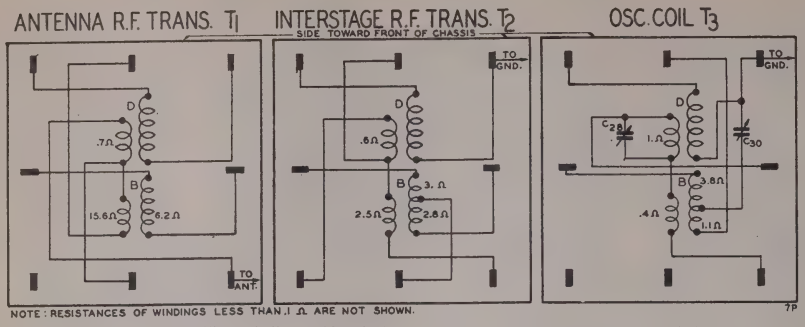

Fig. 4—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

32 Volt Power Supply

This radio is designed for use on farms and in those places where the power supply consists of a 32 volt direct current generating plant.

Polarity of Power Supply

There is a red mark on the plug at the end of the power supply cord of the radio. The prong of the plug at which the red mark is placed must be plugged into the positive side of the line.

Use a receptacle on the 32 volt line from which the plug will not have to be removed after it has once been inserted correctly.

If the polarity of the line is not known, that is, if it is not known which side of the line is positive, a meter may be used to indicate the polarity. A voltmeter of 50 volt range or up is used. Connect the meter across the line. If the pointer deflects correctly, then the positive post of the meter is connected to the positive side of the line.

If the polarity of the line is not known and there is no way of determining it, insert the power supply plug, turn on the set, advance the volume control and proceed to tune the radio. If no sounds are heard from the speaker after the plug has been in two minutes, withdraw the plug, turn it around and re-insert it. This time sounds should be heard after the tubes have been heated.

Caution

If used on any other type of power supply than 32 volt DC, severe damage may be done to the receiver.

Do not turn the radio on unless all of the tubes and the dial lamps are in the proper sockets. Use only No. 51 bayonet pin base lamps.

Do not leave the plug inserted for more than five minutes if it is found that the radio does not operate.

Line Voltage Range

The radio will operate satisfactorily within a line voltage range of 25 to 42 volts.

Series Resistor

If the line voltage is higher than 42, it will be necessary to use a series resistor to cut it down. If the voltage varies, a variable resistor may be required.

Starting Current

When first turned on, the drain for a few seconds is slightly higher than normal until the tubes heat up. Some automatic plants are adjusted to start under a load of 200 to 300 watts. If a number of devices such as lights or motors are being used and the radio set is turned on the total drain may be sufficient to start the plant.

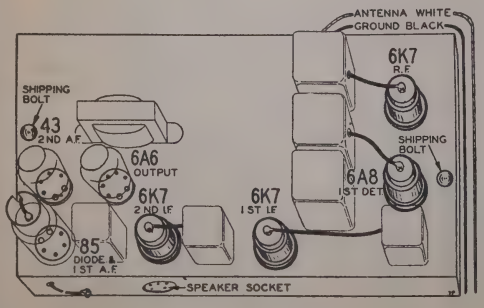

Fig. 6—Tube Arrangement

Dial Lamps

For the dial lamps, No. 51 bayonet pin base lamps must be used. These lamps are part of one section of the tube heater circuit (See Fig. 7) and any other lamps having a different current drain would upset the voltage system of this section.

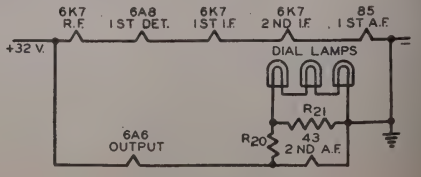

Fig. 7—Abridged Wiring Diagram Showing Tube Heater and Dial Lamp Wiring System

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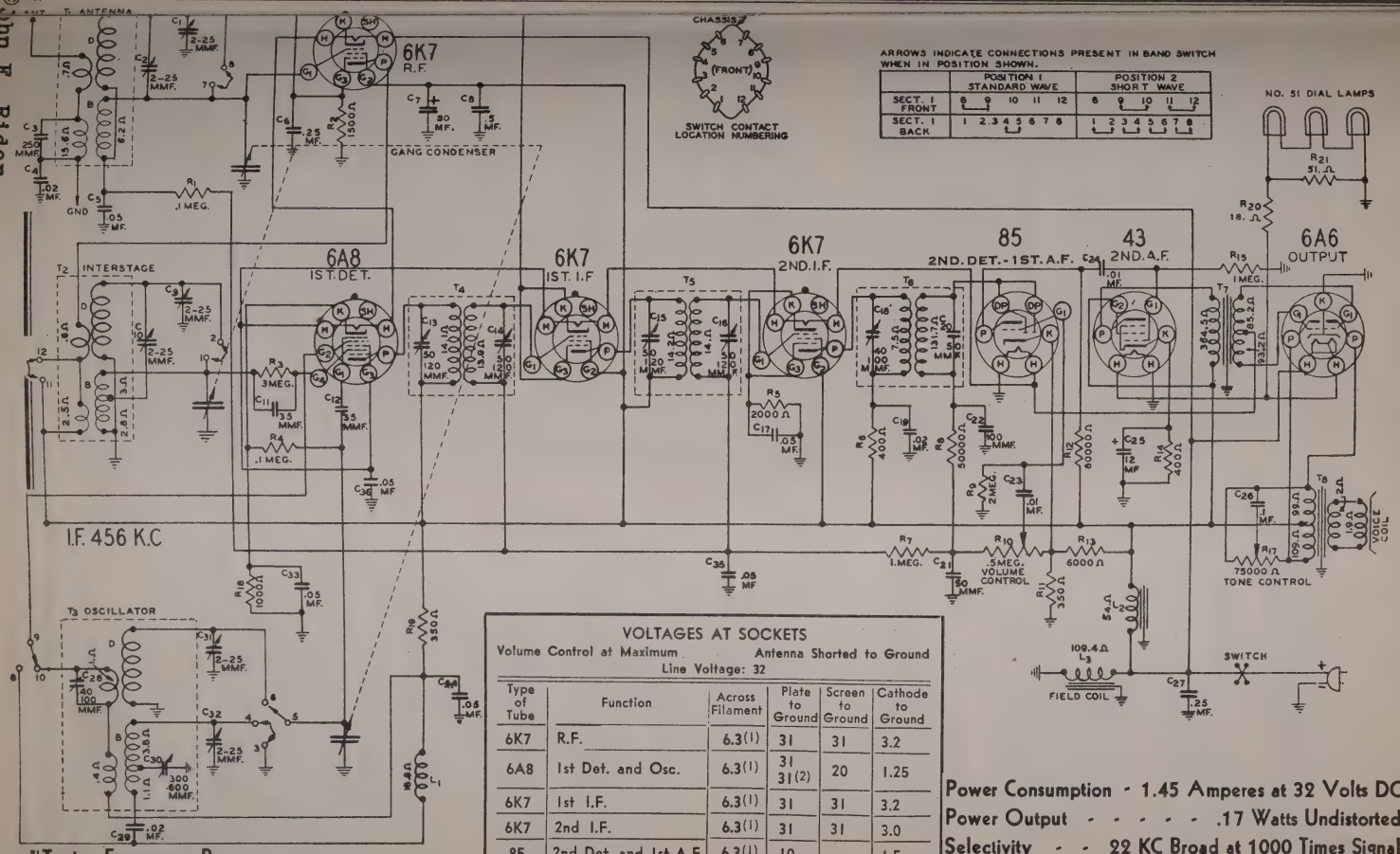

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground
Line Voltage: 32

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Cathode to Ground
6K7	R.F.	6.3(1)	31	31	3.2
6A8	1st Det. and Osc.	6.3(1)	31 31(2)	20	1.25
6K7	1st I.F.	6.3(1)	31	31	3.2
6K7	2nd I.F.	6.3(1)	31	31	3.0
85	2nd Det. and 1st A.F.	6.3(1)	10		1.5
43	2nd A.F.	26.0(1)	28.2	31	3.2
6A6	Output	6.0(1)	31		6.4(3)

(1) Subject to Variation
(2) Anode Grid to Ground
(3) Center Tap of Output Transformer to Ground

Tuning Frequency Range

B Range..... 528 to 1730 KC
D Range.....5650 to 16000 KC

Sensitivity

B Range.....4 Microvolts Absolute
D Range.....6 Microvolts Absolute

Power Consumption - 1.45 Amperes at 32 Volts DC
Power Output - - - - - .17 Watts Undistorted
Selectivity - - 22 KC Broad at 1000 Times Signal
Intermediate Frequency - - - - - - - 456 KC
Speaker - - - - - - - - - 8 inch Dynamic

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MODEL 62-432

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I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector (G_4).

Connect the ground lead of the radio to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the radio through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C32) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the interstage Range B trimmer (C10) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

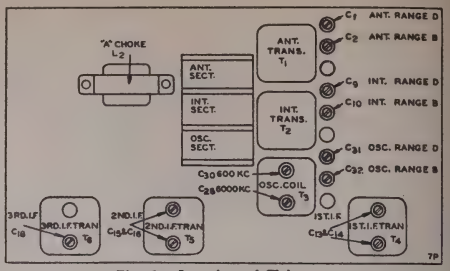

Fig. 3—Location of Trimmers

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer (C30) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC. It may be necessary to increase the input signal to hear the image.

16,000 KC Adjustment

Set the signal generator for 16,000 KC.

Connect the antenna lead of the radio through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

Adjust the oscillator Range D trimmer (C31) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C1) to maximum. When adjusting these trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC (C28) trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

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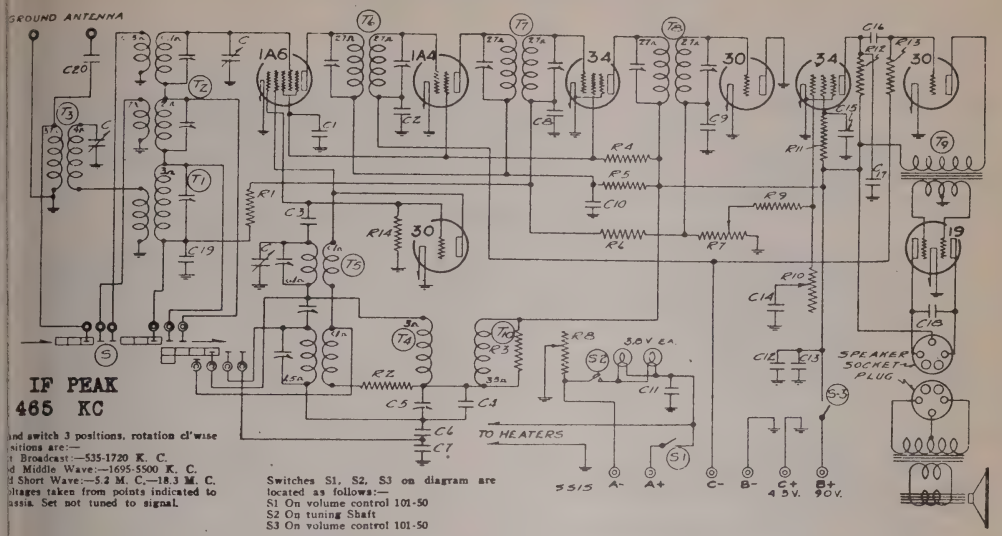


IF PEAK 465 KC

nd switch 3 positions, rotation cl'wise
sitions are:—
t Broadcast:—535-1720 K. C.
d Middle Wave:—1695-5500 K. C.
d Short Wave:—5.2 M. C.—18.3 M. C.
ltages taken from points indicated to
assis. Set not tuned to signal.

Switches S1, S2, S3 on diagram are located as follows:—
S1 On volume control 101-50
S2 On tuning Shaft
S3 On volume control 101-50

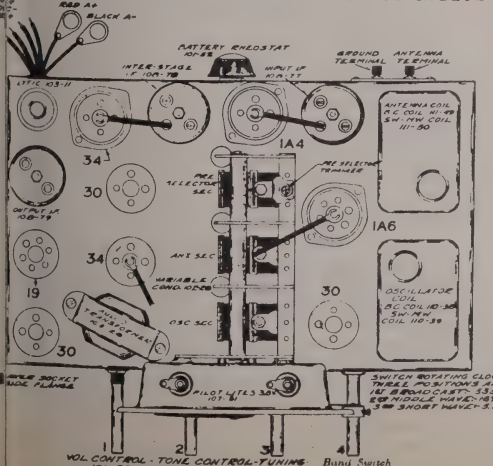
LIST OF REPAIR PARTS

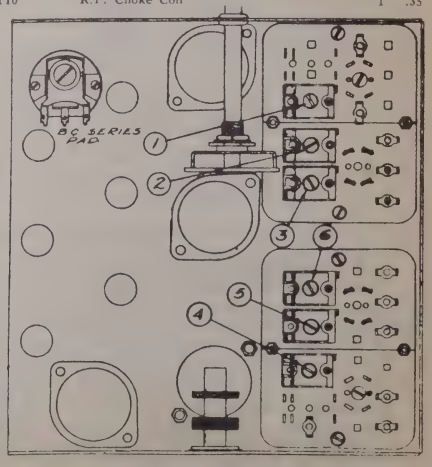
Use Only Genuine Factory Replacement Parts

Part No.	Circuit Diagram Reference	Description	No. Used in Set	List Price Each
		CONDENSERS		
100-5B	C11	1.0 x 120 Volt Tubular with Bracket	1	.50
100-6	C1	.25 x 200 Volt Tubular less Bracket	1	.35
100-6B	C13	.25 x 200 Volt Tubular with Bracket	1	.35
100-11	C14, C16, C20	.01 x 400 Volt Tubular	3	.25
100-20	C10	.1 x 200 Volt Tubular	1	.25
100-22	C2, C8, C15, C19	.05 x 200 Volt Tubular	4	.25
100-25	C18	.002 x 600 Volt Tubular	1	.25
103-11	C12	8 Mfd. x 200 Volt Electrolytic	1	.75
129-5	C17	.0001 Mica—Type MT—20%	1	.25
129-12	C9	.00025 Mica—Type MT—20%	1	.25
129-50	C3	.00004 Mica—Type MT—30%	1	.25
129-54	C7	.003 Mica—Type MW—2½%	1	.35
129-55	C6	.0034 Mica—Type MW—2½%	1	.35
129-65	C4	.00055 Mica—Type MT—5%	1	.25
			1	6.00
		MISCELLANEOUS		
101-50	R7	Volume Control and Switch (250 M ohm)	1	1.25
101-51	R10	Tone Control (300 M ohm)	1	.70
101-52	R8	Filament Rheostat (2 ohm)	1	.50
102-28	C	Three Gang Variable Condenser	1	4.00
105-28	T9	Audio Input Transformer	1	1.75

Part No.		Description	No. Used in Set	List Price Each
125-17	S	Band Switch	1	.85
128-51		Wood Knob with Spring	3	.15
128-52		"Tuning" Knob with Set Screw—Wood	1	.15
131-12		Bakelite Knob with Arrow	1	.15
		RESISTORS		
130-11	R12	250M Ohm—½ Watt—20%—50 Volt Carbon	1	.20
130-12	R3, R9, R14	50M Ohm—½ Watt—20%—20 Volt Carbon	3	.20
130-19	R6, R11, R13	1 Meg Ohm—½ Watt—20%—100 Volt Car.	3	.20
130-20	R1	100M Ohm—½ Watt—20%—50 Volt Carbon	1	.20
130-27	R2	50 Ohm—½ Watt—20%—3 Volt Carbon	1	.20
130-31	R5	1500 Ohm—½ Watt—20%—10 Volt Carbon	1	.20
130-109	R4	7500 Ohm—½ Watt—20%—50 Volt Carbon	1	.20
		COILS		
108-77	T6	Input I.F. complete with Can	1	1.25
108-78	T7	Interstage I.F. complete with Can	1	1.25
108-79	T8	Output I.F. complete with Can	1	1.25
110-38	T4	Broadcast Oscillator Coil Complete	1	.50
110-39	T5	Mid-Wave & Short Wave Oscillator Coil Com.	1	1.50
111-49	T1	Broadcast Antenna Coil Assembly Complete	1	.75
111-50	T2	Mid-Wave & Short Wave Antenna Coil Assem. Complete	1	1.50
111-51	T3	Broadcast Preselector Coil	1	.75
123-3	T10	R.F. Choke Coil	1	.35

PRICES SUBJECT TO CHANGE WITHOUT NOTICE





BOTTOM VIEW SHOWING TRIMMERS

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BATTERIES REQUIRED:

The following batteries are required:

2—45 Volt "B" Batteries.
1—4½ Volt "C" Battery.
1—3 Volt Dry "A" Battery or 2 Volt Storage Battery.

TUBES:

The tube complement of this chassis is as follows:

1—Type 1A6 Pentagrid Mixer, First Detector.
1—Type 1A4 Tetrode First I.F. Amplifier (465 K.C.)
1—Type 34 Remote Cut-Off Pentode, 2nd I.F. Amplifier (465 K.C.)
1—Type 30 Oscillator.
1—Type 30 Second Detector and A. V. C.
1—Type 34 A.F. Amplifier.
1—Type 30 Driver Amplifier.
1—Type 19 Class "B" Push-Pull Output Amplifier.

SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram, are measured with a new set of batteries.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

The approximate current consumption is as follows:
"A"—660 ma., "B"—18 to 24 ma.

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the two plate terminals of the type 19 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-79 Output I.F. Transformer
Part No. 108-78 Interstage I.F. Transformer
Part No. 108-77 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 34 tube, and adjust the output I.F. transformer (No. 108-79) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 34 to grid cap to 1A4 and adjust interstage I.F. transformer (No. 108-78) to resonance.
   (c) Move oscillator to grid cap of 1A6 and adjust input I.F. transformer (No. 108-77).

BROADCAST BAND ALIGNMENT:

535 to 1720 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground posts, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 1; see bottom view of coil assembly, Fig. 3)
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment).
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. Under no circumstances bend plates of variable condenser sections to correct tracking.

SHORT WAVE BAND ALIGNMENT:

5.2 to 18.3 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the antenna and ground posts, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 3) and short wave antenna (adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 18.3 megacycle signal can be tuned in not only at 18.3 on the dial but also at approximately 17.4 megacycles.

MIDDLE WAVE BAND ALIGNMENT:

1695 to 5500 Kilocycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the antenna and ground posts make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (adjustment number 2) and middle wave antenna (adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.

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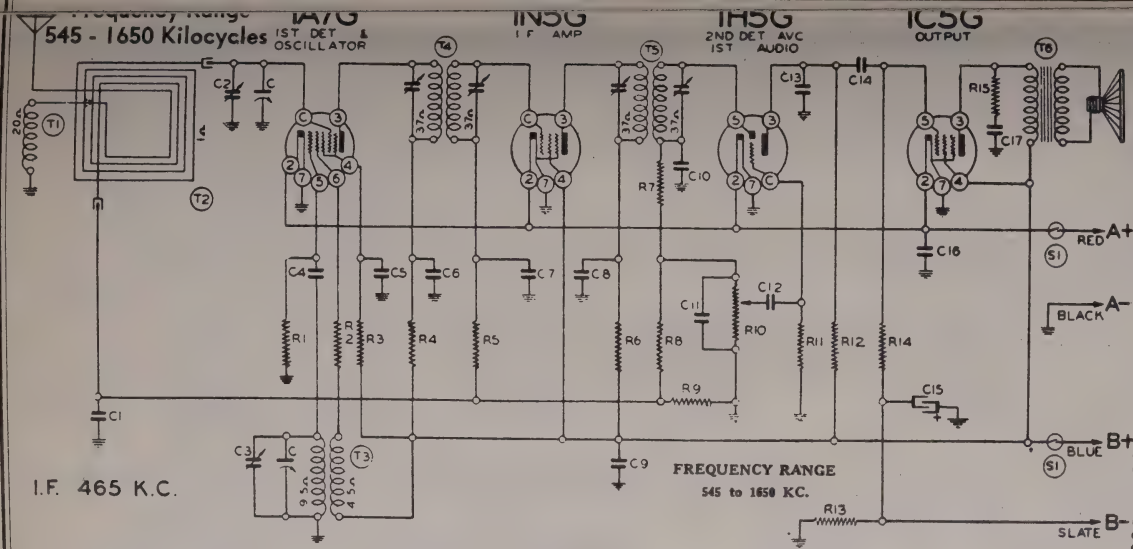


Diagram Ref. No. Part No. Description

RESISTORS

R1	1309	200M ohm—½ w.
R2	13071	4M ohm—½ w.
R3	130208	40M ohm—½ w.
R4	13026	1000 ohm—½ w.
R5	13020	100M ohm—½ w.
R6	13026	1000 ohm—½ w.
R7	13040	19M ohm—½ w.
R8	13038	2 megohm—½ w.
R9	13038	2 megohm—½ w.
R10	101163	1 megohm volume control
R11	13019	1 megohm—½ w.
R12	1303	500M ohm—½ w.
R13	130283	750 ohm—½ w.
R14	13038	2 megohm—½ w.
R15	130218	5M ohm—½ w.

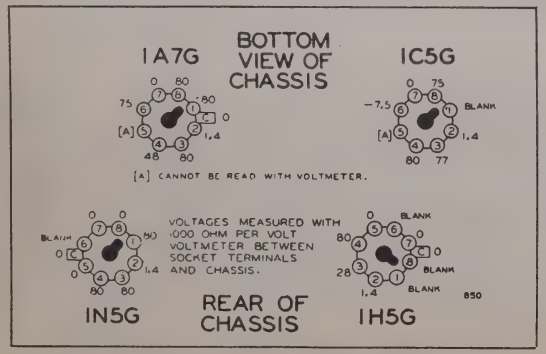
CONDENSERS

C	102103	2 gang variable condenser
C1	10022	.05 x 200 v.
C2		Loop ant. trimmer on gang
C3		Oscillator trimmer on gang
C4	12912	.00025 mica
C5	10022	.05 x 200 v.
C6	10078	.01 x 200 v.
C7	10078	.01 x 200 v.
C8	10078	.01 x 200 v.
C9	10064	.25 x 200 v.
C10	1295	.0001 mica
C11	1295	.0001 mica
C12	10078	.01 x 200 v.
C13	12912	.00025 mica
C14	10078	.01 x 200 v.
C15	11935	.25 mfd. 25 w. v. lytic
C16	10056	.5 x 200 v.
C17	10012	.003 x 600 v.

PARTS

T1	1236	Antenna load coil (on loop)
T2	120257	Loop antenna coil (complete)
T3	110110	Oscillator coil
T4	108142	Input I.F. coil
T5	108143	Output I.F. coil
T6	114158	5" P.M. Speaker
S1		Off-on switch D.P.S.T. on vol. control

101



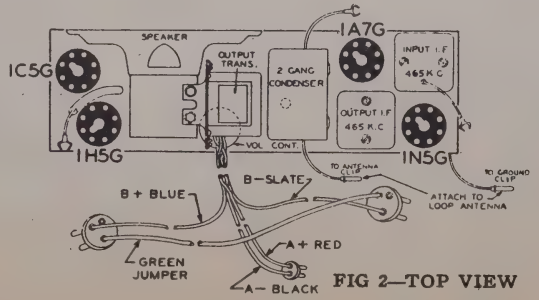


FIG 2—TOP VIEW

Power Output.....200 Milliwatts Undistorted, 300 Milliwatts Maximum

Slight adjustments to the oscillator and antenna circuits can be made without removing the chassis from the cabinet through two holes on the front of the radio cabinet under the nameplate

A ground is essential when an outside antenna is employed.

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ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect —B of radio chassis to ground post of signal generator through .1 Mfd. Condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.

MODEL 93BR-571 (Serial No. 189300 and up)

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Connect to Terminal "B" (See Fig. 4)	Iron Cores All the way out	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Connect to Terminal "B" (See Fig. 4)	Iron Cores All the way out	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1720 Kc.	.1 MFD.	Connect to Terminal "B" (See Fig. 4)	Iron Cores All the way out	Trimmer (C5) (See bottom of Radio, Fig. 3)	Oscillator	Adjust to maximum output
	1720 Kc.	200 MMF.	Connect to Terminal "A" (See Fig. 4)	Iron Cores All the way out	Trimmer (C2) (See bottom of Radio, Fig. 3)	Antenna	Adjust to maximum output
	1400 Kc.	200 MMF.	Connect to Terminal "A" (See Fig. 4)	Turn Dial to 1400 Kc.	Adjust position of antenna coil up or down (see Fig. 4)	Antenna Coil Adjustment	Adjust to maximum output (See Note "A")
	1720 Kc.	200 MMF.	Connect to Terminal "A" (See Fig. 4)	Turn Dial to 1720 Kc.	Adjust trimmer (C2) (See Fig. 3)	Antenna	Check for tracking (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable up or down. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C2) adjustment again at 1720 Kc. If no appreciable change in trimmer adjustment is made the coil is in track; if the trimmer requires considerable change, it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1720 Kc.

FOR OTHER DATA SEE INDEX

MODEL 62-454

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 1N5G I. F. Tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 1A7G	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1735 Kc.	200 mmf.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Top of rear section of gang (See Fig. 1)	Broadcast Oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Set dial at 1400 Kc.	Trimmer—Top of front section of gang (See Fig. 1)	Antenna Broadcast	Adjust to maximum output

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 1A7G Tube	Rotor full open (Plates out of mesh)	Four trimmers on top (See Fig. 1)	Output and input I. F.	(See Note "A") Adjust to maximum output
BROAD-CAST BAND	1650 Kc.	200 mmf.	Grid of 1A7G Tube	Rotor full open (Plates out of mesh)	Trimmer (C3) front section of gang (See Fig. 4)	Oscillator	(See Note "A") Adjust to maximum output
	1400 Kc.		See Note "C"	Set dial at 1400 Kc.	Trimmer (C2) rear section of gang (See Fig. 4)	Antenna	(See Note "B") Adjust to maximum output

NOTE "A" — A 1 megohm resistor must be connected between the two loop antenna leads from the chassis when aligning the I. F. transformers and setting the oscillator trimmer, (C3). The loop antenna must be disconnected from the chassis.

NOTE "B" — Remove the 1 megohm resistor from the loop antenna leads; mount the chassis and the loop antenna in the cabinet, connect the loop antenna to the chassis. Adjust

NOTE "C" — Lay the output lead from the signal generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the signal generator.

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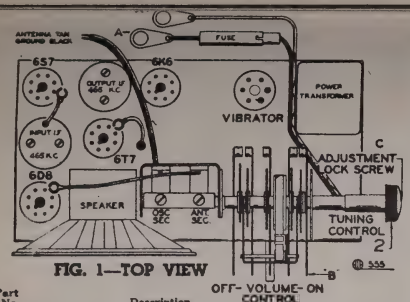
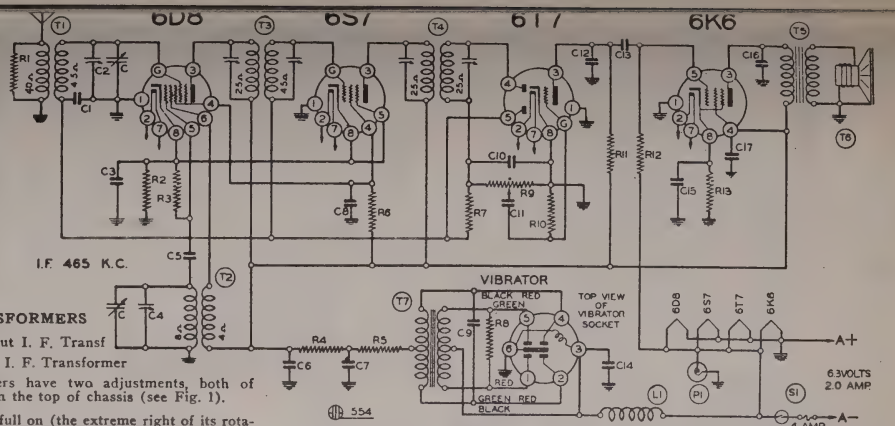


FIG. 1—TOP VIEW



6-Volt Storage Battery Operated

Type 3AG fuse (Part No. 13179)

Code No.	Part No.	Description
		RESISTORS
R1	13021	20M ohm—½ w.
R2	13081	250 ohm—½ w.
R3	13012	50M ohm—½ w.
R4	13084	200 ohm—½ w.
R5	13084	200 ohm—½ w.
R6	130149	15M ohm—½ w.
R7	130170	3 megohm—½ w.
R8	13084	200 ohm—½ w.
R9	101107	500M ohm Volume control
R10	130225	15 megohm—½ w.
R11	1301	200M ohm—½ w.
R12	1303	500M ohm—½ w.
R13	13024	400 ohm—½ w.
		CONDENSERS
C	10267B	2 gang variable condenser
C1	1009	.05 x 200 v.
C2		Antenna Trimmer on gang
C3	10022	.05 x 200 v.
C4		Oscillator trimmer—on gang
C5	12912	.00025—mica
C6	11957	15 mfd.—150 w. v.
C7	11958	30 mfd.—150 w. v.
C8	10022	.05 x 200 v.
C9	10068	.003 x 1400
C10	12912	.00025—Mica
C11	10011	.01 x 400 v.
C12	1292	.0005—Mica
C13	10011	.01 x 400 v.
C14	10031	.5 x 120 w. v.
C15	11957	15 mfd.—25 w. v.
C16	10019	.006 x 600 v.
C17	10020	.1 x 200 v.
		C6 and C 15 in same unit

ALIGNING I.F. TRANSFORMERS

Part No. 10895D Output I. F. Transf

Part No. 10896E Input I. F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 10895D) to resonance.

   (b) Move oscillator output clip from grid of 6S7G to grid of 6D8G and adjust input I.F. transformer (No. 10896E) to resonance.

   (c) With oscillator still connected to 6D8G, readjust output I.F. transformer (10895D) if necessary.

R.F. ALIGNMENT: (535-1720 K. C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 100 mmf. condenser to the antenna lead and chassis ground and make the following adjustments:

   (a) with external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).

   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser.

   (c) Check sensitivity at 600 and 1000 kilocycles.

VOLTAGES AT SOCKETS

Voltage taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. Antenna Shorted to Ground

TUBE	FUNCTION	Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
			(1)					(1)	
6D8—Converter		0	6.25	137	80		137	6.25	3.0
6S7—I. F. Amplifier		0	6.25	137	80	3.0		6.25	3.0
6T7—Diode—Triode		0	6.25	57				6.25	0
6K6—Output		0	6.25	130	137			6.25	5.4 (2)

(1) DC voltage as read across heater terminals 2 and 7.

(2) Bias (11.6 volts) as read across terminals 8 to 7.

Supply Voltage 6.3 DC—Volume Control: Maximum

Readings taken with 1000 ohm per-volt meter

WIRING SIDE OF OCTAL TUBE SOCKET SHOWING LOCATIONS OF PINS

PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are five levers on the dial by means of which five stations may be selected.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now hold tuning knob securely with left hand to prevent it from turning, or Rotate the tuning knob (No. 2) to the right (clockwise) as far as it will turn, and with a coin (half dollar), tighten the special locking screw ("C") in the center of the tuning knob, (See Fig. 1).

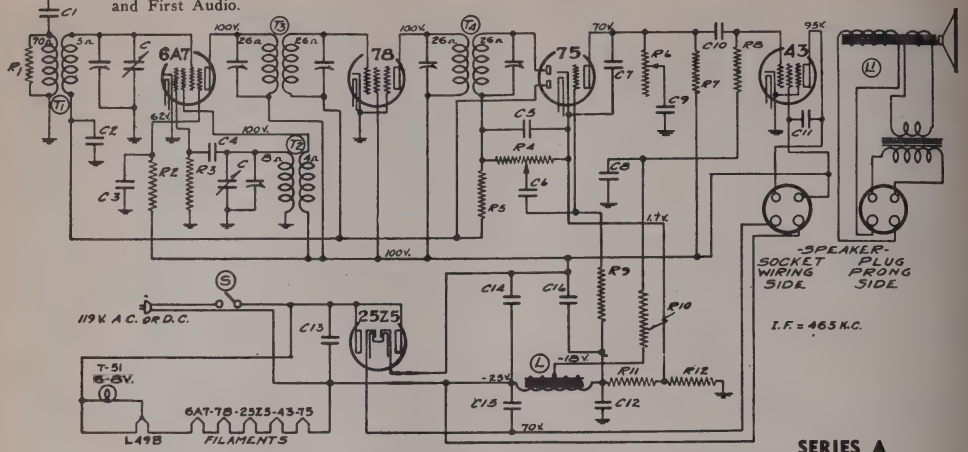
This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, hold the tuning knob No. 2 securely and with a coin loosen the locking screw "C" one or two turns; select the new station as explained. **Be sure to retighten the locking screw,** otherwise the stations you have selected will not stay adjusted to the levers.

MODELS 62-601,
93ER-601

MONTGOMERY-WARD & CO.

Type 6A7 Pentagrid Mixer, First Detector-oscillator
Type 78 Remote Cut-Off Pentode, I.F. Amplifier (465 K.C.)
Type 75 Duplex Diode Triode Second Detector, A.V.C. and First Audio.
Type 43 Pentode Output Amplifier
Type 25Z5 High Vacuum Rectifier.
Type L49B Ballast Tube.



SERIES A

RESISTORS

No.	Part No.	Description
R1	130-12	50M Ohm—½W—20%— 20V—Carbon
R2	130-21	20M Ohm—½W—20%— 20V—Carbon
R3	130-12	50M Ohm—½W—20%— 20V—Carbon
R4	101-54	1 meg Ohm—Volume Control
R5	130-119	3 meg Ohm—½W—20%—100V—Carbon
R6	101-55	1 meg Ohm—Tone Control
R7	130-120	100M Ohm—½W—20%— 50V—Carbon
R8	130-5	300M Ohm—½W—20%—100V—Carbon
R9	130-38	2 meg Ohm—½W—20%—100V—Carbon
R10	130-9	200M Ohm—½W—20%— 20V—Carbon
R11	106-28	35 Ohm—Muter Strip
R12	106-28	50 Ohm—Muter Strip

NOTE: R11 and R12 in one unit—No. 106-28.

TUNING RANGE—
Standard Broadcast Band
535-1720 Kilocycles

CONDENSERS

C1	100-29	.002 x600 Volt—25%
C2	100-22	.05 x200 Volt—25%
C3	100-22	.05 x200 Volt—25%
C4	129-12	.00025 Mica—MT—20%
C5	129-12	.00025 Mica—MT—20%
C6	100-11	.01 x400 Volt—20%
C7	129-2	.0005 Mica—MT—20%
C8	100-20	.1 x200 Volt—25%
C9	100-11	.01 x400 Volt—25%
C10	100-11	.01 x400 Volt—25%
C11	100-25	.002 x600 Volt—25%
C12	100-6	.25 x200 Volt—20%
C13	100-39	.1 x400 Volt—20%
C14	119-25	16 mfd.x100 Volt—Working Voltage
C15	119-25	5 mfd.x100 Volt—Working Voltage
C16	119-25	8 mfd.x100 Volt—Working Voltage

NOTE: C14, C15, and C16 in one unit—No. 119-25

C	102-33	One section of two gang condenser
T1	111-57	Antenna Coil
T2	110-46	Oscillator Coil
T3	108-82	Input I.F. Coil—465 Kc.
T4	108-83	Output I.F. Coil—465 Kc.
L	105-29	Filter Choke (Resistance 600 Ohms)
L1	114-43	Five Inch Speaker (Field resistance 3000 Ohms)
S	101-54	On and off switch on Volume Control

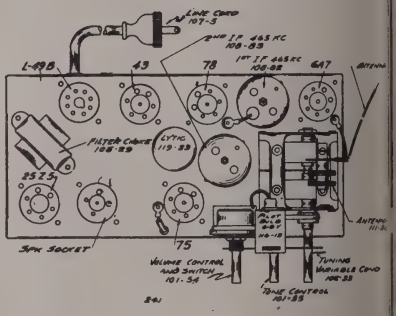


FIG. 2—TOP VIEW

SERIES B is the same as Series A, except for the following changes:-

1 - The C15 condenser was eliminated.

2 - The C14 condenser was replaced by a C15 (Part #119-29) 30 mfd. capacity, and the C16 was replaced by a C14 (Part #119-29) 5 mfd. capacity.

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-83 Output I.F. Transformer
Part No. 108-82 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

(a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 78 tube, and adjust the output I.F. transformer (No. 108-83) to resonance.

(b) Move oscillator output clip from grid of 78 grid cap of 6A7 and adjust input I.F. transformer (No. 108-82) to resonance.

(c) With oscillator still connected to 6A7, readjust output I.F. transformer (108-83) if necessary.

R.F. ALIGNMENT: (535-1720 K.C.)

1. Unsolder the antenna wire from its terminal on the antenna coil and with gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 50 mmf. condenser to the antenna terminal on the antenna coil and chassis ground and make the following adjustments:

(a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer (rear of gang condenser).

(b) Re-set external oscillator to 1550 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser).

(c) Check sensitivity at 600 and 1000 kilocycles.

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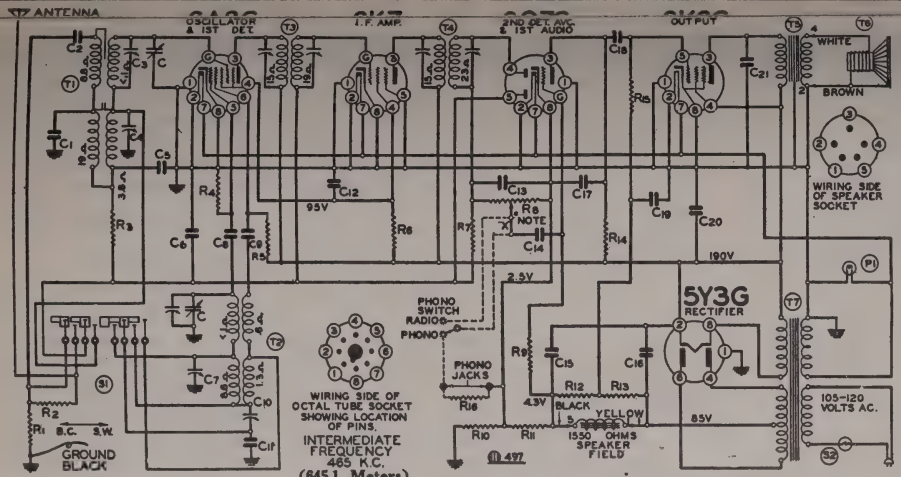

All voltages are to be measured with 115 volts on the primary of the power transformer.

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

POWER SUPPLY

Receivers of this model which are to be used on voltages or frequencies other than 110-130-230 volts, 40-60 cycles are so marked. (Standard chassis is equipped with regular 105-115 volt 50/60 cycle Power Transformer). The power consumption of this receiver is 55 watts. (See taps on top of power transformer.)

110 Tap: For line voltages of 100 to 125 volts.
130 Tap: For line voltages of 125 to 145 volts.
230 Tap: For line voltages of 210 to 250 volts.

To remove the chassis from the cabinet, remove the four bolts which are used to fasten the chassis to the cabinet bottom; remove the special locking screw in the center of the tuning knob on the side of the cabinet; pull the knobs off their shafts and pull off the six button lever keys on front of dial.

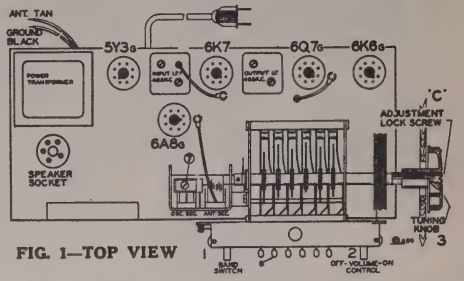

FIG. 1—TOP VIEW

FREQUENCY RANGE 535 to 1720 K.C. (Kilocycles) 5.45 to 18.3 M.C. (Megacycles)

2-Band A. C. Superheterodyne Receiver

CHASSIS MODEL 583 SERIES "A"

(Serial No. 8A977900 and up)

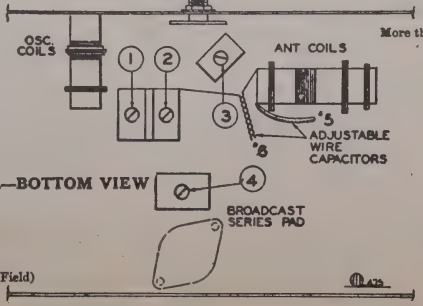

FIG. 3—BOTTOM VIEW

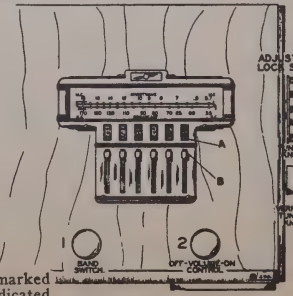

FIG. 2—FRONT VIEW

Mica condensers are coded with an additional dot indicating tolerance:

Tolerance Percent	Color of Dot
2½ %	White
5 %	Green
10 %	Blue
15 %	Yellow
20 %	Red
More than 20 %	None.

FOR OTHER DATA SEE INDEX

Code No.	Part No.	Description	Code No.	Part No.	Description
		RESISTORS	C8	129-39	.00005 mica 20%
R1	130-36	10M ohm - 1/3 w. 20%	C9	100-25	.002 x 600 v. 25%
R2	130-41	800 ohm - 1/3 w. 20%	C10	124-36	350 mmf. w. capacity - Series pad
R3	130-20	100M ohm - 1/3 w. 20%	C11	129-93	.00348 - 2-1/2% Comp. Type
R4	130-12	50M ohm - 1/3 w. 20%	C12	100-24	.25 x 400 v. 25%
R5	130-36	10M ohm - 1/3 w. 20%	C13	129-5	.0001 Mica 20%
R6	130-42	20M ohm - 1/2 w. 20%	C14	100-11	.01 x 400 v. 25%
R7	130-4	3 megohm - 1/3 w. 20%	C15	119-48	8.0 mfd. 350 w.v. lytic
R8	101-100	1 megohm volume control	C16	119-48	4.0 mfd. 350 w.v. lytic
R9	130-4	3 megohm - 1/3 w. 20%	C17	129-2	.0005 mica 20%
R10	130-204	55 ohm - 1/3 w. 10%	C18	100-16	.01 x 400 v. 10%
R11	130-203	40 ohm - 1/3 w. 10%	C19	100-4	.1 x 200 v. 10%
R12	130-205	100M ohm - 1/3 w. 10%	C20	100-13	.05 x 400 v. 25%
R13	130-46	800M ohm - 1/3 w. 10%	C21	100-19	.006 x 600 v. 25%
R14	130-9	200M ohm - 1/3 w. 20%			C4 and C7 in same unit
R15	130-102	500M ohm - 1/3 w. 10%			C15 and C16 in same unit
R16	130-57	35M ohm - 1/3 w. 20% (For Phono Connection)			**PARTS**
		CONDENSERS	T1	111-93	Antenna coil complete
C	102-68	2 gang variable condenser	T2	110-74	Oscillator coil complete
C1	129-49	.00009 mica 5%	T3	108-111B	Input I.F. Complete 465 kc.
C2	129-87	.000105 mica 10%	T4	108-112B	Output I.F. Complete 465 kc.
C3	124-39C	2-25 mmf. Adj. Cond.	T5	105-57	Output Transformer
C4	124-30B	2-20 mmf. Adj. Cond.	T6	114-110	6" Dynamic Speaker (1550 Ohm Field)
C5	100-37	.003 x 600 v. 10%	T7	104-124	Power Transformer
C6	100-22	.05 x 200 v. 25%		104-127	Power Transformer - Universal
C7	124-30B	2-20 mmf. Adj. Cond.	S1	125-46	Band Switch
			S2		Off-on switch on volume control
			P1	107-94	Pilot Light

*NOTE:—When phono connections are made, wire marked "X" should be cut and phono connections made as indicated by dotted lines. Resistor R16 and phono jacks should be added.

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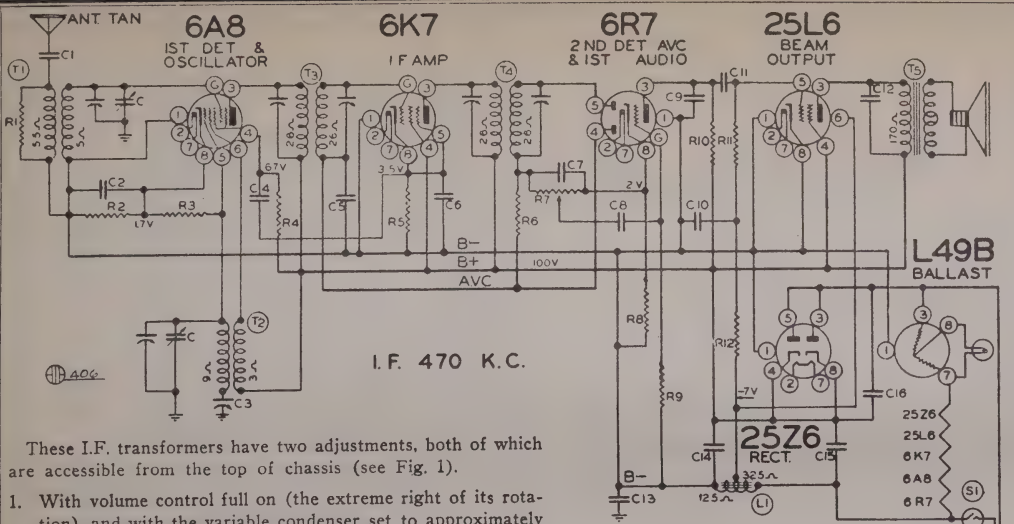


These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

   (a) Connect external oscillator set at 470 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6K7G tube, and adjust the output I.F. transformer (No. 108-83B) to resonance.

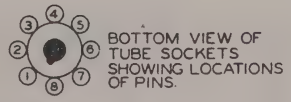
   (b) Move oscillator output clip from grid of 6K7G to grid of 6A8G and adjust input I.F. transformer (No. 108-82B) to resonance.

   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-83B) if necessary.

R.F. ALIGNMENT: (535-1720 K.C.)

1. Unsolder the antenna wire from its terminal on the antenna coil and with gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 50 mmf. condenser to the antenna terminal on the antenna coil and chassis ground and make the following adjustments:

   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser.



No.	Part No.	Description	
		CONDENSERS	
C	102-55	2 Gang Variable Condenser	
C1	100-25	.002 x 600	25%
C2	100-9	.05 x 200	25%
C3	129-75	.0003386 Compression Type Condenser 1%	
C4	100-22	.05 x 200	25%
C5	100-22	.05 x 200	25%
C6	100-20	.1 x 200	25%
C7	129-21	.0002 Mica	20%
C8	100-11	.01 x 400	25%
C9	129-2	.0005 Mica	20%
C10	100-75	.22 x 200	10%
C11	100-10	.05 x 200	10%
C12	100-67	.025 x 400	25%
C13	100-53	.25 x 400	20%
C14	119-42	5. mfd. lytic 100 w. v.	
C15	119-42	20. mfd. lytic 100 w. v.	
C16	100-39	.1 x 400	20%
		RESISTORS	
R1	130-17	10M ohm — 1/3 w.	20%
R2	130-97	200 ohm — 1/3 w.	10%
R3	130-12	50M ohm — 1/3 w.	20%
R4	130-149	15M ohm — 1/3 w.	20%
R5	130-54	500 ohm — 1/3 w.	20%
R6	130-4	3 megohm — 1/3 w.	20%
R7	101-77	Volume Control (1 meg)	
R8	130-193	3M ohm — 1/3 w.	10%
R9	130-19	1 megohm — 1/3 w.	20%
R10	130-94	50M ohm — 1/3 w.	10%
R11	130-103	100M ohm — 1/3 w.	10%
R12	130-194	35M ohm — 1/3 w.	10%
		PARTS	
T1	111-79	Antenna Coil Complete	
T2	110-62	Oscillator Coil Complete	
T3	108-82B	Input I. F. Complete	
T4	108-83B	Output I. F. Complete	
T5	114-88	5" Dynamic Speaker	
L1		Speaker field 450 ohm— total tapped 125 ohm	
S1		Switch on volume control	

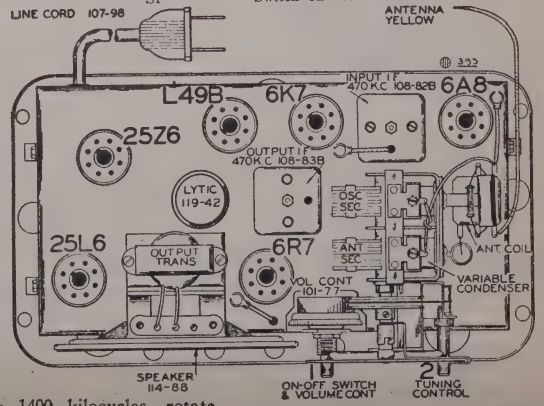
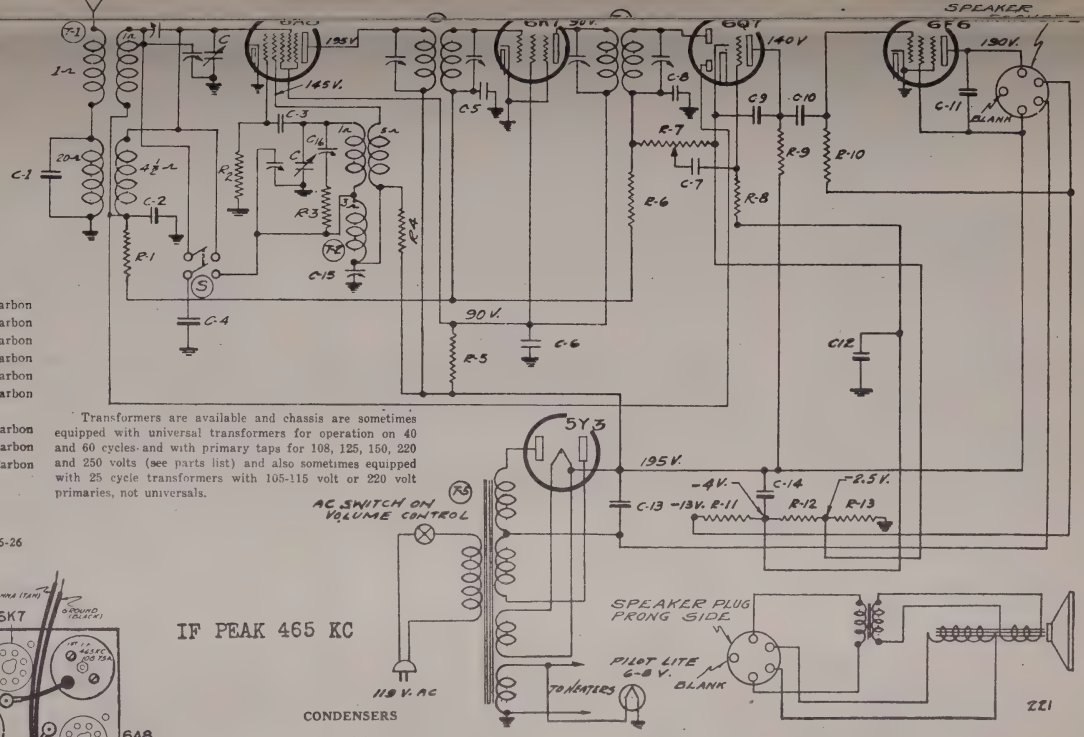


FIG. 1—TOP VIEW

   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).

INDICATED VOLTAGES ARE MEASURED TO CHASSIS WITH 118 VOLT LINE, SET NOT TUNED TO STRONG SIGNAL



Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see parts list) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

RESISTORS

No.	Part No.		Description
R1	130-111	100M	Ohms 1/10W—20%—50V Carbon
R2	130-12	50M	Ohms 1/3 W—20%—20V Carbon
R3	130-112	100	Ohms 1/10W—20%—10V Carbon
R4	130-22	5M	Ohms 1/3 W—20%—10V Carbon
R5	130-77	10M	Ohms 1 W—20%—100V Carbon
R6	130-110	1 meg	Ohm 1/10W—10%—100V Carbon
R7	101-49	1 meg	Ohm Volume Control
R8	130-113	2 meg	Ohm 1/10W—20%—100V Carbon
R9	130-20	100M	Ohms 1/3W—20%— 50V Carbon
R10	130-100	150M	Ohms 1/3W—20%— 50V Carbon
R11	106-26	220	Ohms
R12	106-26	33	Ohms
R13	106-26	52	Ohms

NOTE: R11, R12, and R13 in one unit—106-26

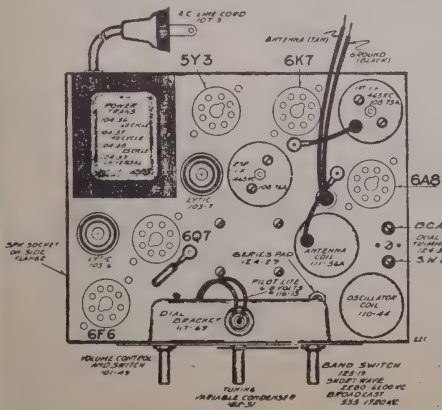


FIG. 1—TOP VIEW

IF PEAK 465 KC

CONDENSERS

C1	129-63	.0004	Mica—W—10%
C2	100-26	.02	x 400 Volt—25%
C3	129-62	.00003	Mica—0—10%
C4	129-61	.0017	Mica—W—2½%
C5	100-9	.05	x 200 Volt—25%
C6	100-6	.25	x 200 Volt—25%
C7	100-11	.01	x 400 Volt—25%
C8	129-12	.00025	Mica—0—20%
C9	129-12	.00025	Mica—0—20%
C10	100-11	.01	x 400 Volt—25%
C11	100-19	.006	x 600 Volt—25%
C12	100-6	.25	x 200 Volt—25%
C13	103-6	8 mfd.	x 350 Volt Electrolytic
C14	103-7	8 mfd.	x 300 Volt Electrolytic
C15	124-29	Adjustable condenser 390 mmf. working capacity	
C16	124-30	Adjustable Dual Condenser	

MISCELLANEOUS PARTS

T1	111-56A	Antenna Coil
T2	110-44	Oscillator Coil
T3	108-75A	Input I.F. 465 Kc.
T4	108-76A	Output I.F. 465 Kc.
T5	104-56	Power Transformer—60 Cycles
S	125-19	Band Switch
C	102-31	One Section of Two Gang Condenser

1—Type 6A8 Pentagrid Mixer, First Detector-oscillator

1—Type 6K7 Remote Cut-Off Pentode, I. F. Amplifier (465 K.C.)

1—Type 6Q7-G Duplex Diode Triode Second Detector, A.V.C. and First Audio.

1—Type 6F6-G Pentode Output Amplifier.

1—Type 5Y3 High Vacuum Rectifier.

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MODEL 62-587 ALIGNMENT

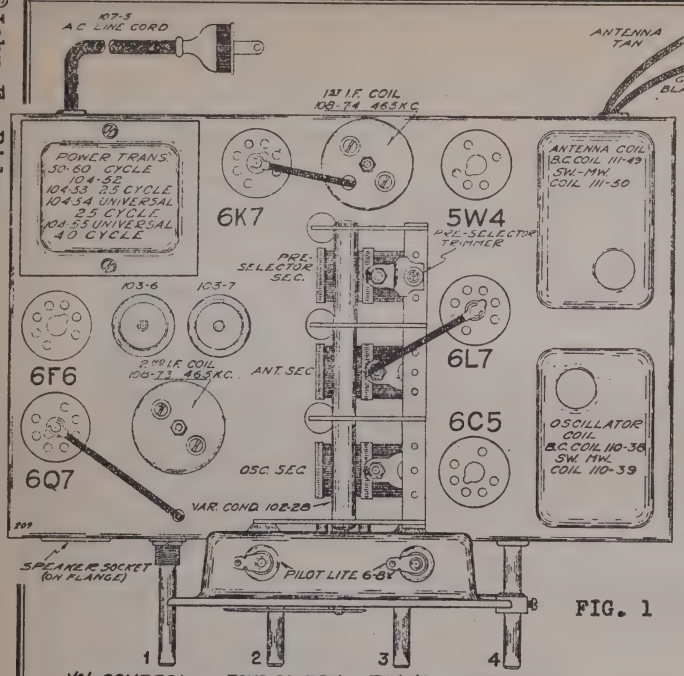
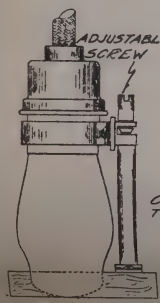


FIG. 1



SWITCH ROTATING CLOCKWISE THREE POSITION ARE:
1ST BROADCAST:-535-1720 K.C.
2ND MIDDLE WAVE:-1695-5500 K.C.
3RD SHORT WAVE:-5.2 M.C.-18.3 M.C.

MODEL 62-249
62-317

RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 6F6-G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator..

ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-76A Output I.F. Transformer.
Part No. 108-75A Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-76A) to resonance.

   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6A8 and adjust input I.F. transformer (No. 108-75A) to resonance.

   (c) With oscillator still connected to 6A8, readjust output I.F. transformer (108-76A) if necessary.

BROADCAST AND SHORT WAVE BAND ALIGNMENT

Broadcast Band:—535 to 1720 Kilocycles.
Short Wave Band:—2280 to 6600 Kilocycles.

Important:—These adjustments must be made in the following order:

SHORT WAVE OSCILLATOR ADJUSTMENT:

1. With band switch in the short wave band position, extreme right of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with the external oscillator connected in series with "Dummy 1" to grid cap of the 6A8 tube, make the following adjustment:

   (a) Set external oscillator to 6.6 megacycles and adjust short wave oscillator trimmer to resonance. This adjustment is marked "S.W Osc." (see top view of chassis, Fig. 1, for location of this adjustment).

NOTE: Make certain that the fundamental 6.6 megacycles signal has been tuned in and not the image frequency, noting that the image appears when the tuning knob is moved to approximately 5.7 megacycles.

BROADCAST BAND OSCILLATOR ADJUSTMENT:

1. With band switch in the broadcast position, extreme left of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 1" to grid cap of the 6A8 tube, make the following adjustment:

   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. This adjustment is the trimmer mounted on the front section of the variable gang condenser.

BROADCAST BAND ANTENNA ADJUSTMENT:

1. With the band switch still in the broadcast position, move the external oscillator from the grid cap of the 6A8 tube to the tan antenna lead and black ground lead, in series with "Dummy 2" and make the following adjustments:

   (a) Set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer to resonance. This adjustment is marked "B.C. Ant." (See top view of chassis, Fig. 1, for location of this adjustment.)

   (b) Re-set external oscillator to 600 K.C. and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until, by adjusting series pad, maximum output is attained. This adjustment is located on the top of the chassis directly in front of the antenna coil. (See top view of chassis, Fig. 1).

   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

SHORT WAVE BAND ANTENNA ADJUSTMENT:

1. With the band switch in the short wave position, and with external oscillator connected in series with "Dummy 3," to the tan antenna lead and black ground lead, make following adjustment:

   (a) Set external oscillator to 6 megacycles and adjust the short-wave antenna trimmer to resonance. This adjustment is the trimmer mounted on the rear section of the variable gang condenser.

MODELS 62-752, 62-753

MONTGOMERY-WARD & CO.

Power Consumption - 1.45 Amperes at 32 Volts DC | **Intermediate Frequency - - - - - - - - 456 KC**

Power Output - - - - - - - .17 Watts Undistorted, .40 Watts Maximum | **Speaker - - - - - 6" or 8" Electro-Dynamic**

Selectivity - - 30 KC Broad at 1000 times Signal | **Tuning Frequency Range**

Sensitivity (For .05 watt output:)

B Range	6.0 Microvolts Average	B Range	528 to 1730 KC (Kilocycles)
D Range	6.0 Microvolts Average	D Range	5750 to 18300 KC (Kilocycles)

Fig. 2—Location of Trimmers

32 Volt Power Supply

and in those places where the power supply consists of a 32 volt direct current generating plant.

Polarity of Power Supply

There is a red mark on the plug at the end of the power supply cord of the radio. The prong of the plug at which the red mark is placed must be plugged into the positive side of the line.

Caution

If used on any other type of power supply than 32 volt DC, severe damage may be done to the receiver.

Do not turn the radio on unless all of the tubes and the dial lamps are in the proper sockets. Use only No. 51 dial lamps.

The radio will operate satisfactorily within a line voltage range of 25 to 42 volts. If the line voltage is higher than 42, it will be necessary to use a series resistor to cut it down. If the voltage varies, a variable resistor may be required.

Starting Current

When first turned on for a few seconds the drain is slightly higher than normal until the tubes heat up. Some automatic plants are adjusted to start under a load of 200 to 300 watts. If a number of devices such as lights or motors are being used and the radio set is turned on the total drain may be sufficient to start the plant.

Fig. 3—Schematic Circuit Diagram

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MODELS 62-752, 62-753

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I. F.					1st I.F. (C17) & (C18) 2nd I.F. (C20) & (C21) 3rd I.F. (C26)
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	
RANGE B					
1730 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C12)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	1st Ant. Range B (C2) 2nd Ant. Range B (C1)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C11) Rock Rotor—See Note B
RANGE D					
18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
15,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C3) Rock Rotor—See Note B
6000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	6000 KC (C9) Rock Rotor—See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTE A—If the pointer is not at 1500 KC on the dial, hold the drive cord and move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

Dial Pointer Attachment—

Tune in a station of known frequency. Move the pointer to the approximate frequency on the dial scale. Pass the cord through the slotted head—See Fig. 4. Hold the drive cord and slide the pointer to the exact frequency on the dial scale.

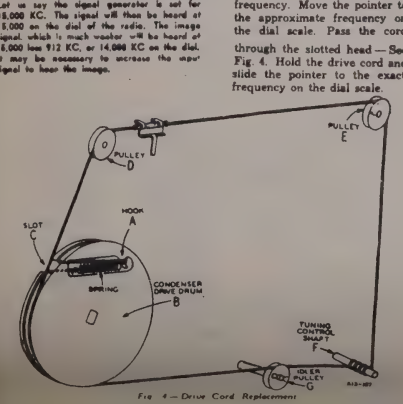


Fig. 4—Drive Cord Replacement

Drive Cord Replacement

Tie a knot with a small loop at one end of the new drive cord. Tie the free end of the drive cord to the tension spring. The distance between knots should be 49¾ inches.

Arrange to keep the gang condenser in the completely closed position.

Place the looped end of the drive cord over hook A on condenser drive drum B (See Fig. 4). Pass the cord through slot C in the drum rim and wind one turn in a clockwise direction (from front of chassis) on condenser drive drum. Pass drive cord over pulleys D and E as shown. Continue cord down to shaft F and wind 4 turns clockwise, progressing towards the chassis. Bring cord over pulley G to bottom of condenser drive drum B as shown. Wind drive cord clockwise (from front of chassis) around condenser drive drum B to slot C. See that the drive cord does not cross in groove of condenser drive drum. Pass the remaining drive cord and tension spring through slot C and secure the free end of the spring on hook A.

MODELS 93WG-1102, 93WG-1110

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments

Selectivity Control—Sharp Position All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BUTTON DEPRESSED	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified)
I. F.					
456 KC	Grid of I.F. Tube	.1 mf.	B Range	Turn Rotor to Full Open	2nd I.F. (C29) & (C30)
456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C25) & (C26)
RANGE B					
1830 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C15)
1500 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Ant. Range B (C5) Int. Range B (C8)
600 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C16) Rock Rotor—See Note B
WAVE TRAP					
456 KC	Antenna Lead	200 mmf.	B Range	Turn Rotor to 600 KC Adjust Sig. Gen.—See Note C	Wave Trap (C1) Adjust for MINIMUM Output
RANGE C					
6350 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C14)
6000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C4) Int. Range C (C7)
RANGE D					
22,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C13)
20,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C3) Int. Range D (C6) Rock Rotor—See Note B
7000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	7000 KC (C12) Rock Rotor—See Note B
PERMEABILITY TUNING UNIT				TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book	ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note D
700 KC	Antenna Lead	200 mmf.	No. 1	Setting Screw No. 1	Antenna Coil No. 1
700 KC	Antenna Lead	200 mmf.	No. 2	Setting Screw No. 2	Antenna Coil No. 2
850 KC	Antenna Lead	200 mmf.	No. 3	Setting Screw No. 3	Antenna Coil No. 3
850 KC	Antenna Lead	200 mmf.	No. 4	Setting Screw No. 4	Antenna Coil No. 4
1100 KC	Antenna Lead	200 mmf.	No. 5	Setting Screw No. 5	Antenna Coil No. 5
1100 KC	Antenna Lead	200 mmf.	No. 6	Setting Screw No. 6	Antenna Coil No. 6

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

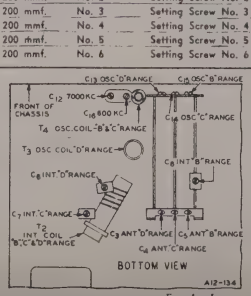
After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Leave condenser rotor at the 600 KC setting and adjust the signal generator until maximum output is obtained at or near 456 KC.

NOTE D—At the bottom of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.



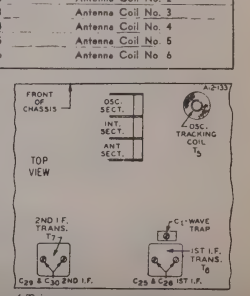
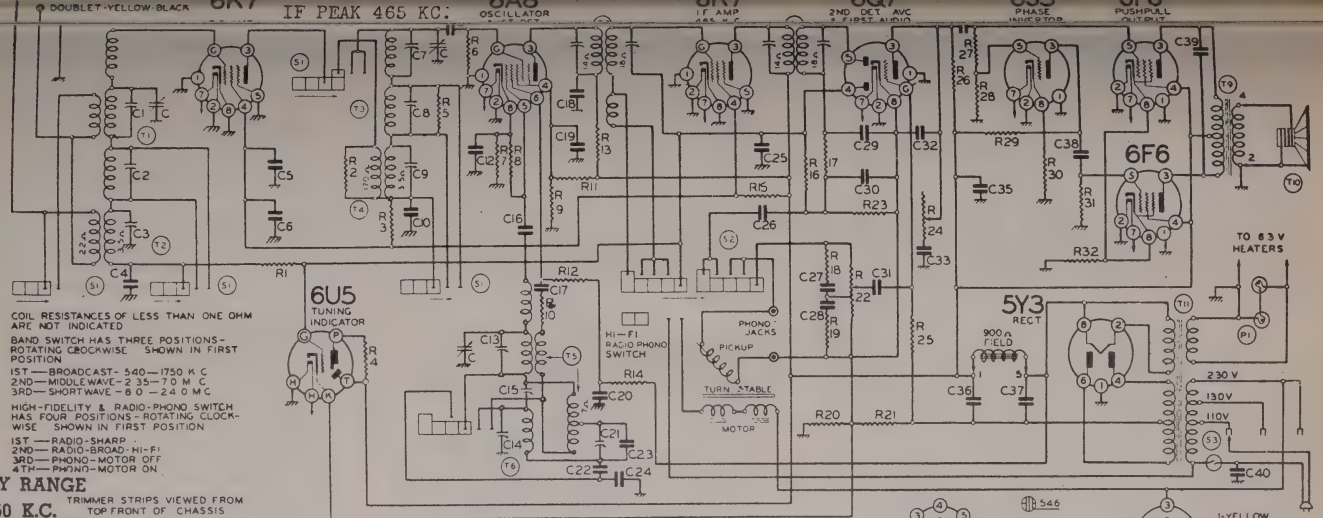


Fig. 1—Location of Trimmers

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.



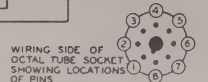
FREQUENCY RANGE

540 to 1750 K.C.
2.35 to 7.0 M.C.
8.0 to 24.0 M.C.

TRIMMER STRIPS VIEWED FROM TOP FRONT OF CHASSIS

For conventional types of antennas connect the tan wire to the antenna lead and the yellow with black tracer and the black wire together to the ground lead.

When a doublet antenna is used connect the tan wire and the yellow with black tracer wire to the doublet antenna and the solid black wire to the ground lead. (See Fig. 1).



Part No.	Circuit Diagram Reference	Description	
		CONDENSERS	
10013	C18	.05x400 Volt Tubular Condenser	1
10019	C33	.006x600 Volt Tubular Condenser	1
10020	C12, C19	.1x200 Volt Tubular Condenser	2
10025	C17, C39	.002x600 Volt Tubular Condenser	2
10026	C25, C31, C34, C38	.02x400 Volt Tubular Condenser	4
10061	C40	.02x600 Volt (Bakelite Case Type)	1
10074	C5, C35	.1x400 Volt Tubular Condenser (with Bracket)	2
10076	C26	.02x400 Volt Tubular Condenser (with Bracket)	1
10078	C28	.01x200 Volt Tubular Condenser	1
10090	C4, C10	.02x400 Volt Condenser (Braided Leads)	2
11955	C36, C37	Dual 15 Mfd Electrolytic Condenser, 450 w. v.	1
11956	C6, C20	Dual 15 Mfd Electrolytic Condenser, 350 w. v.	1
12449	C1, C2, C3	Adjustable Trimmer Strip (3 Gang)	1
12450	C7, C8, C9, C13 C14, C15, C21	Adjustable Trimmer Strip (7 Gang)	1
1295	C29, C32	.0001 Mica Type Condenser—20%	2
12912	C11	.00025 Mica Type Condenser—20%	1
12939	C30	.00005 Mica Type Condenser—20%	1
12962	C16	.00003 Mica Type Condenser—10%	1
129103	C22	.005 Mica Type Condenser—2½%	1
129104	C23	.0004 Mica Type Condenser—5%	1
129105	C24	.0035 Compression Type Condenser—2½%	1
129106	C27	.000155 Mica Type Condenser—20%	1
		RESISTORS	
1304	R16, R25	3 Meg Ohm—½ Watt Resistor—20%	2
13011	R26	250 M Ohm—½ Watt Resistor—20%	1
13021	R19	20 M Ohm—½ Watt Resistor—20%	1
13043	R13	2500 Ohm—½ Watt Resistor—20%	1
13045	R1	250 M Ohm—½ Watt Resistor—20%	1
13048	R12, R14	15 M Ohm—½ Watt Resistor—10%	2
13079	R7	400 Ohm—½ Watt Resistor—10%	1
13094	R8, R9, R18, R29	50 M Ohm—½ Watt Resistor 10%	4
130102	R31	500 M Ohm—½ Watt Resistor—10%	1
130103	R28	100 M Ohm—½ Watt Resistor—10%	1
130117	R17	50 M Ohm—1/10 Watt Resistor—20%	1
130163	R27	400 M Ohm—½ Watt Resistor—10%	1
130171	R6, R23	500 M Ohm—1/10 Watt Resistor—20%	2
130174	R10	50 Ohm—½ Watt Resistor—10%	1
130197	R21	20 Ohm—½ Watt Resistor—10%	1
130201	R5	25 M Ohm—1/10 Watt Resistor—20%	1
130203	R20	40 Ohm—½ Watt Resistor—10%	1
130216	R2	10 M Ohm—1/10 Watt Resistor—10%	1
130217	R3	2 M Ohm—1/10 Watt Resistor—10%	1
130218	R30	5 M Ohm—½ Watt Resistor—10%	1
130219	R15	20 M Ohm—1 Watt Resistor—10%	1
130220	R32	300 Ohm—1 Watt Resistor—10%	1
130221	R11	25 M Ohm—1 Watt Resistor—10%	1
		COILS	
108118	T7	Input I. F. Coil Assembly Complete with Can	1
108119	T8	Output I. F. Coil Assembly Complete with Can	1
10941	T4	Broadcast R. F. Coil Assembly, Complete	1
10942	T3	Short Wave and Middle Wave R. F. Coil Assembly, Complete	1
11078	T6	Middle Wave Oscillator Coil Assembly, Complete	1
11079	T5	Broadcast and Short Wave Oscillator Coil Assembly, Complete	1
11197	T2	Broadcast Antenna Coil Assembly Complete	1
11198	T1	Short Wave and Middle Wave Antenna Coil Assembly, Complete	1
104136	T11	Universal Transformer—40/60 Cycle Primary	1
104		Universal Transformer—25/60 Cycle Primary Note: Universal 25/60 Cycle Transformer available on special order only.	
10554	T9	Output Transformer for Speaker	1
		SPEAKERS	
114102		Eight Inch Dynamic Speaker with 15 Inch Connector Cord and Plug (Field Resis. 900 Ohms)	1
11499	T10.	Ten Inch Dynamic Speaker with 20 Inch Connector Cord and Plug (Field Resis. 900 Ohms)	1
10554	T9	Output Transformer for Speaker	1
		MISCELLANEOUS	
101114	R22	Volume Control Complete (1 Meg Ohms)	1
101115	R24, S3	Tone Control and Power Switch (300 M Ohms)	1
10272	C	Three Gang Variable Condenser	1
12551	S2	High Fidelity and Phono-Radio Switch	1
12552	S1	Band Change Switch	1

PHONOGRAPH MOTOR:

On the underside of the chassis a terminal strip is provided for 220 volt phonograph motor connections.

Connect the supply cord from the phonograph motor to the terminal strip through the hole on top of the chassis provided for this purpose. (See Fig. 1).

Connections to the terminal strip are controlled by the radio-phono switch, knob no. 3 located on the front of the radio.

Only a 220 volt motor can be operated from the terminal strip connections.

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DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

ALIGNING I.F. TRANSFORMERS (465 K.C.)

Part No. 108119 Output I.F. Transformer

Part No. 108118 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 3).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), the tone control turned to treble position, the phono switch in number 1 position sharp, (counter clockwise), and with the variable condenser set to minimum capacity (plates entirely out of mesh), make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 I.F. tube and adjust the output I.F. transformer 108119 to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6A8 and adjust input I.F. transformer (108118) to resonance.

SHORT WAVE BAND ALIGNMENT:

8.0 to 24.0 Megacycles

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 22 Megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments: (See Fig. 3).
   (a) Move dial pointer to 22 Megacycles and adjust short wave oscillator (adjustment C13), short wave R.F. (adjustment C7) and short wave antenna (adjustment C1) to resonance.
   (b) Re-set external oscillator to 9 Megacycles and pick up signal by rotating variable condenser and check for sensitivity.

   NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. As an example of this a fundamental 22 megacycle signal can be tuned in not only at 22 on the dial, but also at approximately 21 megacycles.

MIDDLE WAVE ALIGNMENT:

2.35 to 7.0 Megacycles

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 6 Megacycles connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments. (See Fig. 3).
   (a) Rotate condenser, pick up signal and adjust middle wave oscillator (adjustment C14), middle wave R.F. (adjustment C8) middle wave antenna (adjustment C2) to resonance.
   (b) Re-set external oscillator to 2.5 megacycles and pick up signal by rotating variable condenser and check sensitivity.

BROADCAST BAND ALIGNMENT:

540 to 1750 Kilocycles

1. With band changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 1750 Kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments. (See Fig. 3).
   (a) Move dial pointer to 1750 Kilocycles and adjust broadcast oscillator trimmer (adjustment C15) to resonance.
   (b) Re-set external oscillator to 1400 Kilocycles, move dial pointer to 1400 Kilocycles and adjust broadcast antenna trimmer, (adjustment C3) and broadcast R.F. trimmer (adjustment C9) to resonance.
   (c) With external oscillator set at 600 K.C. adjust broadcast series pad (adjustment C21) to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained.
   (d) Repeat adjustments (a) and (c) until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 Kilocycles.

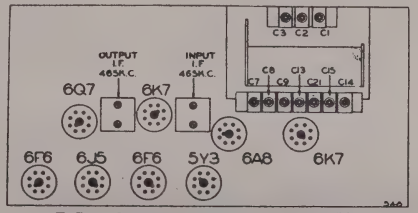


FIG. 3—VIEW SHOWING TRIMMERS

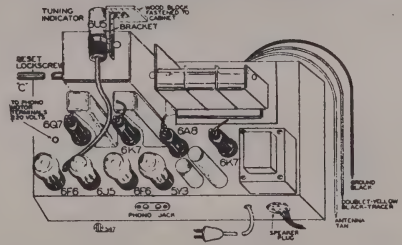


FIG. 1—TOP VIEW

PROCEDURE FOR SETTING THE AUTOMATIC TUNER LEVERS:

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob No. 5 the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position), noting the width of the shadow indicated on the screen of the cathode-ray tuning eye. Minimum width on the eye indicates the ideal tuning position (resonance). The station will then be clearest and accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Rotate the tuning knob No. 5 to the right (clockwise) as far as it will turn. Now remove from the right side of the cabinet the metal button, and, with a screw driver inserted through the hole, tighten the locking adjustment screw "C". It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT. If a screw driver is not available, the locking screw can be tightened by reaching in from the back of the cabinet, rotate the locking screw shaft to the right (clockwise) until thoroughly tight.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, loosen the locking screw "C" four or five complete turns; select the new station as explained. (Note: If the dial mechanism works hard when setting up a new station for one of the automatic tuner levers, it is due to the locking screw being too tight. Loosen the locking screw "C" until the dial mechanism works freely with the tuner lever pressed down.)

BE SURE TO RETIGHTEN THE LOCKING SCREW; otherwise the stations you have selected will not stay adjusted to the levers.

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a voltmeter having a resistance of 1000 ohms per volt.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

VOLTAGES AT SOCKETS

LINE VOLTAGE: 110 — Volume Control: Maximum
Readings taken with 1000 ohm-per-volt meter

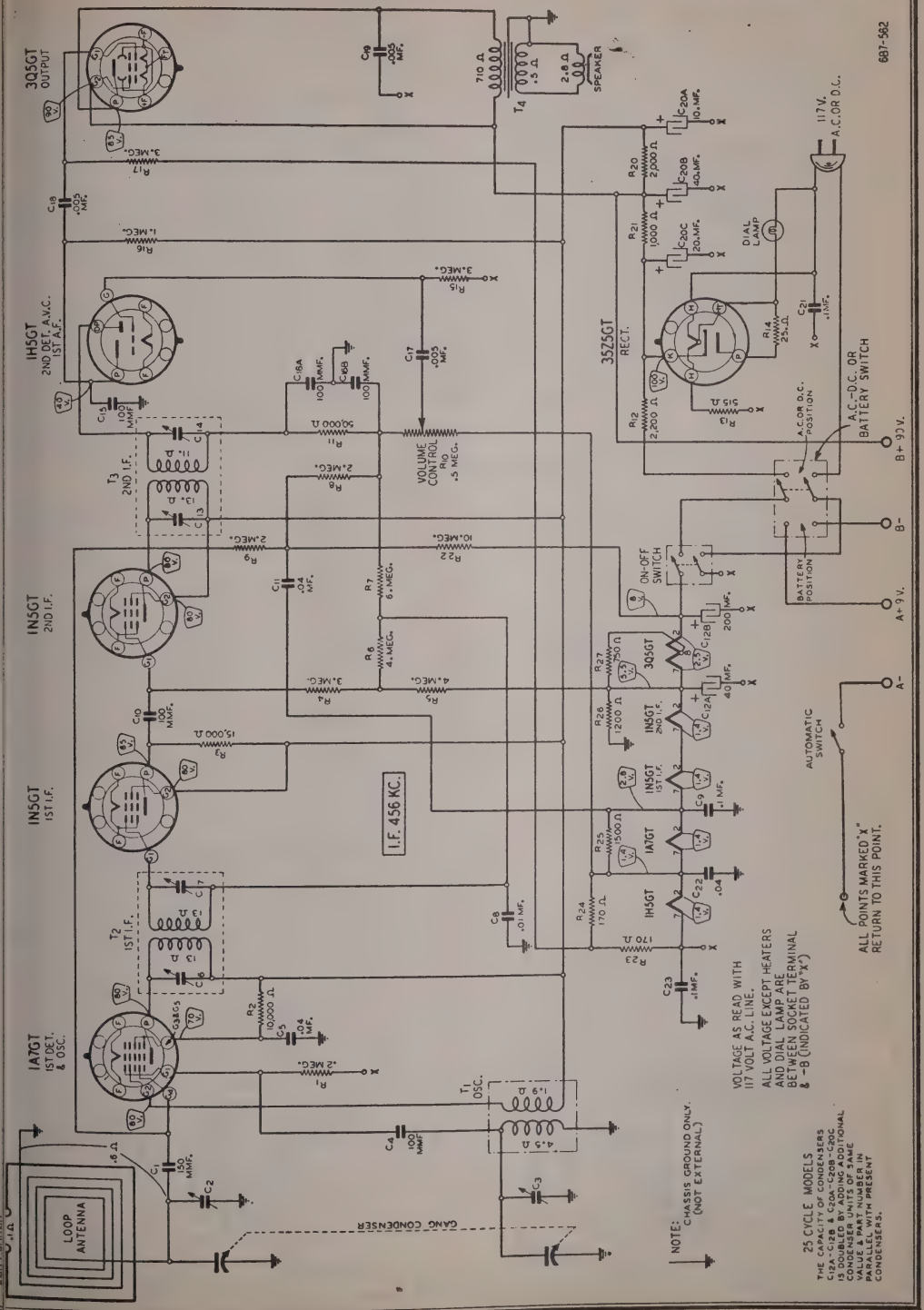
Antenna Shorted to Ground
Band Switch in B. C. Position

TUBE	FUNCTION	Voltage Between Socket Prong and Ground: Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	R. F. Amplifier	0	6.3 (1)	85	95	0	220	6.3 (1)	0 (2)
6A8	Oscillator and First Detector	0	6.3 (1)	220	95		140	6.3 (1)	4
6K7	465 kc. I. F. Amplifier	0	6.3 (1)	220	95	0	220	6.3 (1)	0 (2)
6Q7	2nd detector AVC and First Audio	0	6.3 (1)	90			0	6.3 (1)	(3)
6J5	Phase Inverter	0	6.3 (1)	135	220	0		6.3 (1)	6.5
6F6	Push pull Output	0	6.3 (1)	215	220	0		6.3 (1)	15
6F6	Push pull Output	0	6.3 (1)	215	220	0	215	6.3 (1)	15
5Y3	Rectifier	0	5 (4)		600 (5)		600 (5)		5 (4)
6U5	Tuning Indicator	Plate to Ground	15		Target to Ground 220		Cathode to Ground —3		Across Heaters 6.3 AC

(1) AC voltage as read across heater terminals 2 and 7
(2) Bias (—3.0 volts) as read across Resistor R20
(3) Bias (—1.5 volt) as read across Resistor R21
(4) AC voltage as read across heater terminals 2 and 8
(5) AC voltage as read across terminals 4 and 6

MONTGOMERY-WARD & CO.

MODELS 62-2663, 62-2668, 93WG-2663, 93WG-2668


3Q5GT OUTPUT
1H5GT 2ND DET. A.V.C. 1ST A.F.
1N5GT 2ND I.F.
1N5GT 1ST I.F.
1A7GT 1ST DET. & OSC.
3525GT RECT.
T1 OSC.
T2 1ST I.F.
T3 2ND I.F.
T4
LOOP ANTENNA
GANG CONDENSER
VOLUME CONTROL R10 .5 MEG.
I.F. 456 KC.
ON-OFF SWITCH
A.C.-D.C. OR BATTERY SWITCH
A.C.OR D.C. POSITION
BATTERY POSITION
AUTOMATIC SWITCH
DIAL LAMP
SPEAKER
117 V. A.C.OR D.C.
B+ 90 V.
A+ 9 V.
B-
A-
687-582
NOTE: CHASSIS GROUND ONLY. (NOT EXTERNAL)
VOLTAGE AS READ WITH 117 VOLT A.C. LINE. ALL VOLTAGE EXCEPT HEATERS AND DIAL LAMP ARE BETWEEN SOCKET TERMINAL & -B (INDICATED BY "X")
ALL POINTS MARKED "X" RETURN TO THIS POINT.
25 CYCLE MODELS
THE CAPACITY OF CONDENSERS C12A-C12B & C20A-C20B-C20C IS DOUBLED BY ADDING ADDITIONAL CONDENSER UNITS OF SAME VALUE. THESE MAY BE IN PARALLEL WITH PRESENT CONDENSERS.

MODELS 62-2663, 62-2668, 93WG-2663, 93WG-2668

MONTGOMERY-WARD & CO.

Input Voltages and Currents—Battery Operation
"A" Battery ..... 9 Volts—50 Ma.
"B" Battery ..... 90 Volts—11.5 Ma.
Power Consumption (At 117 volts AC Supply) 28 Watts
Power Output
Battery Operation - - - - 150 Mw. Undistorted, 350 Mw. Maximum
AC Operation - - - - - 200 Mw. Undistorted, 400 Mw. Maximum

Selectivity - 50 KC Broad at 1000 Times Signal
Intermediate Frequency - - - - - - 456 KC
Speaker - - - - - - - - - 6" P.M. Dynamic
Tuning Frequency Range - - 540 to 1600 KC
Sensitivity (For .05 Watt Output)
External Antenna - - - 10 Microvolts Average

Removing Chassis from Cabinet

Take out the 2 screws, one at each rear corner of the chassis shelf. On some models, it will be necessary to remove the nut holding the automatic "A" battery switch to the front panel of the radio. Grasp the chassis shelf at each rear corner and edge it away from the cabinet front until the chassis shelf and chassis slide easily out of the cabinet.

To remove the shelf from the chassis, take out the bolt and the 2 screws at the bottom of the shelf.

Caution

The metal chassis is connected to one side of the line through a .10 mfd. condenser. Both AC and DC power lines are generally grounded on one side. If the side of the line not connected to the metal chassis through this condenser is grounded and the metal chassis comes in contact with an external ground, this condenser will be connected across the line and there will be an increase in hum.

Therefore, in any service work on the chassis, keep it on a wood or other insulated surface to avoid contacts with ground. The person working on the set should avoid getting in contact with any ground.

CAUTION—If the dial lamp burns out, it should be replaced at once. Use ONLY a No. 51 dial lamp.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

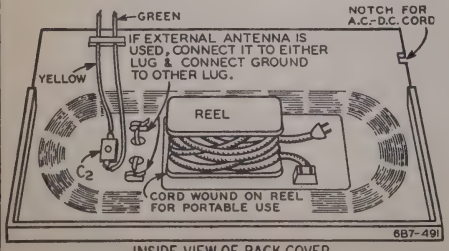
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

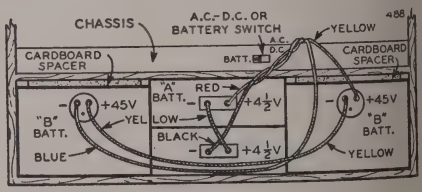
The following equipment is required for aligning:
A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antenna—.1 mf.

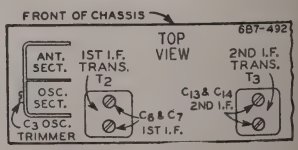
SIGNAL GENERATOR				ADJUST TRIMMERS TO MAXIMUM
FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	CONDENSER SETTING	(See Trimmer Illustration below and Illustration of Back—Page 1)
456 KC	Signal Grid of 1st Det. (Top Cap)	.1 mf.	Turn Rotor to full open	1st I.F. (C6) & (C7) 2nd I.F. (C13) & (C14)
1600 KC	Signal Grid of 1st Det.	.1 mf.	Turn Rotor to full open	Oscillator (C3)
1500 KC	None—See Note A		Turn Rotor to max. output	Antenna (C2)

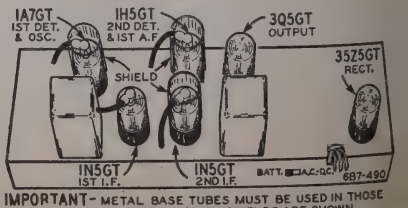
NOTE A—Chassis must be in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. The back of the cabinet must be in place. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

CALIBRATION (For models with pointer in front of dial scale)—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, hold the pulley at the back of the dial and loosen the pointer screw. Set the pointer at the 800 KC mark. Hold the pointer and retighten the pointer screw.


GREEN
NOTCH FOR A.C.-D.C. CORD
IF EXTERNAL ANTENNA IS USED, CONNECT IT TO EITHER LUG & CONNECT GROUND TO OTHER LUG.
YELLOW
REEL
C2
CORD WOUND ON REEL FOR PORTABLE USE
6B7-491
INSIDE VIEW OF BACK COVER







IMPORTANT—METAL BASE TUBES MUST BE USED IN THOSE SOCKETS AT WHICH SHIELDS ARE SHOWN.

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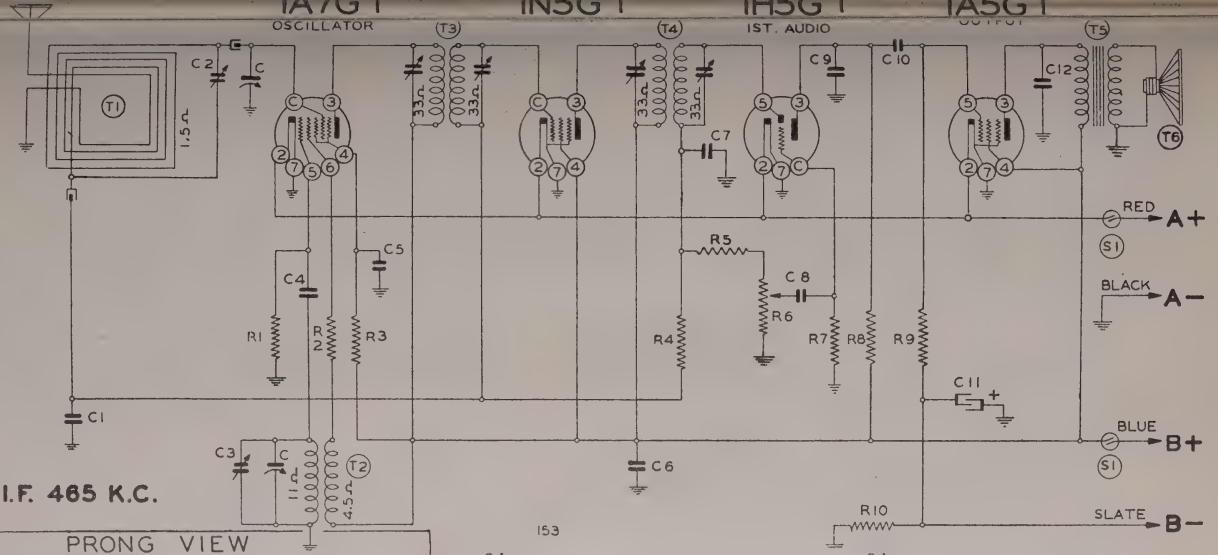

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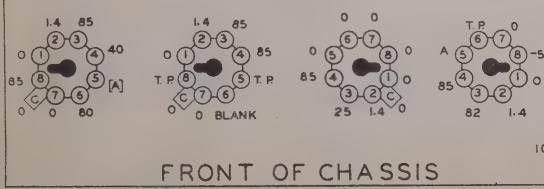
PRONG VIEW

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.

[A] CANNOT BE READ WITH VOLTMETER

T. P.—TIE POINT



Schematic Ref. No.	Part No.	Description
		RESISTORS
R1	BE1309	200M ohm - ⅓ w. - 20%
R2	BE13018	4M ohm - ⅓ w. - 20%
R3	BE13012	50M ohm - ⅓ w. - 20%
R4	BE1304	3 megohm - ⅓ w. - 20%
R5	BE13020	100M ohm - ⅓ w. - 20%
R6	BE101204	1 megohm - volume control
R7	BE130257	5. megohm - ⅓ w. 25%
R8	BE13037	750M ohm - ⅓ w. 20%
R9	BE13038	2 megohm - ⅓ w. - 20%
R10	BE13070	500 ohm - ⅓ w. - 10%
		CONDENSERS
C	BE102120	2 gang variable condenser
C1	BE1009	.05 x 200 v. - 25%
C2	BE124115	R. F. Trimmer on loop
C3		Oscillator Trimmer on Gang
C4	BE12921	.0002 mica - 20%
C5	BE1009	.05 x 200 v. - 25%
C6	BE1006	.25 x 200 v. - 20%
C7	BE1295	.0001 mica - 20%
C8	BE10012	.003 x 600 v. - 25%
C9	BE12912	.00025 mica - 20%
C10	BE10078	.01 x 200 v. - 25%
C11	BE11975	10 mfd. x 25 w. v. lytic
C12	BE10012	.003 x 600 v. - 25%
		PARTS
T1	BE111159	Loop Antenna Complete
T2	BE110139	Oscillator Coil
T3	BE108167	Input I. F. Coil
T4	BE108168	Output I. F. Coil
T5	BE105100	Output Transformer
T6	BE114183	4" P. M. Speaker
S1	BE12597	On-Off Switch No. 153

Power Consumption - - - "A" Battery 200 MA; "B" Battery 8 MA.

Power Output - - - - - - - - - - - 100 Milliwatts, Undistorted

Sensitivity (for .05 Watts) - - - - - - - - 75 Microvolts Average

Selectivity - - - 50 Kc. Broad at 1000 Times Signal at 1000 Kc.

Tuning Range - - - - - - - - - - - 540 to 1650 Kc.

Intermediate Frequency - - - - - - - - - - 465 Kc.

Speaker - - - - - - - - - - - 4 in. P. M. Dynamic

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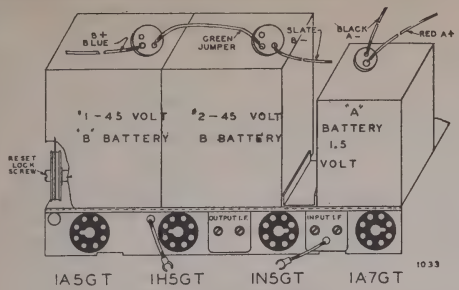


FIG. 1.—TOP VIEW

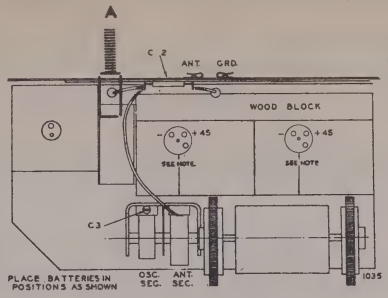


FIG. 2.—REAR VIEW

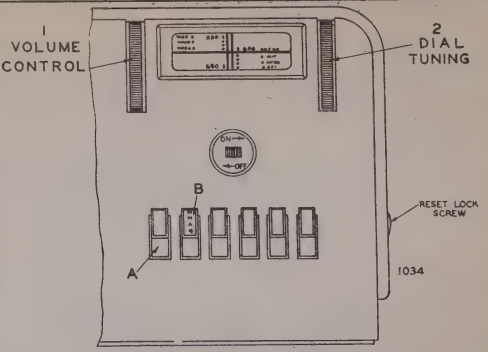


FIG. 3—FRONT VIEW

ADJUSTING THE ANTENNA:

IMPORTANT:

After the batteries have been installed and the radio placed in operation, tune in a weak station around 1400 Kc. on the dial.

On the back of the cabinet a small adjustment screw is provided, (see C2, Fig. 2).

Very carefully turn this adjustment screw in or out until the station is as clear and loud as it can be made.

This adjustment should be made in any case whether the radio is used with an outside antenna and ground or whether only the built-in loop antenna is used.

NEXT:—Tune in a station around 600 Kc. on the dial and adjust adjustment screw (See A, Fig. 2). Both these adjustments are very important for best reception.

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up' for several minutes.

The following equipment is required for alignnig.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 1N5GT I. F. Tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	(See Note "A") Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 1A7GT	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	(See Note "A") Adjust to maximum output
BROAD CAST BAND	1650 Kc.	.1 MFD.	Grid of 1A7GT	Rotor full open (Plates out of mesh)	Trimmer—(C3) on Gang (See Fig. 2)	Oscillator	(See Note "A") Adjust to maximum output
	1400 Kc.	200 mmf.	Ant. and Gnd. Clips	Set dial at 1400 Kc.	Trimmer—(C2) on back of radio (See Fig. 2)	Antenna	(See Note "B") Adjust to maximum output

NOTE "A" — A 1 megohm resistor must be connected between the two loop antenna leads from the chassis when aligning the I. F. transformers and setting the oscillator trimmer. The loop antenna must be disconnected from the chassis.

NOTE "B" — Remove the 1 megohm resistor from the loop antenna leads; mount the chassis and the loop antenna in the cabinet, connect the loop antenna to the chassis. Adjust the antenna trimmer (C2) on back of radio.

MODEL 93BR-462A

MONTGOMERY-WARD & CO.

Procedure for Setting the Automatic Tuner Push Buttons

There are six push buttons on the front of the radio by means of which six stations may be selected, (see "A" Fig. 3).

1. Make a list of local stations you tune in regularly; any number up to and including six.

2. Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

3. On the front of each automatic tuner button an opening is provided for inserting the call letter tabs. (See "B" Fig. 3).

4. Insert the call letter tabs in the rectangular openings in each of the automatic tuner push buttons. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

5. Press in ALL THE WAY any one of the automatic tuner push buttons. Holding it in FIRMLY, tune in by means of the tuning knob (No. 2) the station you have assigned to this push button. Move the tuning knob very slowly up and down (while still holding button in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the push button.

6. Press in another automatic tuner push button. Holding it in FIRMLY, carefully tune in the station assigned to this push button. Release this push button.

7. Follow this procedure until you have selected all of your favorite stations.

8. Move the tuning control (No. 2) as far as it will turn. Now remove from the right side of the cabinet the metal button, and, with a screw driver inserted through the hole, tighten the reset locking screw (see Fig. 3). It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the push buttons. (Note: **Reset Lock Screw is loose when radio is shipped from factory.**

If you should desire to change any station you selected to another, loosen the reset locking screw two or three complete turns; select the new station as explained. (Note: If the dial mechanism works hard when setting up a new station for one of the automatic tuner push buttons, it is due to the locking screw being too tight. Loosen the reset locking screw until the dial mechanism works freely with the tuner push button pressed in).

BE SURE TO RETIGHTEN THE RESET LOCK SCREW, otherwise the stations will not stay adjusted to the push buttons.

The automatic dial is now set up for quick tuning.

Replacement Parts List

MODEL 93BR-462A (SERIAL No. 939800 and UP)

In ordering parts refer to model number on chassis label.

Use Only Genuine Factory Replacement Parts

Part No.	Schematic Ref. No.	Description	No. Used In Set	Selling Price Each
		CONDENSERS		
3E1006	C6	.25 x 200 Volt Tubular Condenser	1	.12
3E1009	C1, C5	.05 x 200 Volt Tubular Condenser	2	.12
3E10012	C8, C12	.003 x 600 Volt Tubular Condenser	2	.12
3E10078	C10	.01 x 200 Volt Tubular Condenser	1	.12
3E11975	C11	10 Mfd. x 25 W.V. Electrolytic Condenser	1	.12
3E12912	C9	.00025 Mica Type Condenser—20%	1	.12
3E1295	C7	.0001 Mica Type Condenser—20%	1	.12
3E12921	C4	.0002 Mica Type Condenser—20%	1	.12
3E124115	C2	Adjustable Trimmer (Loop Antenna)	1	.12
		RESISTORS		
3E13070	R10	500 Ohm—½ Watt Resistor—10%	1	.10
3E1304	R4	3 Megohm—½ Watt Resistor—20%	1	.10
3E1309	R1	200M Ohm—½ Watt Resistor—20%	1	.10
3E13012	R3	50M Ohm—½ Watt Resistor—20%	1	.10
3E13018	R2	4M Ohm—½ Watt Resistor—20%	1	.10
3E13038	R9	2 Megohm—½ Watt Resistor—20%	1	.10
3E13037	R8	750M Ohm—½ Watt Resistor—20%	1	.10
3E130257	R7	5 Megohm—½ Watt Resistor—25%	1	.10
3E13020	R5	100M Ohm—½ Watt Resistor—20%	1	.10
		COILS		
3E108167	T3	Input I.F. Coil Assembly Complete	1	.86
3E108168	T4	Output I.F. Coil Assembly Complete	1	.76
3E110139	T2	Oscillator Coil Assembly Complete	1	.36
3E111159	T1	Loop Antenna Complete with 128396 Back	1	.86
		SOCKETS		
3E121210		Eight Prong Octal Sockets	4	.10
		SPEAKER		
3E114183	T6	4 Inch P.M. Dynamic Speaker	1	2.24
3E105100	T5	Output Transformer for Speaker	1	.62
		MISCELLANEOUS		
3E101204	R6	Volume Control (1 Megohm)	1	.50
3E102120	C, C3	Two Gang Variable Condenser	1	1.88
3E115485		Mounting Bracket for Gang Condenser	1	.08
3E115500		Mounting Bracket for Volume Control	1	.08
3E12597	S1	On-Off Switch	1	.24
3E121128		Two Prong Plug for "A" Battery	1	.05
3E121198		Three Prong Plug for "B" Battery	2	.07
3E128396		Cardboard Back for Cabinet (Less Loop Antenna)	1	.10
BE132108		No. 6 x ½ Hex. Head Screws (Mount Back to Cabinet)	4 Doz.	.10
BE13155		Spring Washers (Mount Back to Cabinet)	4	.01
BE13276		No. 6—32 x ⅜ Chassis Mounting Screws	4 Doz.	.06
BE134101		Rubber Bumpers (For Chassis Mounting)	4	.03
BE128382-18		Bakelite Cabinet Complete Less Back (Dark Walnut)	1	2.40
		DIAL PARTS LIST		
BE112691		Six Lever Automatic Tuner Mechanism Complete with Dial Scale Less Knobs, Gang Condenser and Push Buttons	1	4.00
BE112694		Dial Scale	1	.24
BE112695		Crystal for Dial	1	.12
BE128394-18		Bakelite Knob for Tuning and Volume Control 2		.10
BE128395-18		Bakelite Pulleys for Tuning and Volume Control Knobs	2	.08
BE128292-17		Push Buttons	6	.08
BE112605		Set of Two Sheets Station Call Letters	1	.12
BE112606		Clear Celluloid Tabs for Call Letters	6 Doz.	.06
BE112707		Dial Drive Drum (Mounted on End of Cam Shaft)	1	.12
BE1209		Drive String (2 Ft. Used)	1 Yd.	.12
BE120197		Tension Spring for Drive String	1	.03
BE117684		Locking Screw (End of Cam Shaft)	1	.12

All resistors and mica condensers are RMA color coded—specify value and/or resistor or condenser (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance.

Tolerance Percent	Color of Dot
2½%	White
5%	Green
10%	Blue
15%	Yellow
20%	Red
More than—20%	None

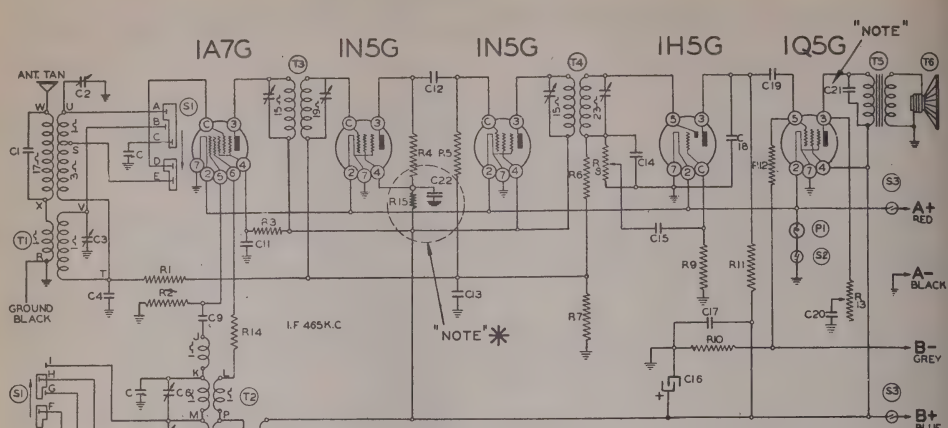
NOTICE—There is a model number label on the chassis. This model number identifies the radio as to year, manufacturer, chassis and issue number or letter. When ordering parts or writing, be sure to mention the complete model number.

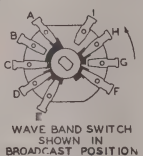
PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

John F. Rider

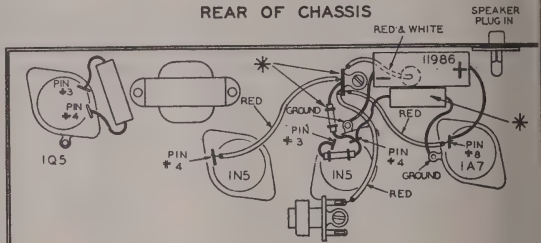
MODEL 93BR-560B

MONTGOMERY-WARD & CO.

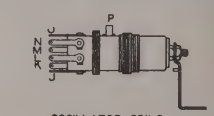




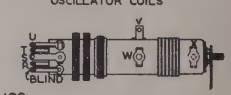
REAR OF CHASSIS



BOTTOM VIEW OF CHASSIS



OSCILLATOR COILS



ANTENNA COILS

Schematic Ref. No.	Part No.	Description
		RESISTORS
R1	BE13020	100M ohm—½ w.
R2	BE1309	200M ohm—½ w.
R3	BE13012	50M ohm—½ w.
R4	BE13022	5M ohm—½ w.
R5	BE13020	100M ohm—½ w.
R6	BE1304	3 megohm—½ w.
R7	BE1304	3 megohm—½ w.
R8	BE101166	1 megohm—volume control
R9	BE130225	15 megohm—½ w.
R10	BE130101	600 ohm—½ w.
R11	BE1303	500M ohm—½ w.
R12	BE13019	1 megohm—½ w.
R13	BE101169	Tone Control—1 Megohm
R14	BE13056	100 ohm—½ w.
*R15	BE13017	10M ohm—½ w.
		CONDENSERS
C	BE102106	2 gang variable condenser
C1	BE129132	.000125 mica
C2	BE12485	B. C. Antenna Trimmer
C3	BE12485	S. W. Antenna Trimmer
C4	BE1009	.05 x 200 v.
C5	BE12486	S. W. Pad
C6	BE12484	S. W. Osc. Trimmer
C7	BE12484	B. C. Osc. Trimmer
C8	BE12486	B. C. Pad
C9	BE12939	.00005 mica
C10	BE1009	.05 x 200 v.
C11	BE1009	.05 x 200 v.
C12	BE1292	.0005 mica
C13	BE1009	.05 x 200 v.
C14	BE12939	.00005 mica
C15	BE10012	.003 x 600 v.
C16	BE11986	8 mfd. lytic
C17	BE1006	.25 x 200 v.
C18	BE12921	.0002 mica
C19	BE10011	.01 x 400 v.
C20	BE10026	.02 x 400 v.
C21	BE10071	.004 x 600 v.
*C22	BE10020	.1 x 200 v.

C2 and C3 in one unit. C6 and C7 in same unit. C5 and C8 in one unit.

		PARTS
T1	BE111120	B. C.—S. W. Antenna Coil
T2	BE110118	B. C.—S. W. Osc. Coil
T3	BE10811G	Input I. F. Coil
T4	BE108112	Output I. F. Coil
T5	BE10569	Output Transformer
T6	BE114162R	6" P. M. Speaker
S1	BE12576	Band Switch
S2	BE12577	Pushbutton Switch—Pilot
S3		Off-on switch on tone control
P1	BE107243	1.5 v. Pilot Light
L1	BE1233	R. F. Choke Coil

Parts marked with * were added.

Several changes were made in the circuit of Model 93BR-560A to prevent a whistle which may occur on high signal inputs.

A partial bottom view of the chassis after the changes have been made, is shown above. The parts marked with an asterisk(*) were added. The model number after the changes were made is 93BR-560B. The data in Rider's Vol.X covering Model 93BR-560A apply to the later model with the exceptions as noted here.

CHANGES MADE

1. Fig. 1 shows a .004 x 600 volt tubular condenser connected from pin No. 3 on the 1Q5 tube socket to ground. Fig. 2 shows the change which was made. The .004 x 600 volt tubular condenser is connected between pin No. 3 and pin No. 4 on the 1Q5 tube socket.
2. Fig. 1 shows the wiring around the 1N5 1st I. F. tube socket before the changes were made. Note that there are three Red wires and one Red and White wire soldered to pin No. 4 on the 1N5 1st I. F. tube socket.
3. Fig. 2 shows the wiring around the 1N5 1st I. F. tube socket after the changes were made.

The changes made are as follows:

(a) A number 1139 stand-off insulated terminal strip was installed, it being held by one of the mounting nuts for the input I. F. transformer.

(b) The three Red wires and one Red and White wire soldered to pin No. 4 of the 1N5 1st I. F. tube socket (see Fig. 1), were unsoldered and soldered to the lug on the top of the stand-off terminal strip.

(c) A 10,000 ohm ½ watt resistor was connected from the lug of the stand-off terminal strip to pin No. 4 of the 1N5 1st I. F. tube socket.

(d) A .1 x 200 volt tubular by-pass condenser was added. One end was soldered to pin No. 4 of the 1N5 1st I. F. tube socket and the other end to the ground lug at the base of the 1A7 tube socket.

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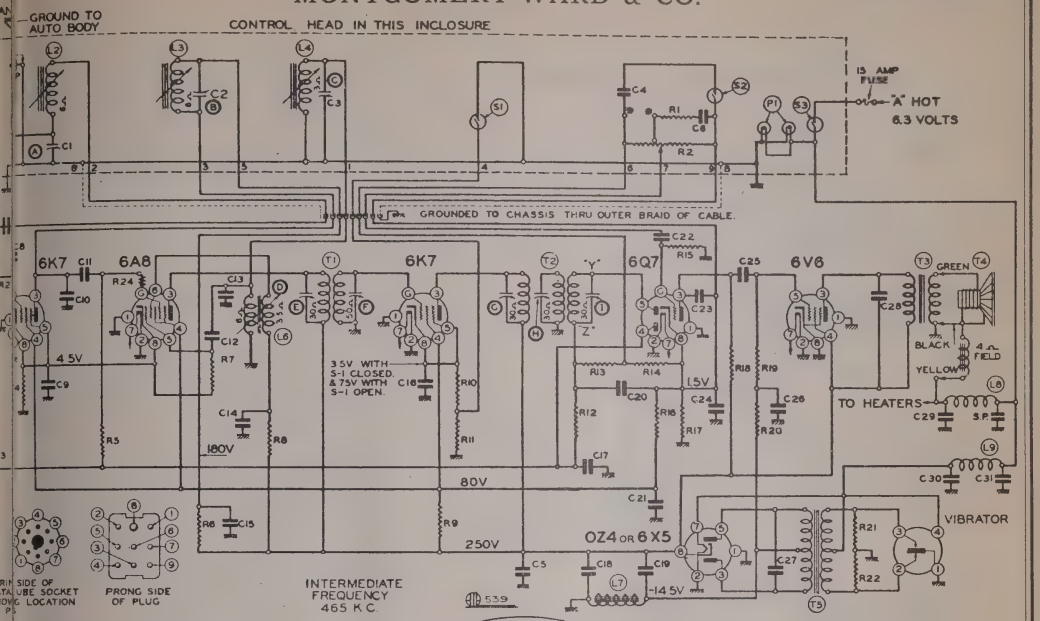
MODEL 93BR-677



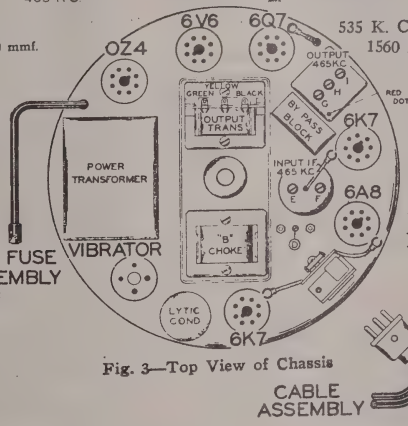
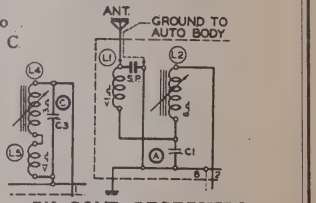


Fig. 3—Top View of Chassis



IN SOME RECEIVERS

R23, R24 GRID RES. NOT USED

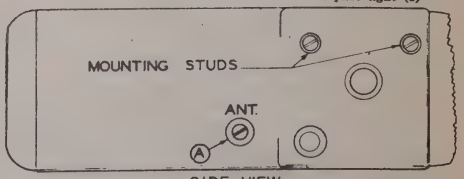
C13	129-97	.00005 Mica 5%
C18	119-51	8.0 mfd. 350 w.v. lytic
C19	119-51	8.0 mfd. 350 w.v. lytic
C28	100-38	.01 x 800 v 10%
L1	111-96	Antenna Choke (No. 111-97)
L5	110-77	Oscillator series coil (No. 110-79)
T1	108-96C	Input I. F. Complete - 465 kc.
T2	108-115	Output I. F. Complete - 465 kc.
T3	105-61	Output Transformer
T4	114-113	8" Dynamic speaker
T5	104-132	Power Transformer
S1	125-47	Sensitivity switch
S2	125-47	Tone control switch
S3		Off-on switch on volume control
P1	107-97	6-8 v. pilot light (2)

Part No.	Description
	CONDENSERS
124-45	Antenna trimmer 50 - 450 w. c. 350 mmf.
127-82	R. F. Trimmer - 5-30 mmf.
127-84	Oscillator Trimmer 5 - 30 mmf.
100-25	.002 x 600 v. - 25%
100-88	.1 x 400 v. 50 - 10%
100-19	.006 x 600 v. - 25%
129-95	.00015 Mica 2½%
129-39	.00005 Mica 20%
100-22	.05 x 200 v. 25%
129-96	.000035 Mica 5%
129-2	.0005 Mica 20%
129-12	.00025 Mica 20%
129-101	.00007 Mica 5%
100-13	.05 x 400 v. 25%
116-24	By pass block .25 x 400 v. 20-10%
100-9	.05 x 200 v. 25%
100-22	.05 x 200 v. 25%
119-51	12 mfd. 350 w.v. lytic
119-51	12 mfd. 350 w.v. lytic
129-5	.0001 Mica 20%
100-11	.01 x 400 v. 25%
116-24	.25 x 400 v. 20-10% By pass block
129-5	.0001 Mica 20%
100-26	.02 x 400 v. 25%
100-11	.01 x 400 v. 25%
116-24	.25 x 200 v. 20-10%
100-36	.01 x 1400 v. 20-10%
100-89	.008 x 800 v. 10%
129-6	.002 Mica 20%
100-31	.5 x 120 v. 50-10%
100-31	.5 x 120 v. 50-10%
	Spark Plates (2)
	C15, C21 and C26 in same unit
	and C19 in same unit
	RESISTORS
130-214	30M - ½ w. 20%
101-109	1.2 meg. volume control
130-19	1 megohm - ½ w. 20%
130-79	400 ohm - ½ w. 10%
130-19	1 megohm - ½ w. 20%
130-21	20M ohm - ½ w. 20%
130-12	50M ohm - ½ w. 20%
130-12	50M ohm - ½ w. 20%
130-65	30M ohm - 1 watt 20%
130-39	700 ohm - ½ w. 20%
130-85	3M ohm - ½ w. 20%
130-19	1 megohm - ½ w. 20%
130-20	100M ohm - ½ w. 20%
130-118	600M ohm - ½ w. 20%
130-19	1 megohm - ½ w. 20%
130-208	40M ohm - ½ w. 20%
130-101	600 ohm - ½ w. 10%
130-11	250M ohm - ½ w. 20%
130-5	300M ohm - ½ w. 20%
130-11	250M ohm - ½ w. 20%
130-56	100 ohm - ½ w. 20%
130-56	100 ohm - ½ w. 20%
130-54	500 ohm - ½ w. 20%
130-54	500 ohm - ½ w. 20%
	PARTS
111-100	Autenna permeability coil complete
109-40	R. F. Permeability coil complete
110-84	Oscillator permeability coil complete
110-75	Oscillator shunt coil Adj.
105-62	Filter Choke - 250 ohms
105-66	"A" Choke
105-65	"A" Choke

Mica condensers are coded with an additional dot indicating tolerance.

Tolerance	Percent	Color of Dot
	2½%	White
	5%	Green
	10%	Blue
	15%	Yellow
More Than	20%	Red
	20%	None.

AUTO RADIO



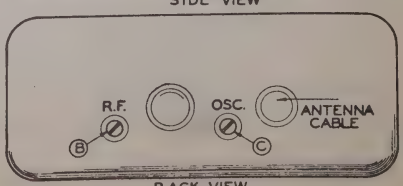


Fig. 4

MODEL 93BR-677

MONTGOMERY-WARD & CO.

WIRING CONNECTIONS AND ASSEMBLY

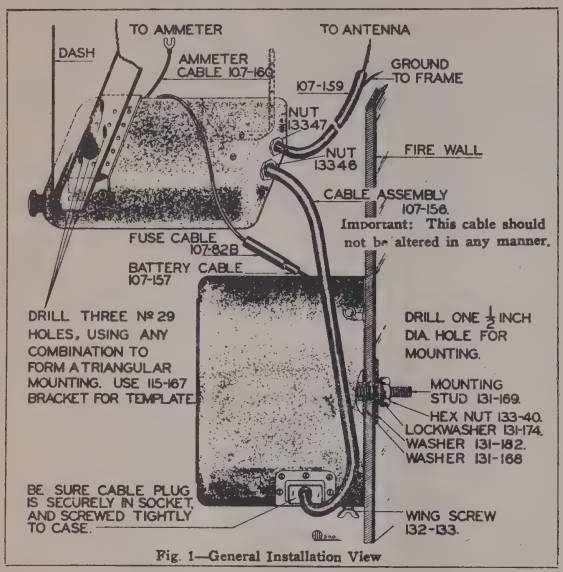

TO AMMETER
TO ANTENNA
DASH
AMMETER CABLE 107-160
GROUND TO FRAME
107-159
NUT 13347
NUT 13346
FIRE WALL
CABLE ASSEMBLY 107-156.
Important: This cable should not be altered in any manner.
FUSE CABLE 107-828
BATTERY CABLE 107-157
DRILL THREE No 29 HOLES, USING ANY COMBINATION TO FORM A TRIANGULAR MOUNTING. USE 115-167 BRACKET FOR TEMPLATE.
DRILL ONE 1/2 INCH DIA. HOLE FOR MOUNTING.
MOUNTING STUD 131-169.
HEX NUT 133-40.
LOCKWASHER 131-174.
WASHER 131-182.
WASHER 131-168
BE SURE CABLE PLUG IS SECURELY IN SOCKET, AND SCREWED TIGHTLY TO CASE.
WING SCREW 132-133.

Fig. 1—General Installation View

Remote Tuner Units are matched to each radio unit at the factory; therefore it is important in such cases where another Remote Tuner Unit is required to replace the original one, that the entire Remote Unit be rebalanced to match the Radio Unit.

ADJUSTING ANTENNA TRIMMER (SET IN CAR)

Tune in a weak signal at approximately 1400 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna trimmer up or down until maximum output is obtained. See Fig. 4, adjustment "A" on side of remote tuner unit.

DUMMY ANTENNAS

The dummy antennas referred to in the following instructions are:

"I.F. Dummy" —A .5 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 175 mmfd. cendenser connected in series with the output lead of the test oscillator.

I.F. ALIGNMENT: (465 K.C.)

IMPORTANT:

To align the output I.F. transformer without using a cathode ray oscillograph a 10M ohm resistor must be shunted across the tertiary coil of this unit.

Connect the resistor as indicated by points "Y" and "Z" on the circuit diagram as follows.

Locate the wires coming from the bottom of the output I.F. coil assembly on the underside of the radio chassis.

The white lead with green tracer which is connected to diode plate terminal No. 5 on the 6Q7 tube socket is one point and the white lead with brown tracer which is connected to the end terminal of the terminal strip is the other point. Proceed as follows:

1. With the dial of the Remote Tuner Unit set at 1400 K.C. and with volume control full on, connect test oscillator set at 465 K.C. in series with I.F. dummy to grid of 6K7 I.F. tube.
2. Adjust trimmers "G" and "H" of output I.F. transformer for maximum gain, (See Fig. 3, top view).
3. Disconnect the 10M ohm resistor which has been shunted across the tertiary winding and adjust trimmer "I" for maximum gain.
   (a) This transformer is now correctly tuned. Under no circumstances re-adjust trimmers "G" and "H" after the 10M ohm resistor has been removed.
   (b) For alignment of the output I.F. transformer using cathode ray oscillograph the 10M ohm resistor is not used and the procedure is similar to the alignment of any two circuit I.F. transformer; merely tune for symmetrical curve of maximum amplitude.
   (c) Output connections for the cathode ray oscillograph should be made to pin No. 8 on 6Q7 tube socket and to the end terminal on the terminal strip; at this point the diode load resistors terminate.
4. Move test oscillator connection to grid of 6A8 tube and adjust trimmer condensers "E" and "F" of input I.F. transformer for maximum gain.

NOTE: A red dot on top of output I.F. can designate location of trimmer "G"

BROADCAST ALIGNMENT:

1. With the dial on the Remote Tuner Unit set at 1560 K. C. connect test oscillator set at 1560 K. C. in series with broadcast dummy to the antenna lead of receiver.
2. Adjust oscillator trimmer (adjustment "C", on back of Remote Tuner Unit) to resonance. (See Fig. 4, back view)
3. Re-set test oscillator to 1400 K.C. and pick up signal by rotating dial on Remote Tuner Unit. Adjust R. F. trimmer (adjustment "B", on back of Remote Tuner Unit), and Antenna Trimmer (adjusment "A", on side of Remote Tuner Unit), to resonance.
4. Re-set test oscillator to 600 K.C. and rotate Remote Tuner Unit dial to 600 K. C.
   Adjust shunt oscillator adjustment "D", rotating dial to and fro at the same time adjusting shunt oscillator for maximum gain. This adjustment is accessible from the top of the radio chassis, (See Fig. 3, top view).
5. Go back and check 1400 K. C. If adjustment is made here, check 600 K. C. again.

PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are six levers on the dial by means of which six stations may be selected. (See "B" Fig. 2).

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in down-ward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now Rotate the turning knob (No. 2) to the left (counter clockwise) as far as it will turn, and tighten the special reset lock screw ("C") located on left side of remote turner unit. (See Fig. 2).

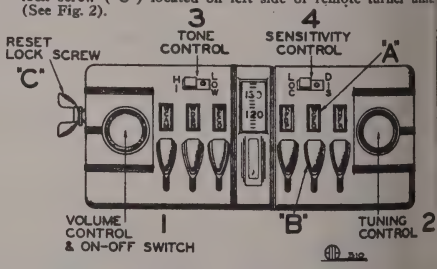


Fig. 2—Front View of Remote Tuner Unit

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Reset lock screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, loosen the locking screw "C" one or two turns; select the new station as explained. Be sure to retighten the locking screw, otherwise the stations you have selected will not stay adjusted to the levers.

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver.

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MONTGOMERY-WARD & CO.

MODEL 93BR-1075
Series A, B

Model 1075 Series A 6U5
SEE NOTE BELOW
SEE NOTE BELOW
5Y3G RECTIFIER
6K6G
6U5G
6K7
6Q7
6A8
6Q7
6K8
6K7
6K7
6Q7
6K8
6K7
6K7
6Q7
6K8
6K7
6K7

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- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metalic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Pushbutton Indicated Below Pushed "In"	Variable Condenser Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	465 Kc.	.1 MFD.	Grid of 6K7 1.F Tube	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 2)	Output I. F.	Adjust to maximum output
	465 Kc.	.1 MFD.	Grid of 6K8	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 2)	Input I. F.	Adjust to maximum output
BAND BROAD-CAST	1690 Kc.	200 mmf	Antenna lead	Broadcast	Rotor full open (Plates out of mesh)	Trimmer (C17) (See Fig. 5)	Broadcast oscillator	Adjust to maximum output
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set dial at 1400 Kc.	Trimmer (C7), (C19) (See Fig. 5)	Broadcast antenna and R. F.	Adjust to maximum output
	600 Kc.	200 mmf.	Antenna lead	Broadcast	Set dial at 600 Kc.	Trimmer (C22) (See Fig. 5)	Broadcast oscillator series pad	Adjust to maximum rock dial. (See note "A")
SHORT WAVE BAND	17 Mc.	400 ohms	Antenna lead	Short Wave	Set dial at 17 MC	Trimmer (C15) (See Fig. 5)	Short wave oscillator	Adjust to maximum output
	17 Mc.	400 ohms	Antenna lead	Short Wave	Set dial at 17 MC	Trimmer (C5), (C20) (See Fig. 5)	Short wave antenna and R. F.	Adjust to maximum output
MEDIUM WAVE BAND	5 Mc.	400 ohms	Antenna lead	Med. Wave	Set dial at 5 MC	Trimmer (C16) (See Fig. 5)	Medium wave oscillator	Adjust to maximum output
	5 Mc.	400 ohms	Antenna lead	Med. Wave	Dial set at 5 MC	Trimmer (C6), (C21) (See Fig. 5)	Medium wave antenna and R. F.	Adjust to maximum output

NOTE "A".. Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

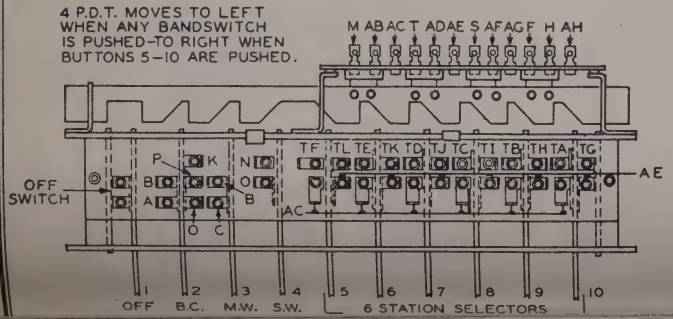
Attentuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

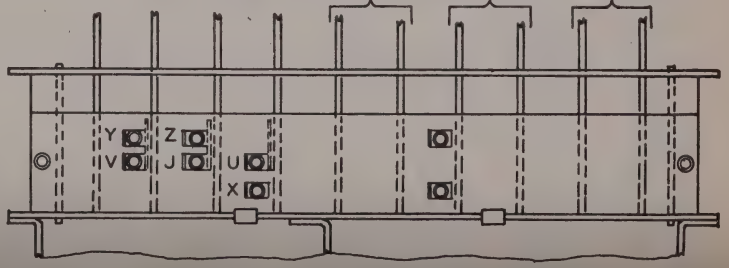
BAND	FREQUENCY RANGE
Broadcast	535 to 1690 Kc.
Medium Wave	1.66 to 5.5 MC.
Short Wave	5.5 to 18.0 MC.

Power Consumption ..... 100 Watts (At 115 volts 50-60 cycles)
Power Output ..... 5 Watts Undistorted, 7.5 Watts Maximum
Intermediate Frequency ..... 465 KC.

TOP VIEW


4 P.D.T. MOVES TO LEFT WHEN ANY BANDSWITCH IS PUSHED—TO RIGHT WHEN BUTTONS 5—10 ARE PUSHED.
M A B A C T A D A E S A F A G F H A H
OFF SWITCH
P K N
B O B
A
O C
AC
TF TL TE TK TD TJ TC TI TB TH TA TG
AE
1 OFF
2 B.C.
3 M.W.
4 S.W.
5 6 7 8 9 6 STATION SELECTORS
10

SERIES B 890-1570 KC 710-1235 KC 535-930 KC
SERIES A 1000-1550 K.C. 680-1100 K.C. 520-830 K.C.



662

BOTTOM VIEW

Important: Allow the radio to "warm up" for about 15 minutes before setting the station adjustment screws for the pushbuttons.

Only a single adjustment for each station is required in setting up your favorite stations for automatic pushbutton operation. These adjustments are located at the front of the chassis shown in Fig. 4 and are accessible through the station call letter tab holes. The only equipment needed is a small screw driver to make the adjustments.

The range of the frequencies covered by each button are given below and are also shown in Fig. 4. Only stations within the frequency ranges given can be obtained on a particular button. Counting the **station buttons** from left to right, looking at the front of the set, the frequency ranges are as follows:

1. 1550 to 1000 Kilocycles.
2. 1550 to 1000 Kilocycles.
3. 1100 to 680 Kilocycles.
4. 1100 to 680 Kilocycles.
5. 830 to 520 Kilocycles.
6. 830 to 520 Kilocycles.

This means that any station which has a kilocycle number lying between 1550 and 1000 K.C. can be set up on either Button 1 or Button 2. Any station which has a kilocycle number lying between 1100 and 680 K.C. can be set on either Button 3 or Button 4. Any station which has a kilocycle number lying between 830 and 520 K.C. can be set on either Button 5 or Button 6.

After you have made up your list of stations, press button selected having the highest frequency is tuned in and the program noted. Press button covering frequency range in which station is located (See Fig. 4). Adjust screw through station tab opening above button pressed until the same station is heard clearly and tuning indicator indicates that it is correctly tuned.

Press pushbutton marked "Broadcast" and tune in next station selected. Press button covering frequency range in which station is located. Adjust screw through station tab opening above button pressed until the same station is heard clearly and with maximum volume.

Follow this procedure for each button until you have selected all of your stations. The automatic buttons are now set up for quick tuning and no further adjustment is necessary.

NOTE: In setting up the pushbuttons, station identification may require switching back and forth to button marked "Broadcast" until the same program is heard for both. If the same program is heard on more than one station, find the station on dial tuning and select the proper one on the pushbutton by comparing the order or sequence of programs with that on dial tuning.

Punch out the station call letter tabs of the stations you have set up for the automatic buttons from the set of sheets supplied and insert them into the rectangular openings in the escutcheon. One of the small, clear celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

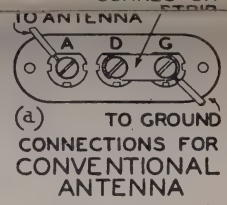
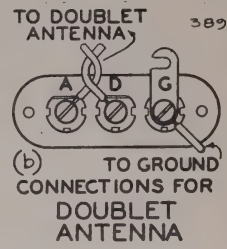


FIG. 1



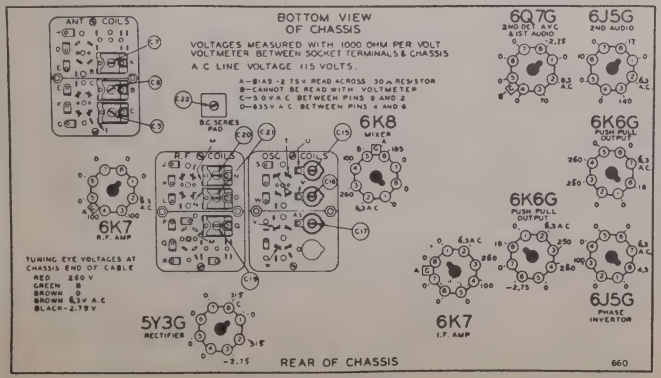


FIG. 5

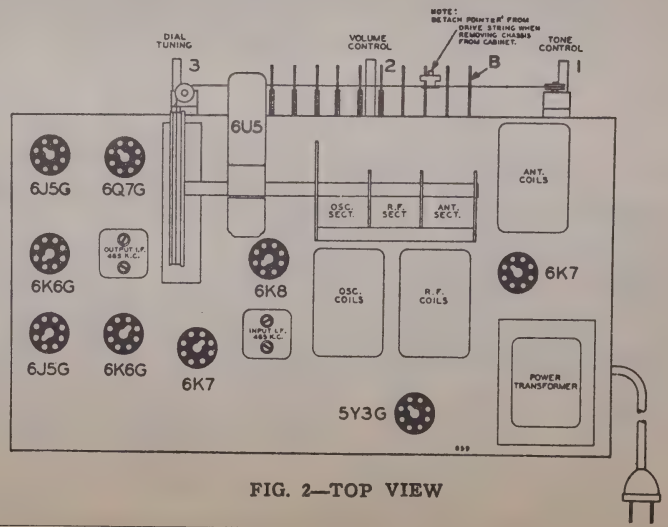


FIG. 2—TOP VIEW

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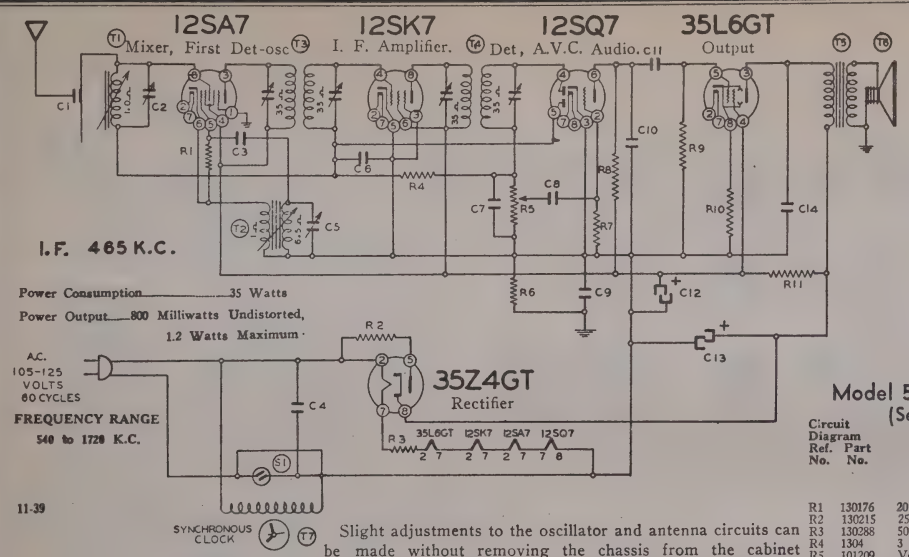


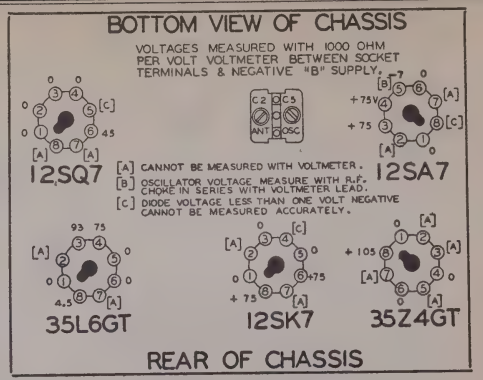

BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & NEGATIVE "B+" SUPPLY.
[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] OSCILLATOR VOLTAGE MEASURE WITH R.F. CHOKE IN SERIES WITH VOLTMETER LEAD.
[C] DIODE VOLTAGE LESS THAN ONE VOLT NEGATIVE CANNOT BE MEASURED ACCURATELY.
12SQ7
12SA7
35L6GT
12SK7
35Z4GT
REAR OF CHASSIS

FIG. 3—BOTTOM VIEW

Model 571 Series A (Serial No. 189300 and up)

Circuit Diagram Ref. No.	Part No.	Description
		RESISTORS
R1	130176	20M ohm—⅓ w.
R2	130215	25 ohm—½ w.
R3	130288	50 ohm—1½ w.
R4	1304	3 Megohm—⅓ w.
R5	101209	Volume Control—½ Meg.
R6	130100	150M ohm—⅓ w.
R7	130257	5 Megohm—⅓ w.
R8	130100	150M ohm—⅓ w.
R9	13011	250M ohm—⅓ w.
R10	130166	150 ohm—⅓ w.
R11	130199	1500 ohm—1 w.
		CONDENSERS
C1	131262	.0002 Washer Condenser (Ant. Clip on Ant. Plate)
C2	124100	Ant. Section Dual Trimmer
C3	12939	.00005 Mica
C4	1001	.1 x 400 v.
C5	124100	Osc. Section Dual Trimmer
C6	10013	.05 x 400 v.
C7	1295	.0001 Mica
C8	10025	.002 x 600 v.
C9	10091	.15 x 400 v.
C10	1292	.0005 Mica
C11	10071	.004 x 600 v.
C12	11992	20 Mfd. 'Lytic
C13	11992	40 Mfd. 'Lytic.
C14	10011	.01 x 400 v.
		C2 and C5 in one unit.
		C12 and C13 in one unit.
		PARTS
T1	111136	Antenna Coil Complete
T2	110126	Oscillator Coil
T3	108157D	Input I. F. Coil—465 Kc.
T4	108157E	Output I. F. Coil—465 Kc.
T5	105106	Output Transformer
T6	114187	4" Speaker—PM.
T7	104188	Electric Clock Complete
S1		On-Off Switch on Volume Control

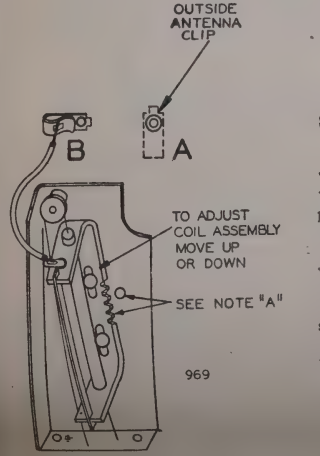


FIG. 4

Slight adjustments to the oscillator and antenna circuits can be made without removing the chassis from the cabinet through a hole which is provided on the bottom of the cabinet. (Remove snap-in button.)

The two adjustments on the trimmer assembly can be reached with a long insulated type screwdriver through this hole.

SERVICE NOTES:

Voltages taken from different points of circuit to —B are measured with all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on the voltage chart are measured with 117 volt A.C. line.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscilla-

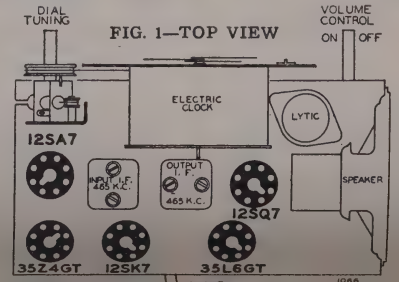


FIG. 1—TOP VIEW

MONTGOMERY-WARD & CO.

MODEL 93WG-562

Power Consumption - 2.2 Amperes at 6.3 Volts	Intermediate Frequency - - - - - - - 456 KC.
Power Output - - - - - - - - .5 Watt Undistorted 1.0 Watt Maximum	Speaker - - - - - - - - - - 5" P. M. Dynamic
Selectivity - 41 KC Broad at 1000 times Signal	Tuning Frequency Range - - 528 to 1730 KC.
	Sensitivity (For .05 Watt Output) 15 Microvolts Average

MODEL 93WG-562

MONTGOMERY-WARD & CO.

Procedure for Setting the Station Buttons

Selecting the Stations to be Set

There are 6 buttons on the automatic tuning dial by means of which 6 stations may be set for quick tuning.

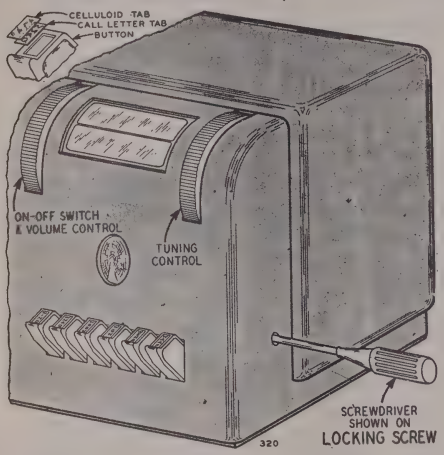
Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

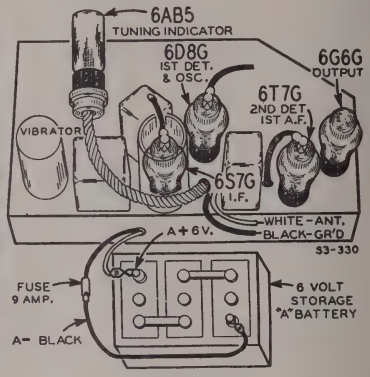
It is better to list the station with the lowest kilocycle number first, the station with the next higher kilocycle number next, and so on.

Any button may be used for any station you can receive, although it will be more convenient to set the stations so that the kilocycle numbers increase from left to right.

Setting a Station Button

At the right side of the cabinet (from the front) will be seen a cap which covers a hole in the cabinet—See illustration. Pry off this cap being careful not to scratch the cabinet. Removal of the cap will expose a large locking screw. Using a screwdriver, loosen the mechanism by turning this screw in a counter-clockwise direction. The screw will turn easily until the dial stops rotating. Then exert a slight amount of additional pressure and continue to turn the screw about one and one-half complete turns.





Select the first station from the list you have prepared, and carefully tune in this station by means of the manual tuning control using the tuning eye as a guide.

With one hand, hold the manual tuning control to prevent it from turning and with the other hand, push one of the station buttons shown in the illustration *all the way down*. It will go down easily at first and then a firm gentle pressure must be applied to push it down the rest of the way. It is better to start with the left hand button.

Hold *this* button all the way down. With the other hand, see whether or not this station is still accurately tuned in by moving the tuning control a slight amount back and forth while observing the tuning eye. *Be sure to hold the button all the way down.*

Release the button after the station is tuned in.

Carefully tune in the second station on your list. Then hold the tuning control and push the second button slowly and firmly all the way down. Check for accurate tuning.

Proceed in the same manner to set the remaining station buttons.

After all the stations are set, it will be necessary to lock the mechanism so that the settings will not change. Do this by turning the locking screw in a clockwise direction until it is tight. It will turn easily until the dial stops rotating—then additional pressure must be exerted. Replace the cap over the hole.

Remove the correct station call letter tab from the sheets supplied by bending the sheet back and forth at the score mark until the tab can be broken off. Press this tab all the way to the bottom of the space provided in the button. Cover the call letter tab with a celluloid tab, pressing this in until it snaps into place.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

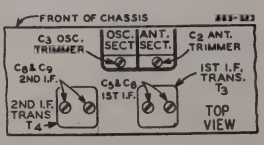
SIGNAL GENERATOR				
FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration)
456 KC	Signal Grid of 1st Det.	.1 mf.	Turn rotor to full open	1st I.F. (C5) & (C6) 2nd I.F. (C8) & (C9)
1730 KC	Grid of 1st Det.	.1 mf.	Turn rotor to full open	Oscillator (C3)
1500 KC	Antenna Lead	200 mmf.	Turn rotor to max. output	Antenna (C2)

The following equipment is required for aligning:

Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter; Non-Metallic Screwdriver.

Dummy Antennas—.1 mf. and 200 mmf.



CALIBRATION—If it is necessary to calibrate the radio, remove the back cover. Turn the tuning control drum until the 2 set screws on the dial hub near the volume control can be reached with a screwdriver. Loosen the 2 set screws by turning them about 1/8th turn in a counter-clockwise direction. Tune in an 800 KC signal. Hold the tuning control motionless and at the same time turn the dial drum until the dial is in calibration. Then slowly turn the tuning control drum until the 2 set screws can be reached and re-tightened with a screwdriver. Check to see that the dial has remained in calibration.

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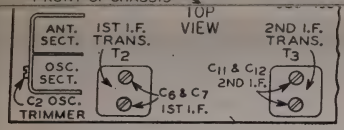
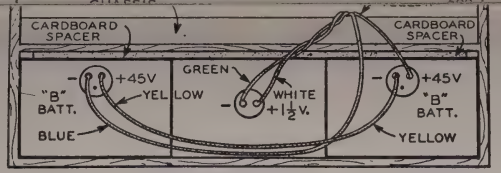
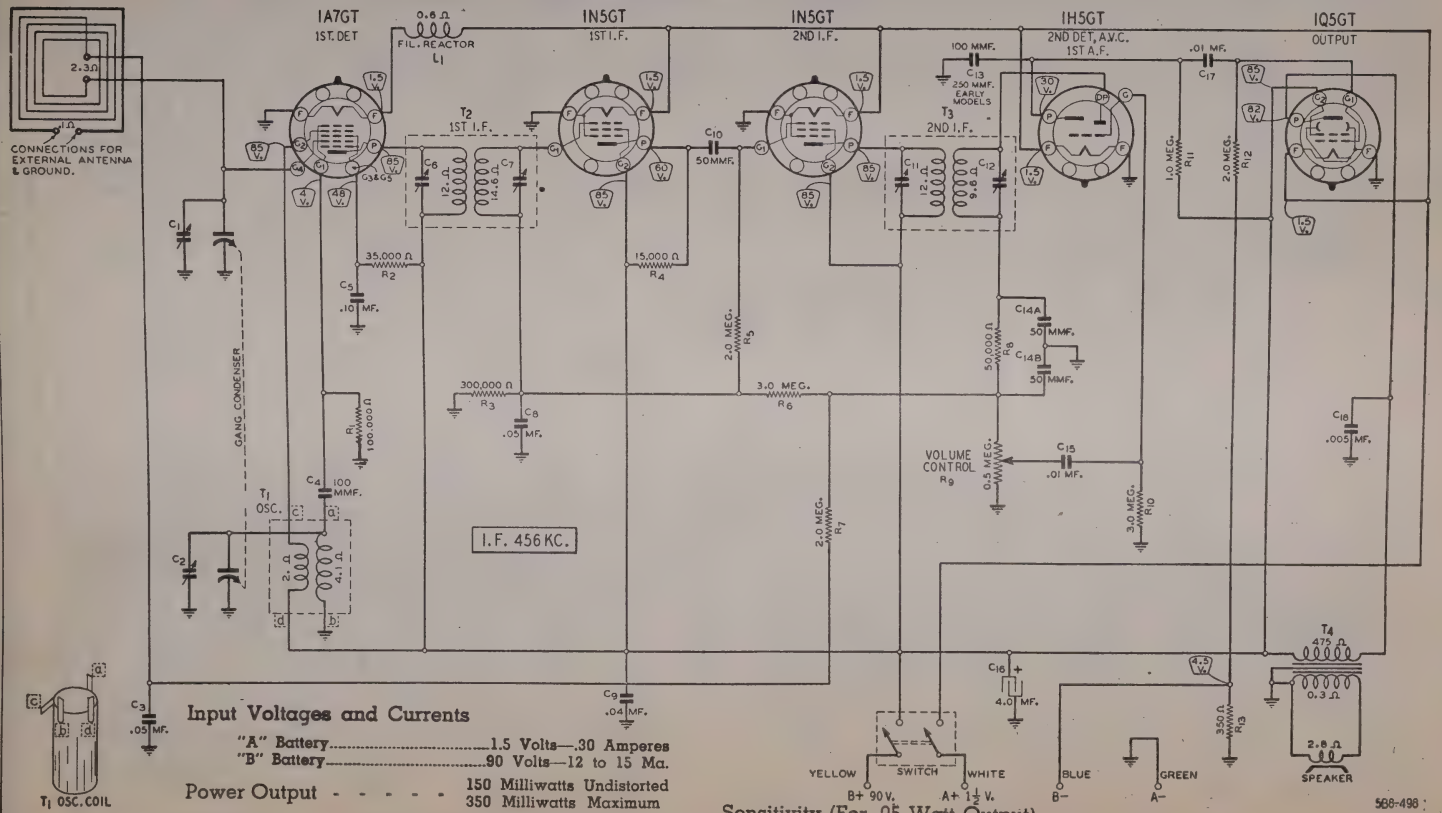




Take out the 2 screws, one at each rear corner of the chassis shelf. Remove battery cable clamp. Grasp the chassis shelf at each rear corner and edge it away from the cabinet front until the chassis shelf and chassis slide easily out of the cabinet.

To remove the shelf from the chassis, take out the bolt and the 2 screws at the bottom of the shelf.



Input Voltages and Currents

"A" Battery.....1.5 Volts—.30 Amperes
"B" Battery.....90 Volts—12 to 15 Ma.

Power Output - - - - - 150 Milliwatts Undistorted
350 Milliwatts Maximum

Selectivity - - 50 KC Broad at 1000 Times Signal

Sensitivity (For .05 Watt Output)

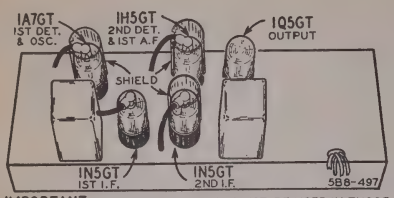
External Antenna.....10 Microvolts Average

568-498

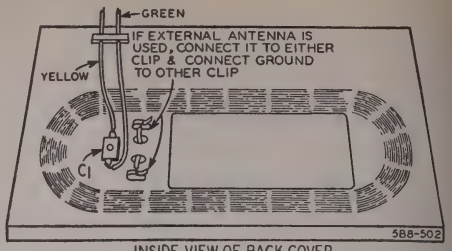
MONTGOMERY-WARD & CO.

MODEL 93WG-565

MONTGOMERY-WARD & CO.



IMPORTANT- METAL BASE TUBES MUST BE USED IN THOSE SOCKETS AT WHICH SHIELDS ARE SHOWN.



INSIDE VIEW OF BACK COVER

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antenna—.1 mf.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration—page 3, and illustration of back—page 1)
456 KC	Signal Grid of 1st Det. (Top Cap)	.1 mf.	Turn rotor to full open	1st I.F. (C6) & (C7) 2nd I.F. (C11) & (C12)
1600 KC	Signal Grid of 1st Det.	.1 mf.	Turn rotor to full open	Oscillator (C2)
1500 KC	None—See Note A		Turn rotor to max. output	Antenna (C1)

NOTE A—Chassis must be in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. The back of the cabinet must be in place. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

CALIBRATION (For models with pointer in front of dial scale)—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, hold the pulley at the back of the dial, loosen the pointer screw, set the pointer at the 800 KC mark, and retighten the pointer screw.

Replacement Parts List

MISCELLANEOUS

SPEAKER

When ordering parts for speakers, specify part number of speaker and letters preceding part number stamped on the speaker.

Bin No.	Part No.	Description	Selling Price
	12A340	6" P.M. Dynamic Speaker	$2.84
		Cone and Voice Coil Assembly for above Speaker	.90
		Output Transformer only (T4)	.90
	14X251	Wire Screen to cover front of Speaker	.16

GENERAL

	3A293	Tube Socket—Octal (8 prong)	.10
	32X174	Tube Shield	.06
10003	30X44	Grid Clip only Doz.	.06
	13X388	"A" Battery Cable and Plug Assembly	.10
	13X389	"B" Battery Cable and Plug Assembly	.14
	4A99	Terminal Strip (2 Lugs—1 Lug Insulated)	.04
	4A98	Terminal Strip (6 Lugs—4 Lugs Insulated)	.04
	4A139	Fibre Strip (Loop Antenna Leads)	.04

TRANSFORMERS AND COILS

Bin No.	Part No.	Code	Description	Selling Price
	9A1053	T1	Oscillator Coil Assembly	$0.42
	9A1192	T2	1st I.F. Transformer and Can Assembly	.92
	9A1193	T3	2nd I.F. Transformer and Can Assembly	.84
		T4	Output Transformer (See "Speaker")	
	9A1199	L1	Filament Reactor	.20
	9A1191		Loop Antenna Assembly	.54

CONDENSERS

TUBULAR

Bin No.	Part No.	Code	Capacitance	Voltage	Selling Price
11106	46X253	C3,C8	.05 mf.	180	$0.06
10979	46X254	C5	.10 mf.	180	.06
11539 -	46X250	C9	.04 mf.	180	.06
11256	46X249	C15,C17	.01 mf.	180	.06
10592	46X274	C18	.005 mf.	360	.06

MOLDED

10876	47X57	C4,C13	100 mmf.	.06
10625	47X56	C10	50 mmf.	.06

TRIMMER

	17A110	C1 C2	2.5-35 mmf. Loop Antenna Part of Gang Condenser	.06
	17A51	C6 C7	70-150 mmf. 40-100 mmf. 1st I.F.	.16
	17A80	C11 C12	50-120 mmf. 85-185 mmf. 2nd I.F.	.18

MISCELLANEOUS

	47X112	C14A C14B	50 mmf. 50 mmf. Dual Mica	.06
9870	45X250	C16	4 mf. 100 Dry Electrolytic	.20
	14A114		2 Section Gang Condenser complete with Tuning Control Shaft	1.20

RESISTORS

CARBON

Bin No.	Part No.	Code	Resistance	Wattage	Selling Price
11097	A85104	R1	100,000 Ohm	0.2	$0.06
11189	A84353	R2	35,000 Ohm	0.2	.08
11061	A84304	R3	300,000 Ohm	0.2	.08
11094	A84153	R4	15,000 Ohm	0.2	.08
11086	A85205	R5,R7,R12	2 Megohm	0.2	.06
11116	A84305	R6	3 Megohm	0.2	.08
11068	A85503	R8	50,000 Ohm	0.2	.06
11090	A85305	R10	3 Megohm	0.2	.06
11188	A84105	R11	1 Megohm	0.2	.08
	A83351	R13	350 Ohm	0.2	.10

MISCELLANEOUS

10144	36X274	R9	500,000 Ohm Volume Control and On-Off Switch	.48

DIAL AND DRIVE ASSEMBLY

Bin No.	Part No.	Description	Selling Price
	58X448	Dial Mounting Plate complete with Dial Scale, Pointer, and Pulley Shaft and Bracket	$0.54
	58X436	Cardboard Dial Scale	.06
	15X161	Pointer	.04
		14" Drive Cord (12 lb. Test) Doz. Pcs.	.16
	28X206	Tension Spring for Drive Cord Doz.	.12
	17X49	Celluloid Crystal	.06
	10A275	Tuning Control Knob	.06
	10A276	On-Off Switch and Volume Control Knob	.06
	4X345	Escutcheon for Tuning Control Knob	.12
	4X346	Escutcheon for On-Off Switch and Volume Control Knob	.12

Use only genuine factory tested parts to insure service jobs you can depend on and to obtain original set performance.

Prices Subject to Change Without Notice.

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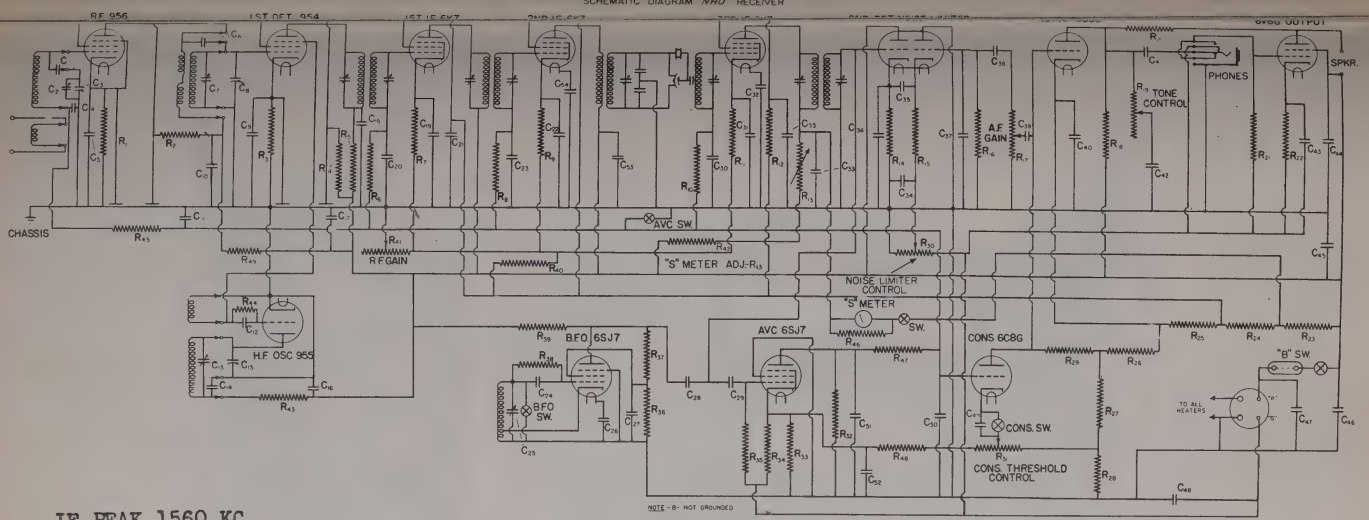


IF PEAK 1560 KC

For the sake of clarity in this schematic diagram, only one set of R.F. coils is shown. The terminals of each R.F. coil assembly are indicated, and it will be understood that condensers C1, C6, C7, C13 and C14 are duplicated in each range.

THE NHU is a communications type receiver designed primarily for operation in the frequency range from 27.5 to 62 megacycles. This spectrum is covered in three bands: 27.5 to 36 Mc., 34 to 46.5 Mc. and 45 to 62 Mc. A superheterodyne circuit is used and all elements necessary for communications service are incorporated

The power supply, Type 5856, employs a type 80 rectifier. The normal B current drain of the receiver is 65 ma. at 200 volts. The heater circuit requires 3 amperes at 6.3 volts.

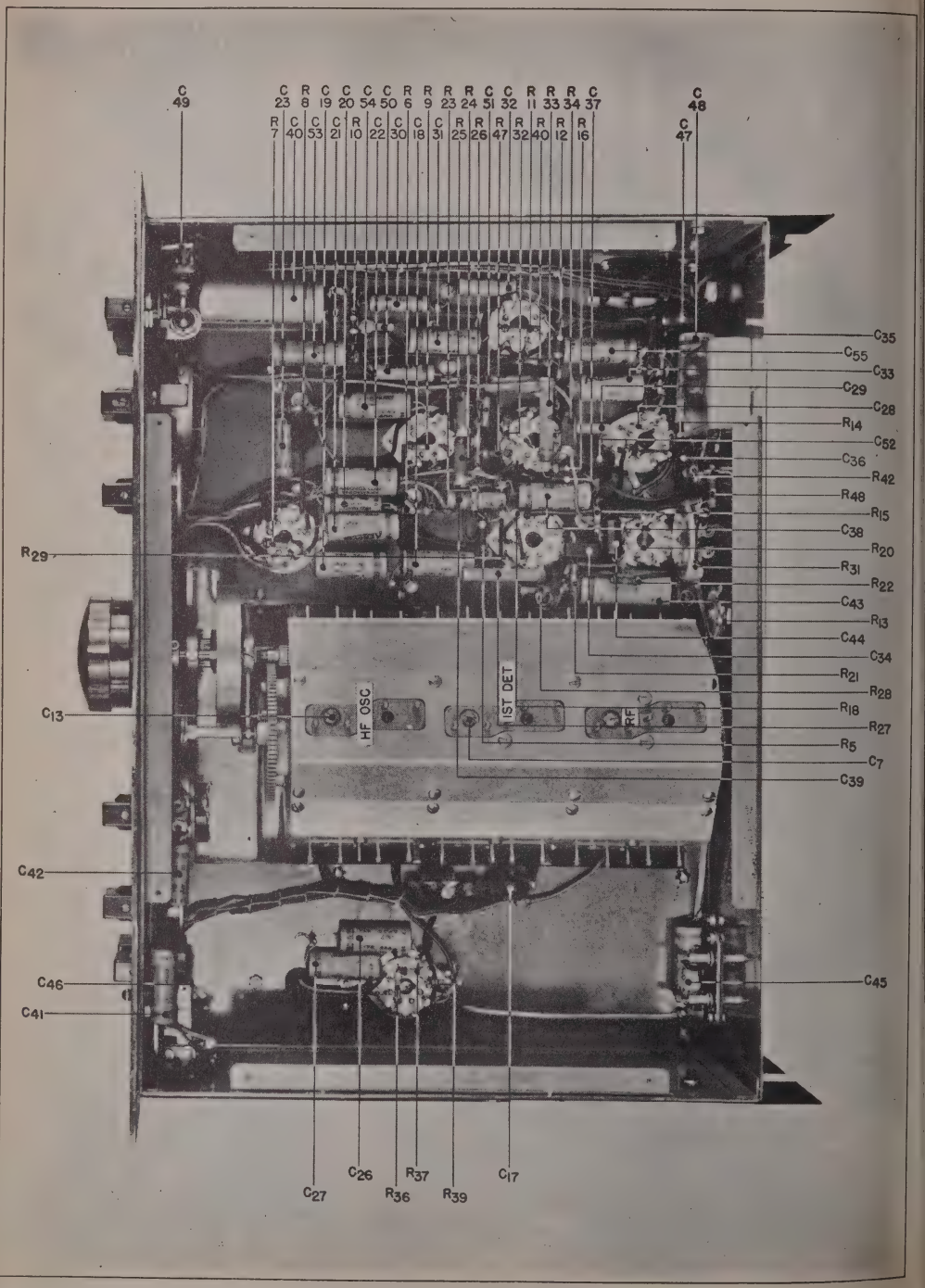
Battery model NHU receivers may be operated with 180 volts of B supply, with a current drain of 60 ma.

The input impedance of the receiver averages about 500 ohms and an open wire transposed line, constructed to have this impedance, will probably give best performance. Such a line may consist of two No. 10 wires spaced 1½ inches apart; two No. 14 wires spaced 2 inches apart may be used as an alternative.

The maximum undistorted audio output of the NHU is about 2 watts. Speaker terminals are provided at the rear of the receiver. The speaker is connected directly in the plate circuit of the 6V6G output tube and the speaker coupling transformer should, therefore, be designed to have an impedance of 5000 ohms. It should also be capable of carrying the 45 milliampere plate current of the output tube.

MODEL NHU

NATIONAL CO., INC.



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TUBES

Individual tubes of the same type will vary slightly in their characteristics and it is well to remember this fact when replacements become necessary. Even though the circuit is designed to reduce the effect of such variations to a minimum, the high frequency oscillator and I.F. tubes should be selected with some care. A replacement high frequency oscillator should be checked in the receiver to make sure that the inter-electrode capacities are the same as those of the tube originally employed. This is easily determined by noting any change in calibration at the high frequency end of any coil range. The change should not exceed four or five dial divisions on the vernier scale.

Substitution of new tubes in the I.F. amplifier may possibly alter overall gain and selectivity characteristics. Instructions for realignment are given in detail in the following pages.

Two other points should be checked when trying the new high frequency oscillator; a fairly strong steady signal should be tuned in, preferably on some frequency above 50 mc.; the C.W. oscillator should be turned off; jarring the receiver or lightly tapping the tube, should not show any evidence of noise in the output. Next turn on the C.W. oscillator to make sure that the tube does not introduce "modulation hum" on the carrier. The tube should again be lightly tapped to see whether or not its characteristics change.

R.F. AND H.F. OSCILLATOR ALIGNMENT

All circuits are carefully and accurately aligned before shipment, using precision crystal oscillators which insure close conformation to the dial calibration. No readjustments will be required, therefore, unless the receiver is subjected to extremely rough handling. Do not attempt to make any adjustments without first determining the exact function of each trimmer condenser and the effect that it will have upon performance.

The coil group which is plugged into the circuit at any time is the one directly underneath the contact strips of the R.F. sub-assembly. The coil nearest the front of the receiver is the H.F. oscillator, the middle coil is the first detector and the coil nearest the antenna terminal strip is the R.F. preselector. Complete alignment for any one coil range is apt to be rather complicated and it is recommended that the operator make no adjustments on the coils themselves. Even the conventional trimmer adjustments require considerable care and should not be attempted by anyone who has not had a great deal of practical experience with high frequency equipment. It should be kept in mind that the capacities and inductances employed in these high frequency circuits are extremely small. Leads to the contact terminals, variable condensers and tubes should not be moved or bent indiscriminately. Furthermore, hand capacity effects are very noticeable when making the trimmer adjustments and it will usually be found necessary to turn any given trimmer condenser to a slightly higher capacity than that which appears to give maximum response because the total circuit capacity will decrease appreciably when the screw driver is released from the trimmer shaft.

If it is found necessary to readjust any coil range of the NHU, the following procedure is recommended: Set the tuning dial near the high frequency end of the range and check the frequency reading by means of an accurate test oscillator or signal generator. Readjustment should be made if the dial is in error by more than about 1%. Correction of calibration is made by adjusting the high frequency oscillator trimmer, which is located underneath the contact terminal strip nearest the front of the receiver. It may be reached from the top of the chassis by means of a 6″ or 8″ metal screw driver, preferably having a shaft diameter of about 3/16″. A screw driver with a metal shaft must be used since the trimmer condenser turns with difficulty but the shaft must not touch any of the metal parts of the receiver when making the adjustment. If the dial reading is found to be too low, more trimmer capacity is needed and vice versa. In adjusting the first detector trimmer in the middle compartment, no signal is necessary, correct alignment being indicated by maximum background noise. This background noise should be fairly loud when the R.F. and audio gain controls are fully advanced, the crystal filter being adjusted for minimum selectivity. Furthermore, the background noise will be approximately the same on all ranges. After the first detector trimmer is adjusted, the R.F. trimmer panel control should be checked to see that the R.F. circuits resonate properly, resonance being indicated by an increase in background noise. It may be advisable to use a test signal at this point since the correct R.F. trimmer adjustment is sharper than the peak in background noise would indicate. There are no internal trimmers on the R.F. coils which require adjustment.

With the receiver correctly aligned at the high frequency end of the range, the dial should be rotated towards the low numbers. The background noise may vary slightly over the range but should not change by more than 2 to 1 when progressing across the major portion of the dial. Ganging is checked by pressing one of the outside rotor plates of the gang condenser sideways towards the stator but not enough to make the plates touch. Any change in the position of the rotor plates on either the oscillator or detector condenser section should make background noise definitely weaker. The ganging of the R.F. stage can be checked by noting any change in the position of the R.F. trimmer control. Such a change at this point is relatively unimportant and does not indicate the need for realignment.

In making the initial adjustments on the high frequency oscillator and detector circuits, care must be taken to avoid the image frequencies. The oscillator normally works on the high frequency side of the signal circuits and the test signal will, therefore, appear as an image at a lower dial reading (where the oscillator moves to the low frequency side). The image will show up approximately 3.1 Mcs. lower since the intermediate frequency of the NHU is 1560 kc. It was previously stated that the alignment of the receiver should be correct to about 1% at the high frequency end of any range. The error may be somewhat greater at the center or low frequency dial readings since the receiver is adjusted at the factory for accurate ganging and best performance rather than for exact conformation to the dial scale.

I.F. AND CRYSTAL ALIGNMENT

The frequency to which the I.F. amplifier is tuned is determined by a quartz crystal built into the crystal filter unit. It is extremely important, therefore, that I.F. transformers be tuned exactly to the crystal frequency since the latter is not adjustable. The alignment process differs slightly from that ordinarily employed since the test oscillator or signal generator must first be tuned to the fundamental frequency of the crystal. This frequency is normally 1560 kc. in the NHU but may vary a few kilocycles in either direction.

With a test oscillator connected to the grid of the first detector tube and with the crystal filter adjusted for maximum selectivity, the phasing control being set at 5, the frequency of the test oscillator should be adjusted to give maximum output, as indicated on an output meter connected to the speaker terminals. The A.V.C. switch should be off and the R.F. and A.F. gain controls fairly well advanced. Any coil range may be connected and the setting of the tuning condenser is unimportant.

When using a modulated test signal, the high selectivity of the filter circuits will, under certain conditions, give a triple response since it is possible to separate the carrier frequency from the two side band frequencies. It is usually preferable, therefore, to employ an unmodulated signal, obtaining the necessary audio output by using the beat frequency oscillator. After the crystal peak has been found by carefully tuning the test oscillator in the neighborhood of 1560 kc. the seven I.F. adjustments should be made to give maximum sensitivity. The order in which the adjustments are made is not important. The locations of these adjustments are indicated in the top view photograph and are numbered from one to seven.

Since the I.F. transformers are tuned with air-dielectric condensers, the adjustments are permanent and need only be checked when new tubes are installed, provided, of course, the receiver is not subjected to severe mechanical shocks or vibration.

THE C.W. OSCILLATOR

With the I.F. amplifier correctly aligned to the crystal the C.W. oscillator panel control should be turned to zero. This adjustment should give zero beat with the test signal but if it does not it is only necessary to readjust either No. 8 or No. 9 trimmer.

S-METER ADJUSTMENT

With the R.F. gain control set at any position below 9, the S-meter is disconnected and should read zero. If it does not, it will be necessary to reset the zero adjustment on the meter itself. Advancing the R.F. gain control from 9 to 10 (with A.V.C. off) switches the meter into the circuit and in the absence of any signal or noise the meter should still read zero. If such is not the case readjust control R_{23}, as indicated in the photographs. Line voltage variations of 10 or 15 volts will cause the meter pointer to shift from zero about one division, and compensation may be effected if desired by readjustment of the same control. Similarly, substitution of any tubes in the I.F. amplifier, particularly in the third I.F. stage, will change the zero reading of the meter and compensation is made in the same manner.

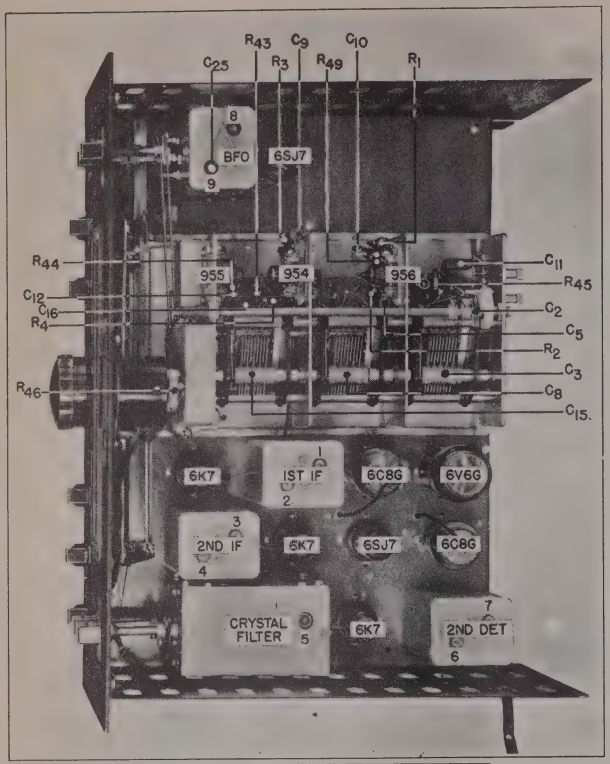
C.O.N.S. ADJUSTMENT

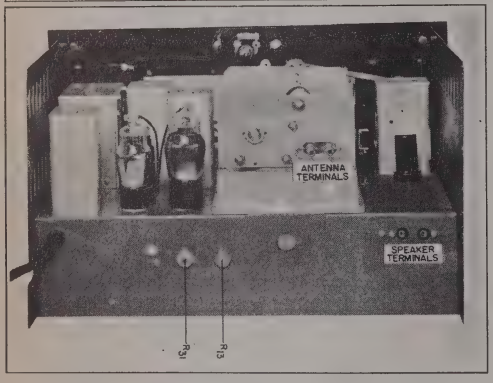
Before using the NHU with C.O.N.S. it is necessary to adjust the threshold signal level to which the squelch circuits respond. To do this the receiver must be set up in its normal operating position with the receiver antenna connected. The R.F. gain control

CONTINUED ON NEXT PAGE

MODEL NHU

NATIONAL CO., INC.





should be advanced to 9 and the receiver tuned to the operating frequency. The R.F. trimmer must be correctly resonated and the selectivity control set between 7 and 8 for maximum band width. The phasing control should be set at its normal operating position; the adjustment of the A.F. gain, tone and limiter controls is unimportant. The A.V.C.-C.O.N.S. switch should now be thrown to the "on" position and the threshold level adjustment, R_{31}, turned counterclockwise until the noise drops out. The control must not be retarded any farther than is necessary for the receiver will not respond to the desired signal. This point should be carefully checked by tuning in the signal with C.O.N.S. off and then turning it on to make sure that the signal is not squelched. The amount of leeway can be easily determined by retarding the R.F. gain control until the signal drops out. Ordinarily, the receiver will be operated with the R.F. gain control advanced to 9.

MISCELLANEOUS

There are a few additional points relating to the operation of the crystal filter which should be mentioned. Inasmuch as the A.V.C. circuits are actuated by the I.F. signal at the 2nd detector, it is essential that the desired station be very carefully and accurately tuned. If this is not done, the action of the selectivity control will appear to be restricted. Suppose, for instance, a signal is being received with the selectivity pointer set at minimum selectivity; readjusting the control to increase selectivity should, of course, reduce the strength of the signal due to side band cutting and should weaken the high audio frequencies. If the signal is tuned slightly off the center of the carrier, changing the selectivity control setting will result in greater audio output, since the fundamental I.F. signal reaching the 2nd detector will be decreased and the A.V.C. circuits will automatically increase the circuit again. Furthermore, the "tone control" effect, noted above, will be absent; in fact the high audio frequencies may be increased in volume. These effects are mentioned because they are apt to be confusing when the receiver is first put in operation. The obvious way of avoiding them is to tune in the signal with the control set near maximum selectivity and then readjust the selectivity knob, as may be required by receiving conditions.

The setting of the phasing condenser will modify the range of selectivity. With the phasing condenser set near either end of its range (as would be required to eliminate an interfering signal close to the desired signal) it will not be possible to obtain knife-edge selectivity. There will still be a very definite single signal effect but modulation side bands will be passed through the filter since the capacity bridge circuit is unbalanced. This is a fundamental consideration and holds true in either phone or C.W. reception with A.V.C. either on or off.

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CONDENSER AND RESISTOR LIST

Symbol	Function	Type	Rating
C_1	R.F. Padding	Fixed Mica	See Note No. 1.
C_2	R.F. Trimmer	Variable Air	15 mmf. max.
C_3	R.F. Tuning	Ganged Section	8–40 mmf.
C_4	R.F. Grid Return	Fixed Mica	.008 mfd. 500 Volt
C_5	R.F. Cathode Bypass	Tubular	.01 mfd. 400 Volt
C_6	R.F. Coupling	Fixed Ceramic	See Note No. 1.
C_7	1st Det. Trimmer	Variable Air	See Note No. 1.
C_8	1st Det. Tuning	Ganged Section	8–40 mmf.
C_9	1st Det. Cathode Bypass	Tubular	.01 mfd. 400 Volt
C_{10}	R.F. B+ Bypass	Tubular	.01 mfd. 400 Volt
C_{11}	R.F. AVC Bypass	Fixed Mica	.003 mfd. 500 Volt
C_{12}	H.F. Osc. Grid	Fixed Mica	100 mmf. 500 Volt
C_{13}	H.F. Osc. Trimmer	Variable Air	See Note No. 1.
C_{14}	H.F. Osc. Padder	Fixed Ceramic	See Note No. 1.
C_{15}	H.F. Osc. Tuning	Ganged Section	8–40 mmf.
C_{16}	H.F. Osc. Filter	Fixed Mica	250 mmf. 500 Volt
C_{17}	R.F. Filter	Fixed Mica	.003 mfd. 500 Volt
C_{18}	1st Det. B+ Bypass	Tubular	.1 mfd. 400 Volt
C_{19}	1st I.F. Cathode Bypass	Tubular	.1 mfd. 400 Volt
C_{20}	1st I.F. Grid Filter	Tubular	.01 mfd. 400 Volt
C_{21}	1st & 2nd I.F. Screen Bypass	Tubular	.1 mfd. 400 Volt
C_{22}	2nd I.F. Cathode Bypass	Tubular	.1 mfd. 400 Volt
C_{23}	2nd I.F. Grid Filter	Tubular	.01 mfd. 400 Volt
C_{24}	BFO Grid	Fixed Mica	100 mmf. 500 Volt
C_{25}	BFO Tuning	Variable Air	4 mmf.
C_{26}	BFO Heater Bypass	Tubular	.1 mfd. 400 Volt
C_{27}	BFO Screen Bypass	Tubular	.1 mfd. 400 Volt
C_{28}	BFO-2nd Det. Coupling	Special	2 mmf.
C_{29}	AVC Coupling	Fixed Mica	50 mmf.
C_{30}	3rd I.F. Grid Filter	Tubular	.01 mfd. 400 Volt
C_{31}	3rd I.F. Cathode Bypass	Tubular	.1 mfd. 400 Volt
C_{32}	3rd I.F. Heater Bypass	Tubular	.01 mfd. 400 Volt
C_{33}	3rd I.F. Plate Filter	Tubular	.1 mfd. 400 Volt
C_{34}	Limiter Control Bypass	Fixed Mica	.003 mfd. 500 Volt
C_{35}	2nd Det. Coupling	Metal Cased	1 mfd. 200 Volt
C_{36}	2nd Det. Cathode	Mica	100 mmf. 500 Volt
C_{37}	Limiter Output Bypass	Mica	100 mmf. 500 Volt
C_{38}	Limiter Output Blocking	Tubular	.1 mfd. 400 Volt
C_{39}	1st A.F. Grid Coupling	Tubular	.01 mfd. 400 Volt
C_{40}	1st A.F. Cathode Bypass	Electrolytic	8 mfd. 200 Volt
C_{41}	Audio Coupling	Tubular	.1 mfd. 400 Volt
C_{42}	Tone Control	Tubular	.01 mfd. 400 Volt
C_{43}	2nd A.F. Cathode	Electrolytic	25 mfd. 50 Volt
C_{44}	2nd A.F. Screen	Mica	.003 mfd. 500 Volt
C_{45}	Spkr. B+ Bypass	Tubular	.1 mfd. 400 Volt
C_{46}	B+ Switch Bypass	Mica	.003 mfd. 500 Volt
C_{47}	B+ Cable Bypass	Mica	.003 mfd. 500 Volt
C_{48}	Chassis to B− Bypass	Electrolytic	25 mfd. 50 Volt
C_{49}	CONS Switch Bypass	Mica	100 mmf. 500 Volt
C_{50}	AVC Filter	Tubular	.01 mfd. 400 Volt
C_{51}	AVC Plate Bypass	Tubular	.01 mfd. 400 Volt
C_{52}	AVC Cathode Bypass	Fixed Mica	.003 mfd. 500 Volt
C_{53}	I.F. B+ Bypass	Tubular	.1 mfd. 400 Volt
C_{54}	Heater Bypass	Tubular	.1 mfd. 400 Volt
R_1	R.F. Bias	Fixed	500 ohms ½ Watt
R_2	R.F. Screen	Fixed	50,000 ohms ½ Watt
R_3	1st Det. Bias	Fixed	5,000 ohms ½ Watt
R_4	1st Det. Screen	Fixed	250,000 ohms ½ Watt
R_5	1st Det. Plate Filter	Fixed	2,000 ohms ½ Watt
R_6	1st I.F. Grid Filter	Fixed	500,000 ohms ½ Watt
R_7	1st I.F. Bias	Fixed	500 ohms ½ Watt
R_8	2nd I.F. Grid Filter	Fixed	500,000 ohms ½ Watt
R_9	2nd I.F. Bias	Fixed	500 ohms ½ Watt
R_{10}	3rd I.F. Grid Filter	Fixed	500,000 ohms ½ Watt
R_{11}	3rd I.F. Bias	Fixed	500 ohms ½ Watt
R_{12}	3rd I.F. Screen Filter	Fixed	2,000 ohms ½ Watt
R_{13}	S-Meter Adjustment	Variable	1,000 ohms 1 Watt
R_{14}	2nd Det. Load	Fixed	20,000 ohms ½ Watt
R_{15}	Limiter Input	Fixed	100,000 ohms ½ Watt
R_{16}	Limiter Output	Fixed	50,000 ohms ½ Watt
R_{17}	Audio Gain Control	Variable	500,000 ohms
R_{18}	1st A.F. Plate	Fixed	100,000 ohms ½ Watt
R_{19}	Tone Control	Variable	500,000 ohms
R_{20}	Degeneration	Fixed	1 meg. ½ Watt
R_{21}	2nd A.F. Grid	Fixed	500,000 ohms ½ Watt
R_{22}	2nd A.F. Bias	Fixed	250 ohms ½ Watt
R_{23}	S-Meter Bridge	Fixed	1,000 ohms ½ Watt
R_{24}	Voltage Divider	Fixed	5,000 ohms 1 Watt
R_{25}	Voltage Divider	Fixed	5,000 ohms 1 Watt
R_{26}	1st A.F. Bias	Fixed	150 ohms ½ Watt
R_{27}	Voltage Divider	Fixed	15,000 ohms 2 Watt
R_{28}	Voltage Divider	Fixed	1,500 ohms ½ Watt
R_{29}	CONS Plate	Fixed	500,000 ohms ½ Watt
R_{30}	Noise Limiter Control	Variable	10,000 ohms
R_{31}	CONS Threshold Control	Variable	10,000 ohms
R_{32}	AVC Plate	Fixed	500,000 ohms ½ Watt
R_{33}	Voltage Divider	Fixed	1,500 ohms 2 Watt
R_{34}	AVC Bias (Voltage Div.)	Fixed	200 ohms 1 Watt
R_{35}	AVC Grid	Fixed	5 meg. ½ Watt
R_{36}	BFO Screen Bleeder	Fixed	100,000 ohms ½ Watt
R_{37}	BFO Screen	Fixed	100,000 ohms ½ Watt
R_{38}	BFO Grid Leak	Fixed	50,000 ohms ½ Watt
R_{39}	BFO Plate	Fixed	250,000 ohms ½ Watt
R_{40}	R.F. Gain Bleeder	Fixed	50,000 ohms ½ Watt
R_{41}	R.F. Gain Control	Variable	10,000 ohms
R_{42}	S-Meter Bridge	Fixed	1,500 ohms ½ Watt
R_{43}	HFO Plate Filter	Fixed	5,000 ohms ½ Watt
R_{44}	HFO Grid Leak	Fixed	20,000 ohms ½ Watt
R_{45}	R.F. Grid Filter	Fixed	500,000 ohms ½ Watt
R_{46}	S-Meter Shunt	Fixed	130 ohms ½ Watt
R_{47}	AVC Filter	Fixed	500,000 ohms ½ Watt
R_{48}	CONS Threshold	Fixed	25,000 ohms ½ Watt
R_{49}	R.F. Plate Filter	Fixed	2,000 ohms ½ Watt

Note No. 1. — Condensers C_1, C_6, C_7, C_{13} and C_{14} are different in each coil range and are individually adjusted as circuit conditions may require. Definite ratings cannot be listed.

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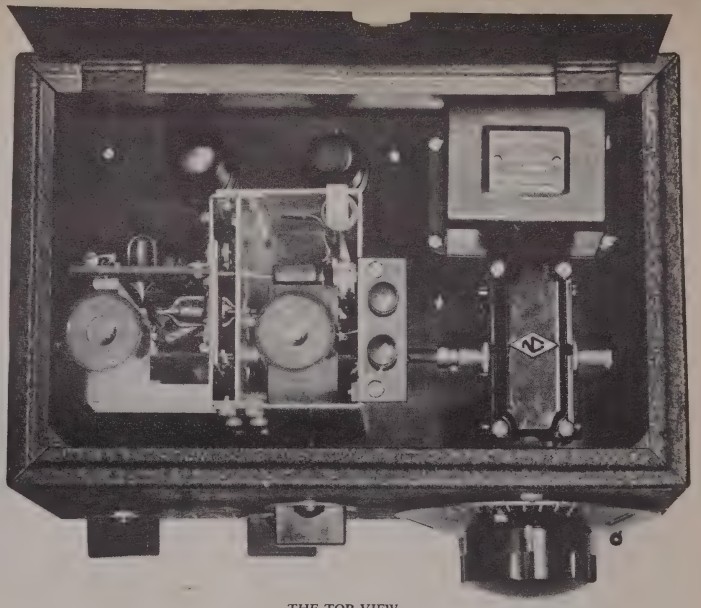
The 1-10
Ultra High Frequency Receiver



THE TOP VIEW
Note the double-shielding between the R.F. and detector circuits, and the unique arrangement of parts

Tubes and Power Supply

THE Type "1-10" receiver employs a 4-tube circuit, consisting of one stage of tuned R.F., a self-quenching superregenerative detector, transformer coupled to a first stage of audio which, in turn, is resistance coupled to a power output stage.

The tubes employed are as follows:

954 — R.F.
955 — Detector
6C5 — First Audio
6F6 — Second Audio

The receiver is designed for operation from the National Type No. 5886 'AB power unit, all voltage dividers, etc., being built in so that but one B-voltage lead is necessary. This power supply furnishes six volts at 1.6 amperes to the heater circuit and 180 volts at 35 milliamperes to the plate and screen circuits. If desired, the heaters may be supplied from a 6-volt battery and the B-circuits from B-batteries. Voltages in excess of 180 are not recommended and receiver performance will be unsatisfactory on the "A" range at voltages below 167. If lower voltages must be used, as in portable operation, the 20,000 ohm resistor connected between the B+ lead and the regeneration control and the 35,000 ohm screen dropping resistor of the R.F. stage, may both be shorted out. This will allow the receiver to function normally with a maximum voltage of 90, but with reduced audio output. A 3-volt C-battery is used to supply bias to the R.F. tube. This battery is mounted in the rear righthand corner of the R.F. compartment, being held in place by a spring clip. Two Eveready Type 915 cells, or equivalent, are needed. They are mounted in a bakelite tube and the positive (center) terminal of the upper cell is grounded at the top by a retaining bracket.

Antenna

The importance of an efficient antenna cannot be over emphasized. The antenna lead, or leads, should be brought directly to the antenna binding posts at the top of the receiver. They may be threaded through the hole in the cover and arranged so that the cover may be opened for changing coils.

A small flexible lead will be found connected to the front antenna post. This supplies a ground connection where a single-wire antenna is used. It should be disconnected from the binding post when doublet feeders or two-wire lines are employed. An external ground connection is usually undesirable, but this point must be determined by experiment.

While the antenna primaries are of symmetrical construction, mechanical considerations prevent exact balance to ground, and there is some capacity coupling between the windings, especially at the higher frequencies.

Exact recommendations for antenna systems cannot be given, since the dimensions will depend upon the frequency at which best efficiency is desired, directional characteristics, etc. In general, however, the antenna proper should be tuned to the received signal. In many installations this condition may be satisfactorily realized by tuning the feeders with series or parallel condensers. The size of the tuning condensers will depend upon the frequency of the received signal and upon antenna dimensions. The transmission line must be efficient. As a rule, "twisted pair", or similar lines, are not satisfactory at frequencies much above 40 or 50 mc., especially where the length exceeds a full wavelength. The open wire or transposed line is much better.

Another general rule regarding antennae, is that any system which is found to be efficient in transmission will have good efficiency with the same directional characteristics, etc., in reception.

Output Circuit and Speaker

The plate circuit of the output tube is brought to the output jack, located at the rear lefthand side. There is no output transformer in the receiver. The speaker requirements are not at all critical, any good magnetic or dynamic speaker being satisfactory provided the input impedance is approximately 7000 ohms, and provided the speaker windings are capable of carrying the plate current of the output tube (about 25 ma.). Some magnetic speakers will require a filter system, such as a 1 to 1 transformer or a 30 henry choke and 1. mfd. condenser combination. There is no provision for the field excitation of a dynamic speaker from the Type No. 5886 AB power unit. For this reason, the permanent magnet type of dynamic speaker is recommended, no field excitation being required.

The headphone jack is located on the front panel, just below and to the left of the main dial. This jack is wired into the output of the first audio stage in such a way that when the phones are plugged in, the signal input to the last tube is completely disconnected. *It is important, however, that the plate circuit of the output tube be complete at all times.* If the speaker is to be disconnected, a jumper must be inserted in the tip-jacks to connect them together. The receiver should not be operated from the above mentioned power supply with the output tube removed, as the voltage might rise above 180 volts. When operated from batteries, the removal of the 6F6 is permissible and will give better battery economy.

Controls

The main dial is the tuning control; calibration curves for the various coils are shown on page 7. The curves are accurate to about three percent. It will be noted that frequency increases with dial reading.

The switch at the lower righthand corner breaks the positive B-supply lead and is useful for temporarily rendering the receiver inoperative during periods of transmission or when changing coils. When using B-battery plate supply, the switch should be thrown to the "Off" position at all times when the receiver is not in use, in order to avoid parasitic drain. No switch is provided for opening the heater circuit.

There are three small dials in addition to the main tuning dial. These control detector regeneration, audio gain, and the alignment of the R.F. circuit, and are marked accordingly.

Operating Characteristics

The "1-10" receiver is designed primarily for the experimenter and to this end has been made to have maximum sensitivity and a wide frequency range. The use of a self-quenching superregenerative detector with a stage of tuned R.F. provides excellent sensitivity and AVC action. Unfortunately, this type of detector introduces some distortion, since it does not have a linear characteristic. The distortion is small when signals are not modulated heavily, and increases with the percentage of modulation.

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The various coils are stamped "A-1", "A-2", coil sockets of the R.F. and detector stages are marked "1", and "2", respectively, to correspond with the coil designations. The high frequency coils, (particularly the "A-1") must be pushed down in the socket as far as they will go. If they are not, the inductance of the primary and secondary circuits will be increased and the calibration of the circuit will be altered.

With any pair of coils in the receiver, the audio gain control should be advanced to 3 or 4 on the dial. Advancing the regeneration control will throw the detector circuits into superregeneration. This condition is indicated by a loud rushing or hissing noise. The hiss will drop down to a very low level or disappear entirely when a signal is tuned in, the reduction depending somewhat upon signal strength. The setting of the regeneration control at which the detector goes into superregeneration will vary with different sets of coils and with the condition of the 955 detector tube. On the "A" range it may be necessary to advance the control to the full on position as the detector tube begins to wear out. Sensitivity will depend upon the adjustment of the regeneration control, the maximum occurring just beyond the point where the hiss starts. The audio gain control must be used to control volume.

With the antenna disconnected and the detector just beyond the point at which superregeneration starts, rotation of the R.F. trimmer control will produce a definite decrease in the detector hiss at a certain setting, usually between 2 and 4. The R.F. circuit is aligned with the detector at the middle of this "dead spot". Advancing the regeneration control will start the hiss again. It is well for the operator to familiarize himself with the effect of these two controls as one is dependent upon the other.

The regeneration control has some tuning effect, increased plate voltage causing an increase in frequency. This necessitates re-tuning toward the lower dial numbers. The effect will vary with the coils employed and the dial setting. Similarly, the effect of the trimmer condenser will vary over the range of the receiver and also over the range of any one pair of coils. With any type of antenna connected, even a few inches of wire, the effect of the R.F. trimmer upon the detector circuit will be greatly reduced if not eliminated. It may still be found by operating the detector at the very edge of superregeneration. The trimmer setting is still critical with regard to the receiver sensitivity, however. The alignment of the trimmer will change with the dimensions of the antenna and also with the tuning of the receiver when using an antenna of fixed size. The setting which aligns the R.F. stage may move in either direction on the trimmer dial, depending upon antenna characteristics.

In determining the correct trimmer setting, when a signal is already tuned in, the operator should judge by the degree of hiss suppression, the maximum suppression indicating correct alignment.

It is important that the regeneration control be advanced sufficiently so that the detector is oscillating strongly. If it is not, any received signal will appear to have a series of carriers a few k.c. apart over several divisions of the tuning dial.

The operator who is not familiar with the PW impression that the receiver tunes very broadly. A superregenerative receiver is, of course, less selective than other types used on lower frequencies but selectivity cannot be judged by the dial space covered by a given signal unless the total equivalent scale length is remembered. Since the dial makes ten revolutions to cover any one coil range, the scale length is approximately 12 feet.

Maintenance

There are no circuit adjustments or trimmer settings to be made, other than those which are brought out to the front panel and which have been previously discussed.

The effect of decreasing battery voltages (both A and B) and ageing tubes will first be noticed when using the "A" coils, particularly at the extreme ends of the range. A 955 detector tube which will no longer operate on the "A" range will still give good performance at lower frequencies. Similarly, any poor connection at the tube socket or coil socket will be especially noticeable at the highest frequencies. In fact, the detector may refuse to go into superregeneration unless the coil contacts, etc., are perfectly clean.

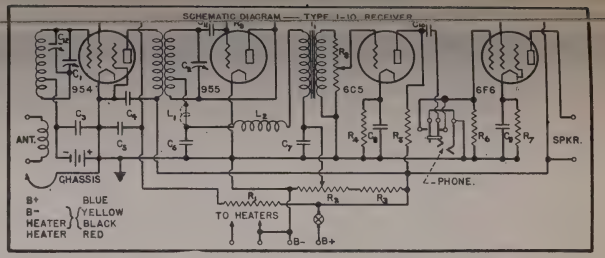
It will be noted that the variable condenser supports, coil sockets, and coil bases, etc. are made of Victron, and while this material has exceptional electrical characteristics, it is similar to hard rubber in mechanical strength and its inability to withstand heat. The receiver should not, therefore, be subjected to high temperatures and the Victron parts must be handled with reasonable care to prevent breakage.

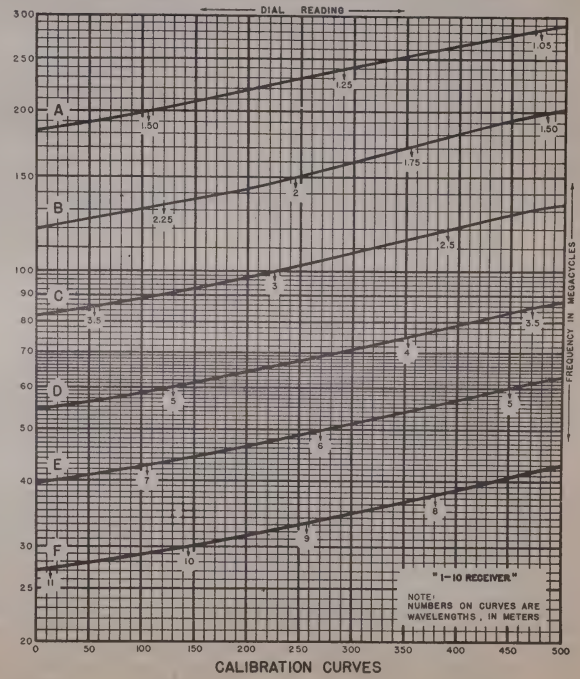
The C-battery does not supply any current and will require replacement but about once a year.

Additional coils for extending the range in either direction are not available.

List of Parts

C_1	R.F. Tuning Condenser	15 mmf. max.
C_2	Detector Tuning Condenser	15 mmf. max.
C_3	R.F. Grid Return Bypass	.002 mfd.
C_4	R.F. Plate Return Bypass	.003 mfd.
C_5	Screen Bypass (copper plate)	.0005 mfd.
C_6	Quench Frequency Bypass	.003 mfd.
C_7	Detector B+ Bypass	.5 mfd. — 200 volt
C_8	1st Audio Cathode Bypass	10 mfd. — 50 volt
C_9	2nd Audio Cathode Bypass	10 mfd. — 50 volt
C_{10}	Audio Coupling Condenser	.1 mfd. — 400 volt
C_{11}	Detector Grid Condenser	.00005 mfd.
C_{12}	R.F. Trimmer Condenser	5 mmf. max.
R_1	Screen Dropping Resistor	35,000 ohms — ½ watt
R_2	Regeneration Control	50,000 ohm Potentiometer
R_3	Detector Plate Dropping Resistor	20,000 ohms — 1 watt
R_4	1st Audio Bias Resistor	5,000 ohms — ½ watt
R_5	1st Audio Plate Resistor	.1 megohm — ½ watt
R_6	2nd Audio Grid Leak	.5 megohm — ½ watt
R_7	2nd Audio Bias Resistor	500 ohms — 1 watt
R_8	Audio Gain Control	500,000 ohm Potentiometer
R_9	Detector Grid Leak	20 megohms
L_1	Ultra-audion Choke — Used only on Higher Frequency Ranges	
L_2	Quench Frequency Choke	250 millihenries
T_1	Audio Transformer	4:1 Ratio





NATIONAL CO. INC.
MODEL 1-10
NATIONAL PAGE 14-7

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ANTENNA input terminals are located at the rear left side of the receiver chassis. The input circuit is suitable for use with a single-wire antenna, a balanced feed line or a low impedance concentric transmission line. A short flexible grounding lead is attached to the chassis.

When using a single-wire antenna, the lead-in should be connected to the input terminal nearest the front of the receiver and the flexible lead, mentioned above, should be attached to the other terminal. The dimensions of the single-wire antenna system are not critical, the recommended length, including lead-in, being 75 to 100 feet.

Feed lines of doublet systems should be connected to the two input terminals; the flexible lead is not used.

The inner conductor of a concentric transmission line should be connected to the input terminal nearer the front of the receiver. The outer conductor and the flexible grounding lead should be connected to the other terminal.

Power Requirements

The Universal Model SW-3 can be operated from either an AC source in conjunction with a National Type 5886-AB Power Unit or from a combination of batteries. When AC or battery operated using one 6C5G and two 6J7G tubes, the heater circuits require .9 amperes at 6.3 volts; a "B" supply of 135 volts is recommended: When battery operated using one 1A5G and two 1N5G tubes, the filament circuits require .15 amperes at 1.5 volts; a 90-volt "B" supply is recommended.

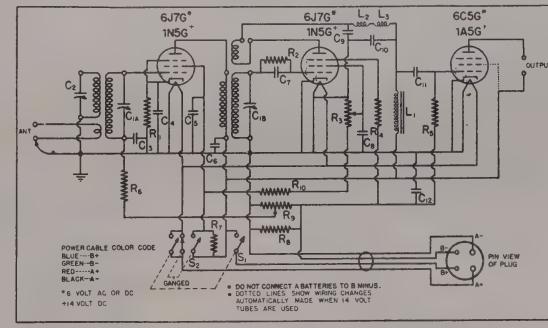
When using the 6.3-volt type tubes, the change-over switch mounted at the rear left-hand top of the chassis *must* be set in the "6.3" position. When the 1.4-volt series of tubes is used, the change-over switch *must* be set at "1.5."

A four-wire cable and plug is attached to the SW-3 Receiver. Plug prong connections are as shown in Dwg. No. 1. When AC-operated, the plug should be inserted in the output socket of the National Type 5886-AB Power Unit. When battery-operated, battery leads may be wired to a four-prong socket and the receiver cable and plug used to complete inter-connections. Alternatively, the plug may be removed and the cable leads connected directly to the battery terminals.

The National Type 686 Vibrator Pack is recommended for use with the SW-3 when a 6-volt DC source is available and when additional batteries for the "B" supply are not desirable. The plug

A type 6X5 tube *must* be used as a rectifier in the 686 Pack, although the rectifier socket is wired so that an OZ4 tube may be substituted without circuit changes.

Two types of commercial vibrator packs are generally available; the self-rectifier and the tube-rectifier. Of these, the latter is recommended, but only when a heater type of tube such as the 6X5 is employed. Packs having a cold-cathode gas rectifier tube such as an OZ4 cannot be used since the "B" current drain of an SW-3 is below the minimum value at which the tube functions normally.



DWG. NO. 1 — CIRCUIT DIAGRAM OF THE UNIVERSAL SW-3

C_1 — *dual variable air capacitor, 90 mmf. per section.*
C_2 — *Variable air capacitor, 50 mmf.*
C_3 — *.01-mfd., 400-volt paper capacitor.*
C_4 — *.1-mfd., 400-volt paper capacitor.*
C_5 — *.1-mfd., 400-volt paper capacitor.*
C_6 — *.1-mfd., 400-volt paper capacitor.*
C_7 — *.0001-mfd., mica capacitor.*
C_8 — *1.-mfd., 200-volt paper capacitor.*
C_9 — *.00025-mfd. mica capacitor.*
C_{10} — *.00025-mfd. mica capacitor.*
C_{11} — *.01-mfd. mica capacitor — part of coupler.*
C_{12} — *25-mfd., 50-volt elec. capacitor.*
L_1 — *700-henry choke — part of coupler.*
L_2 — *2.5-m.h. R.F. choke.*
L_3 — *5.5-m.h. R.F. choke.*
R_1 — *500-ohm, ½-watt resistor.*
R_2 — *5-megohm, ½-watt resistor.*
R_3 — *50,000-ohm potentiometer.*
R_4 — *5,000-ohm, ½ potentiometer.*
R_5 — *.25-megohm, ½-watt resistor — part of coupler.*
R_6 — *50,000-ohm, ½-watt resistor.*
R_7 — *70,000-ohm, ½-watt resistor.*
R_8 — *2,000-ohm, ½-watt resistor.*
R_9 — *3,000-ohm potentiometer.*
R_{10} — *20,000-ohm, ½-watt resistor.*
S_1 — *DPDT toggle switch.*
S_2 — *DPDT toggle switch.*

In no case should a common connection be made between B— and heater circuits. Such a connection would remove the bias voltage from the audio tube. For this reason, the heater center-tap resistor of all new Type 5886-AB Power Supplies is omitted. This omission will not affect the operation of the 5886-AB is recommended. The heater center-tap resistor must be removed from an older 5886-AB Supply when used in conjunction with a Universal Model SW-3.

R.F. Transformer Coils

Thirteen sets of plug-in coils are used to tune from 9 to 3000 meters. Five additional sets are used to bandspread the 10-, 20-, 40-, 80- and 160-meter amateur bands. See Dwgs. Nos. 2 and 3 and the coil listing

When operation on any general coverage range is desired, the proper set of coils should be plugged into the receiver coil sockets. R.F. amplifier and detector coils of Sets No. 30 to No. 35 and No. 39 to No. 41, inclusive, are identical and may be interchanged in the coil sockets of the receiver. Coils of Sets No. 36, No. 37, No. 38 and No. 42 are not interchangeable. The coil forms of these sets are marked on the bottom outside near the prongs — "D," detector coils; "R," R.F. amplifier coils.

With a band-spread range in use, the receiver will not function properly if the R.F. amplifier and detector coils are interchanged in the receiver coil sockets. The detector coil can be readily identified by the variable trimmer capacitor mounted at the top of the coil form. When the band-spread coils are used, the grid leads attached to the receiver should be removed from the tube grid caps and clipped in place on the insulated posts mounted on the sides of the metal shields next to the main tuning capacitor. The grid leads of the coils should be attached to the proper tube grid caps.

In all models of SW-3 Receivers, the R.F. amplifier coil socket is located at the left of the main tuning capacitor, as the receiver is viewed from the

Controls

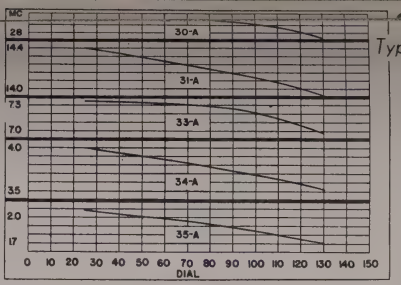
THE main tuning dial of the SW-3 Receiver is mounted on the front of the cabinet at the center. It is of the variable ratio type. A control lever is provided to adjust the control knob-to-capacitor drive coupling ratio to any desired point between the limits of 6 to 1 and 18 to 1. Scale graduations are from 0 to 150 divisions over the 270 degrees of rotation through which the dial turns the main capacitor. Calibration curves (Dwgs. Nos. 2 and 3) show the approximate frequency to which the receiver is tuned.

To the left of the main dial is the R.F. amplifier trimmer capacitor. This control is used to compensate for minor mistracking of the R.F. amplifier stage, as may be caused by antenna detuning. The trimmer knob should be adjusted to give maximum sensitivity, in the following manner: The regeneration control should be advanced beyond the point of detector oscillation. As the R.F. amplifier trimmer capacitor is rotated back and forth or "rocked," the regeneration control should be slowly retarded. At one adjustment of the latter, the detector will oscillate only with the R.F. amplifier trimmer set at a definite point. It is at this point that the R.F. amplifier and detector circuits track, and the receiver has maximum sensitivity.

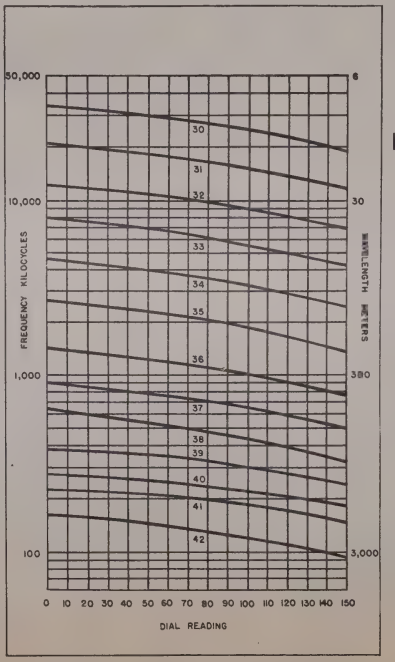
Below the main dial is the R.F. gain control. The control disc is arbitrarily calibrated from 1 to 9. The purpose of the gain control is to adjust the amplification of the R.F. amplifier tube. Amplification increases as the control is turned toward 1. The graduated R.F. gain control makes signal input, as follows: With the receiver tuned to either a modulated or unmodulated carrier, the R.F. gain control should be retarded until the signal is barely audible. The gain control disc number centered in the panel opening below the main dial will indicate the signal input in S units, a term commonly used by radio operators.

The regeneration control is located to the right of the main dial. It is used to adjust the voltage applied to the screen of the detector tube. As the control knob is turned in a clockwise direction, the amplification of the detector tube increases up to the point at which oscillation takes place. When receiving modulated signals (phone), best sensitivity will be had with the detector operated just below the point of oscillation. For C.W. (code) reception, the detector must be oscillating to produce a beat note, the frequency of which will be determined by the main dial setting.

At the left side center of the cabinet front panel is mounted a toggle switch. When the change-over switch mentioned under "Power Requirements" is set at "6.3," the panel toggle switch is used to open the receiver "B" circuits and silence the receiver as may be necessary during periods of transmission. With the change-over switch referred to above set at "1.5," the panel toggle switch is used as a battery ON-OFF control, opening both the filament and "B" circuits. It is also used to silence the receiver during transmission periods.



DWG. NO. 2 — BANDSPREAD COIL CALIBRATION CURVES



DWG. NO. 3 — GENERAL COVERAGE COIL CALIBRATION CURVES

Type No.	Range — Meters		
30	9	to	15
31	13.5	to	25
32	23	to	41
33	40	to	70
34	65	to	115
35	115	to	200
36	200	to	360
37	350	to	550
38	500	to	850
39	850	to	1200
40	1200	to	1500
41	1500	to	2000
42	2000	to	3000

Bandspread Coils:

Type No.	
30A	— 10-meter
31A	— 20-meter
33A	— 40-meter
34A	— 80-meter
35A	— 160-meter

Alignment and Service

Coil Alignment

ALL SW-3 Receivers and coils are tested to laboratory standards and are, therefore, mutually interchangeable. In normal service, possible adjustment of the band-spread detector coils should be the only realignment required. The necessity for such adjustment is determined by the accuracy of receiver calibration as compared to the calibration curves Dwgs. Nos. 2 and 3.

The procedure for adjusting any band-spread detector coil is as follows: With the coils to be aligned in place and with the receiver controls set for normal C.W. reception, the main dial should be tuned to the high frequency limit of the band. An accurate test oscillator or signal generator should be coupled to the receiver antenna input terminals and tuned to deliver a signal of the same frequency as indicated by the receiver dial setting. The trimmer capacitor in the detector coil should be varied until the test signal is tuned in. With this trimmer properly set, the low frequency limit should be accurate, and the R.F. amplifier and detector stages should track.

Tube and Circuit Failures

Failures can readily be located by checking the individual components, including tubes, with reliable equipment or by temporary substitution with parts known to be in good condition. A replacement detector tube should be selected with care to eliminate the possibility of trouble from microphonics, hum modulation, or instability of signals.

MODEL ACSW-3
MODEL 2V DCSW-3
MODEL 6V DCSW-3

NATIONAL CO., INC.

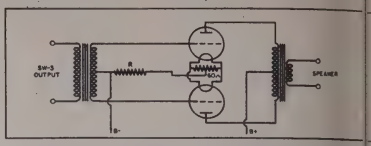
Earlier Models of SW-3

General

THE data on the Universal Model SW-3 applies, in most part, to all models of the SW-3 Receiver. Details applicable to older types only are given below.

AUDIO AMPLIFIER

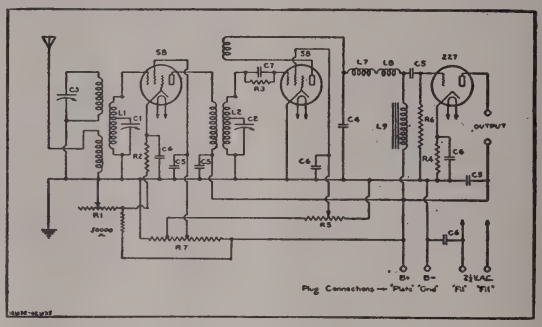
For loud speaker reception, the audio amplifier shown at the right is recommended. Resistor "R" will depend on the particular tubes employed, as follows: 2-45's, 750 ohms; 2-2A3's, 400 ohms; 2-2A5's triode connected, 350 ohms; 2-27's, 1000 ohms.



DWG. NO. 4 — CIRCUIT DIAGRAM OF AUD AMPLIFIER

ACSW-3 PARTS LIST

C_1 — *Dual variable air capacitor, 90 mmf. per section.*
C_2 — *Part of C_1, ganged.*
C_3 — *Variable air capacitor, 50 mmf.*
C_4 — *.00025-mfd. mica capacitor.*
C_5 — *.01-mfd. mica capacitor.*
C_6 — *.5-mfd., 200-volt paper capacitor.*
C_7 — *.0001-mfd. mica capacitor.*
L_1 — *R.F. amplifier transformer.*
L_2 — *Detector transformer.*
L_7 — *2.5-m.h. R.F. choke.*
L_8 — *5.5-m.h. R.F. choke.*
L_9 — *700-henry choke — part of coupler.*
R_1 — *10,000-ohm rheostat.*
R_2 — *300-ohm, ½-watt resistor.*
R_3 — *5-megohm, 1-watt resistor.*
R_4 — *2000-ohm, 1-watt resistor.*
R_5 — *50,000-ohm potentiometer.*
R_6 — *.25-megohm, ½-watt resistor — part of coupler.*
R_7 — *12,000-ohm voltage divider resistor — 3100, 2000, 6900-ohm sections.*



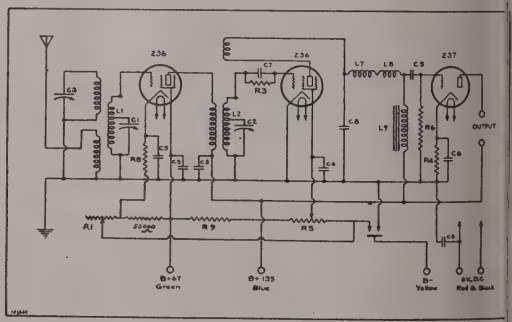
DWG. NO. 5 — CIRCUIT DIAGRAM OF THE ACSW-3

ACSW-3 Receiver

Dwg. No. 5 shows the circuit diagram and parts list. This model uses two type 58 tubes as R.F. amplifier and detector and one type 27 as audio. Heater circuits require 3.75 amps., 2.5 volts; "B" circuits, 135–180 volts D.C. "60–70" series of coils are used.

6V DCSW-3 PARTS LIST

The circuit diagram shows types 36 and 37 tubes in place for 6-volt DC operation. By simply substituting type 35 for type 36 and type 27 for type 37, the receiver may be converted to 2.5-volt AC operation, without circuit or coil changes. Circuit constants are identical with those applying to DWG. No. 5 with the following exceptions:
R_8 — *350-ohm, ½-watt resistor.*
R_9 — *20,000-ohm, 2-watt resistor.*

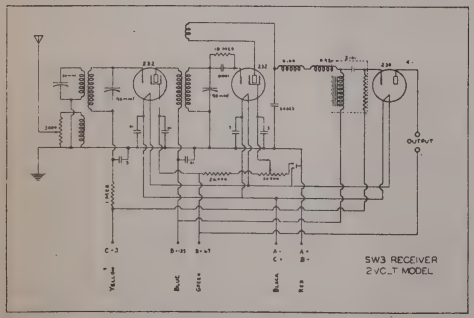


DWG. NO. 6 — CIRCUIT DIAGRAM OF THE 6V DCSW-3

6V DCSW-3 Receiver

Dwg. No. 6 shows the circuit diagram and lis values of parts. Tubes used are two type 36 R.F. amplifier and detector and one-type 37 audio. Heater circuits require .9 amps., 6.3 volt "B" circuits, 67 and 135 volts DC.

If desired, type 35 tubes may be substituted fo type 36 and type 27 for 37, making the receiv suitable for 2.5-volt heater operation. Heat current drain when so operated is 5.25 amps "B" potential, 67 and 135 volts DC. In eithe case. "10–20" series of coils are used.



DWG. NO. 7 — CIRCUIT DIAGRAM OF THE 2V DCSW-3

DWG. No. 7 shows the circuit and the values of component parts of the 2V DCSW-3 Receiver. This model was the preferred type for portable operation with low battery power consumption before the introduction of the Universal Model, using 1.4-volt tubes.

2V DCSW-3 Receiver

Dwg. No. 7 shows the circuit diagram and parts list. Two-type 32 tubes are used as R.F. amplifier and detector; one type 30 as aud Filament circuits require .16 amps., 2 volts I "B" circuits, 67 and 135 volts; and bias circu 3 volts. "10–12" series coils are used.

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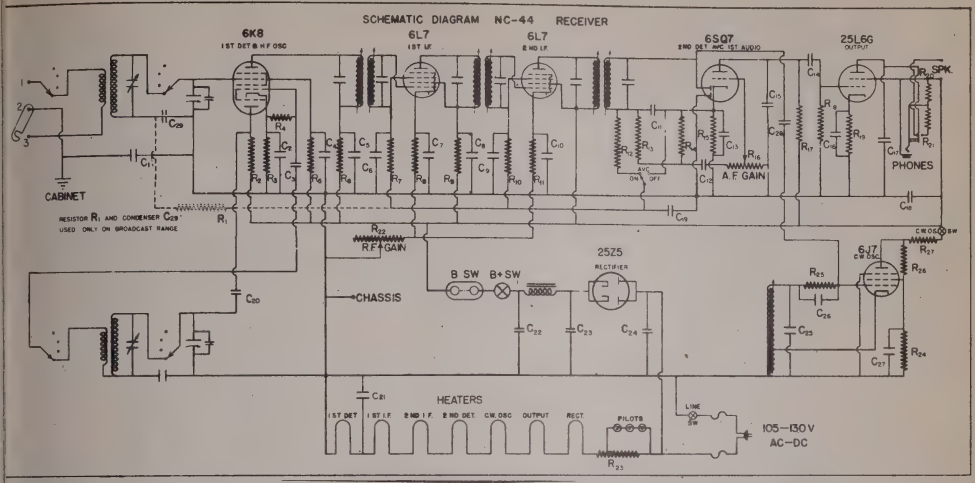
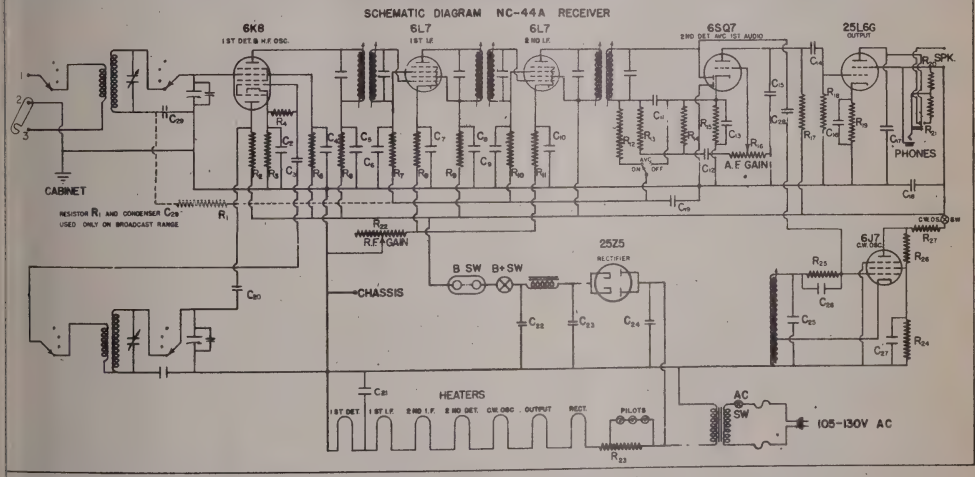
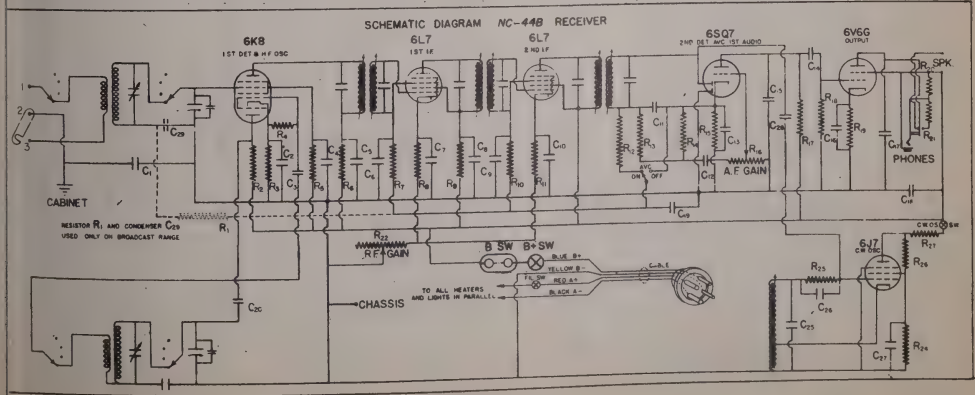
MODEL NC-44
MODEL NC-44A
MODEL NC-44B







IF PEAK 456 KC

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PROTECTIVE DEVICES: A double fuse block is mounted underneath the chassis and contains two standard fuses designated as the type 3AG, having a rating of 2 amperes. One fuse is connected in either side of the line and will provide adequate protection against damage to the various tubes and circuit elements which might result from any short-circuit or ground.

The operator who uses break-in, or who is experimenting with various types of transmitting and receiving antennae should provide some means of preventing excessive R.F. pick-up which might harm the input circuit of the receiver. In case of doubt, it is recommended that an R.F. ammeter be connected in the antenna lead-in, or in one of the doublet feeders close to the receiver, in order to measure the actual R.F. pick-up. This current should not exceed .1 ampere.

DIAL LAMPS: From the circuit diagram, it may be seen that the dial is illuminated by three lamps connected in series across a portion of the series heater resistor. These lamps are the standard "brown bead" type, designed for 6.3 volts and drawing .15 ampere. Since they necessarily form a part of the heater circuit of the receiver, burned out lamps should be replaced promptly, for, altnough the receiver will not be harmed, the various tubes will not function quite as efficiently if the dial lamps are not lighted.

NATIONAL NC-44 RECEIVER

AC-DC Model

CAPACITORS

	mfd.	volts		mfd.	volts
C1-	.1	400	C15-	.0005	mica
C2-	.1	400	C16-	25.	50
C3-	.0001	mica	C17-	.001	mica
C4-	.1	400	C18-	.1	400
C5-	.1	400	C19-	.01	400
C6-	.01	400	C20-	.005	mica
C7-	.1	400	C21-	.1	400
C8-	.1	400	C22-	40	200
C9-	.01	400	C23-	40	200
C10-	.1	400	C24-	.1	400
C11-	.00025	mica	C25-	.0001	mica
C12-	.01	400	C26-	.0001	mica
C13-	25	50	C27-	.1	400
C14-	.1	400	C28-	.000002	
			C29-	.01	400

RESISTORS

	ohms	watts		ohms	watts
R1-	.5 meg-	1/2	R15-	5,000	1/2
R2-	10,000	1/2	R16-	.5 meg-	
R3-	200	1/2		A.F.Gain	
R4-	25,000	1/2	R17-	.1 meg-	1/2
R5-	1,000	1/2	R18-	.5 meg-	1/2
R6-	1,000	1/2	R19-	140	1
R7-	.5 meg-	1/2	R20-	500	1/2
R8-	300	1/2	R21-	1,000	2
R9-	1,000	1/2	R22-	10,000	
R10-	.5 meg-	1/2		R.F.Gain	
R11-	300	1/2	R23-	132	10
R12-	1. meg-	1/2	R24-	.1 meg-	1/2
R13-	.5 meg-	1/2	R25-	50,000	1/2
R14-	1. meg-	1/2	R26-	.1 meg-	1/2
			R27-	.1 meg-	1/2

THE NC-44A RECEIVER

AC Model

Recommendations pertinent to the NC-44 (AC-DC) receiver apply also to the NC-44A (AC) model, except as follows:

The NC-44A is designed for operation from 105-130 volt, 50-60 cycle lines only and draws approximately 50 watts. Attempted operation from other AC sources or from DC lines will cause serious damage to the receiver.

The schematic diagram below shows the circuit of the NC-44A model.

Parts List same as NC-44, except that C1 is not used.

CAPACITORS

	mfd.	volts		mfd.	volts
C1-	.1	400	C14-	.1	400
C2-	.1	400	C15-	.0005	mica
C3-	.0001	mica	C16-	25	50
C4-	.1	400	C17-	.001	mica
C5-	.1	400	C18-	.1	400
C6-	.01	400	C19-	.01	400
C7-	.1	400	C20-	.005	mica
C8-	.1	400	C25-	.0001	mica
C9-	.01	400	C26-	.0001	mica
C10-	.1	400	C27-	.1	400
C11-	.00025	mica	C28-	.000002	
C12-	.01	400	C29-	.01	400
C13-	25	50			

RESISTORS

	ohms	watts		ohms	watts
R1-	.5 meg-	1/2	R15-	5,000	1/2
R2-	10,000	1/2	R16-	.5 meg-	Pot.
R3-	200	1/2		A.F.Gain	
R4-	25,000	1/2	R17-	.1 meg-	1/2
R5-	1,000	1/2	R18-	.5 meg-	1/2
R6-	1,000	1/2	R19-	350	1
R7-	.5 meg-	1/2	R20-	500	1/2
R8-	300	1/2	R21-	1,000	2
R9-	1,000	1/2	R22-	10,000	Rheo.
R10-	.5 meg-	1/2		R.F.Gain	
R11-	300	1/2	R24-	.1 meg-	1/2
R12-	1.0 meg-	1/2	R25-	50,000	1/2
R13-	.5 meg-	1/2	R26-	.1 meg-	1/2
R14-	1.0 meg-	1/2	R27-	.1 meg-	1/2

THE NC-44B RECEIVER

Battery Model

The NC-44B (Battery Operated) is basically the same as the NC-44 (AC-DC) model, the power supply being omitted. In general, the data given applies to the NC-44B. Data applicable to the NC-44B only is as follows:

The tube complement is the same as the NC-44 except that a type 6V6G tube is used in the audio output stage; the rectifier tube is omitted. The heater circuit requires 2.25 amps. at 6 volts; a "B" supply of 90-135 volts is recommended. The "B" drain is approximately 40-65 milliamperes.

If desired, the NC-44B may be operated entirely from a 6-volt DC source in conjunction with a National Type 686 Vibrator Power Pack. On special order and at an increase in price, the receiver can be furnished with a built-in vibrator pack (Type NC-44BV).

Operation from AC lines is made possible by employing a National Type 5886AB Power Supply.

Receiver power cable color code and connector plug connections are shown on the circuit diagram below. Plug prong connections match the output socket wiring of the Types 686 and 5886AB Power Supplies.

As stated above, the output stage employs a 6V6G tube. The loud speaker furnished with the receiver is equipped with a coupling transformer to match the load impedance of the output tube - 5000 ohms. Since both speaker and headphone outputs are obtained from the output tube, it is not possible to operate the receiver with this tube removed from its socket.

The main dial is illuminated by two dial lamps connected in parallel across the heater circuit. These lamps are the standard "brown bead" type, designed from 6.3 volts and drawing .15 ampere each.

MODELS NC-45, NC-45A NC-45B

NATIONAL CO., INC.

MODEL NC-44
MODEL NC-44A
MODEL NC-44B

GENERAL DESCRIPTION: The NC-44 is an inexpensive seven-tube receiver covering frequencies from 540 to 30,000 kilocycles in four ranges, the various ranges being selected by means of a conventional band switch.

The circuit of the receiver, as shown in the schematic diagram, is simple, but effective. It consists of a 6K8 combination first detector and oscillator, two I.F. stages with permeability tuned iron-core transformers and 6L7 tubes, a 6SQ7 combination second detector - AVC - first audio stage, and a single audio output stage employing a 25L6G. The C.W. oscillator is a 6J7 and the rectifier is a 25Z5. The receiver is designed for operation from 105-130 volt AC or DC lines and draws approximately 40 watts.

A dual tuning system provides both general coverage and bandspread operation. The main tuning capacitor is of straight frequency design and is coupled to a scale calibrated accurately in megacycles; it is operated through a vernier reduction drive having a ratio of about 30 to 1. The electrical bandspread system comprises a separate two-gang tuning capacitor with a separate dial mechanism and dial scale. Practically all tuning in the short-wave ranges will be done with this bandspread capacitor and the various amateur bands are spread as follows:

3.5 to 4.0	megacycles	65 divisions
7.0 to 7.3	"	50 "
14.0 to 14.4	"	56 "
28.0 to 30.0	"	40 "

Separate audio and I.F. gain controls are provided and each of these controls is fitted with a switch. When the audio gain control is turned to the "off" position, the B-supply circuit is opened to place the receiver in stand-by position. Turning the R.F. gain control to the minimum position turns the receiver completely off. In addition to these controls, separate switches are provided for the C.W. oscillator and the AVC circuits. A BSW terminal panel for external (remote) stand-by control is mounted at the rear of the chassis. The terminals are connected in series with the B+ switch.

ANTENNA: Three antenna terminals are located on the right-hand side of the cabinet. The center terminal is grounded to the cabinet and is provided with a strap by means of which it may be connected to either of the other terminals when using a single-wire antenna. In general, it will be found best to connect this strap between the center and the right-hand terminals; the single-wire antenna being connected to the remaining terminals. For all-around short-wave reception, the simple single-wire antenna will be found satisfactory except in extremely noisy locations. The overall length may be between 50 and 100 feet and an external ground is not required.

For amateurs who wish to obtain best performance on any particular band, the single-wire antenna should be made to have an overall length, including lead-in, approximately equal to an odd quarter-wave length. For instance, at 10 meters the antenna may be 24, 40 or 56 feet, etc. These figures represent 3, 5 and 7 quarter-wave lengths, respectively. An antenna designed in this manner will provide good signal pick-up with efficient transfer to the receiver and will, at the same time, minimize high-capacity and other similar undesirable effects.

From the above, it will be seen that the same antenna cannot be expected to function with full efficiency on more than one band, unless some provision is made for tuning. Such tuning can often be satisfactorily accomplished by means of a series variable capacitor having a maximum capacity of 100 or 200 mmf.

Doublet antennae, directive arrays, etc., having two-wire feeder systems, can be connected directly to the two outside antenna terminals, the center terminal and strap not being used.

Where local noise is not bothersome, the single-wire type of antenna is to be preferred. In some installations, however, where there are some one or more sources of interference within fifty feet of the receiver, the single-wire will pick up the disturbance on the lead-in. Under such conditions, the doublet may provide the better signal-to-noise ratio. The improvement will be small, however, unless the pick-up portion can be erected at a considerable distance from the noise source (i.e., about twice the distance which separates the source from the receiver). If the installation cannot be made in this manner, the use of a doublet may weaken signals due to unavoidable losses in the feed-system, and the signal-to-noise ratio will not be improved.

OUTPUT CIRCUIT: As shown in the schematic diagram, the output terminals of the receiver are connected in the plate circuit of the 25L6G power output tube. The speaker terminals are at the rear of the chassis. The speaker furnished with the receiver is of the permanent magnet dynamic type having a suitable coupling transformer to match the load impedance of the tube - 10 ohms. A headphone jack is mounted at the rear of the chassis and is wired in such manner that the speaker is quiet when the phones are in use. The impedance of the headphones should be approximately 20,000 ohms, this being the usual impedance of phones having a total DC resistance of between 2000 and 3000 ohms. The NC-44 should not be operated unless either a speaker or a headphone set is connected to the proper terminals. Also, the receiver will not function with the output tube removed from its socket, since all heaters are connected in series and since this tube supplies both speaker and headphone outputs.

SPEAKER MOUNTING: The loud speaker is mounted in a small cabinet finished to match the receiver. To obtain best tone quality the speaker chassis should be mounted on a large baffle insulated mechanically from the receiver. The baffle should be of non-resonant material, so that it will not vibrate. A baffle three or four feet square will generally prove satisfactory. More uniform bass response will be obtained by increasing the baffle size up to about nine feet square. Mounting the speaker in the receiver in the same cabinet, or console, is not recommended since vibration from the speaker is apt to be transferred to the tubes, producing microphonic noises.

OPERATING INSTRUCTIONS: As previously stated, the NC-44 receiver may be connected to either the AC or DC lines. In the case of a DC line, the receiver will be inoperative unless the plug has the correct polarity. This must be determined by trial, but the receiver will not be harmed in any way if the plug happens to be reversed. After the receiver is plugged in and the antenna is connected, both the R.F. and A.F. gain controls should be advanced to 6 or 7. The AVC switch should be "on" and the C.W. oscillator switch "off". The band selector switch, which is located in the middle of the front panel between the two tuning knobs, should be set to indicate the desired frequency range, and the bandspread tuning knob at the right should be set so that the small pointer reads ninety on the scale. Stations may then be tuned in, in the regular way, by means of the left-hand, or general coverage, tuning knob.

It should be noted that the frequency calibration of the main scale will only be correct when the bandspread pointer is at ninety. After a station has been found, however, the bandspread control will provide a vernier action which makes tuning of high frequency signals very easy, particularly where the receiver is to be used in amateur communication work. Ordinarily, the AVC switch will be "on" at all times and the R.F. gain control will be well advanced with volume being controlled by the A.F. gain adjustment. When receiving extremely strong signals, such as would be obtained from a local broadcast station, the R.F. gain control should be retarded in order to avoid any possibility of tube overload or distortion. The C.W. oscillator may be used if desired in locating weak signals with the AVC switch either "on" or "off".

ALIGNMENT AND SERVICE DATA: Individual tubes of the same type will vary slightly in their characteristics and it is well to remember this fact when replacements become necessary. Even though the circuit is designed to reduce the effect of such variations to a minimum, the converter and I.F. tubes should be selected with some care. A replacement converter should be checked in the receiver to make sure that the interelectrode capacities are the same as those of the tube originally employed. This is easily determined by noting any change in calibration at the high frequency end of any coil range. The change should not exceed two or three dial divisions.

The intermediate frequency of the NC-44 receiver is 456 kilocycles. The three I.F. transformers are of the permeability tuned iron-core type and are adjustable from the outside of the cabinet. The transformers are of such construction that the factory adjustment is permanent and they should not be re-tuned, therefore, unless there are definite indications that such tuning is required. The high frequency coils and trimmer capacitors are mounted underneath the chassis, being grouped above the band-selector switch. The oscillator coils are mounted nearest the left-hand side of the receiver with the first detector coils at the right. The adjustment of these circuits is quite conventional but here, again, the various trimmers should NOT be adjusted indiscriminately, as it is often rather difficult to determine the correct capacitor settings without special test equipment.

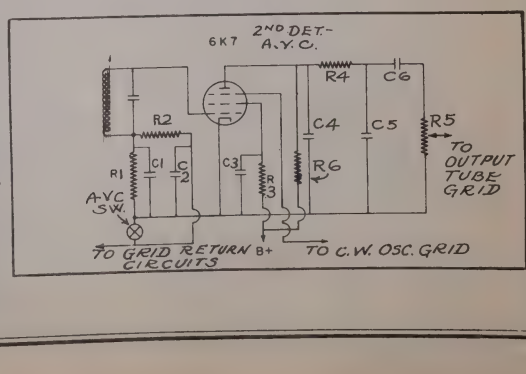
DET – AVC – AUDIO TUBE

6K7—6SQ7

Earlier models of the NC-44 Series of Receivers used a type 6K7 as a combination second detector - AVC - first audio. Later models employed a 6SQ7 in place of the 6K7, with improved AVC action. The diagram of circuit connections of the 6K7 tube is shown below.

This does not apply to the NC-45 Series.

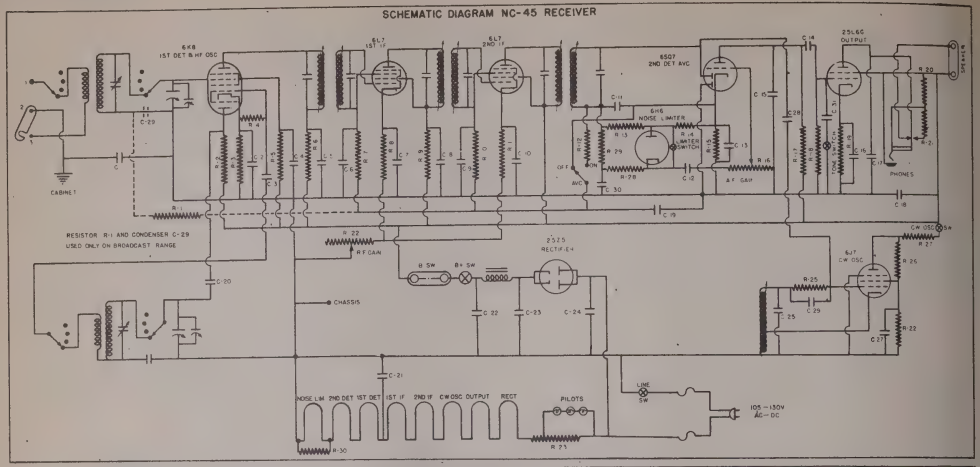
CAPACITORS		RESISTORS	
mfd.	volts	ohms	watts
C1-.00025	mica	R1- 1 meg-	1/2
C2-.01	400	R2- 1 meg-	1/2
C3-.1	400	R3-.5 meg-	1/2
C4-.0001	mica	R4-20,000	1/2
C5-.0005	mica	R5-.5 meg-	
C6-.1	400	Audio Gain	
		R6-.1 meg-	1/2



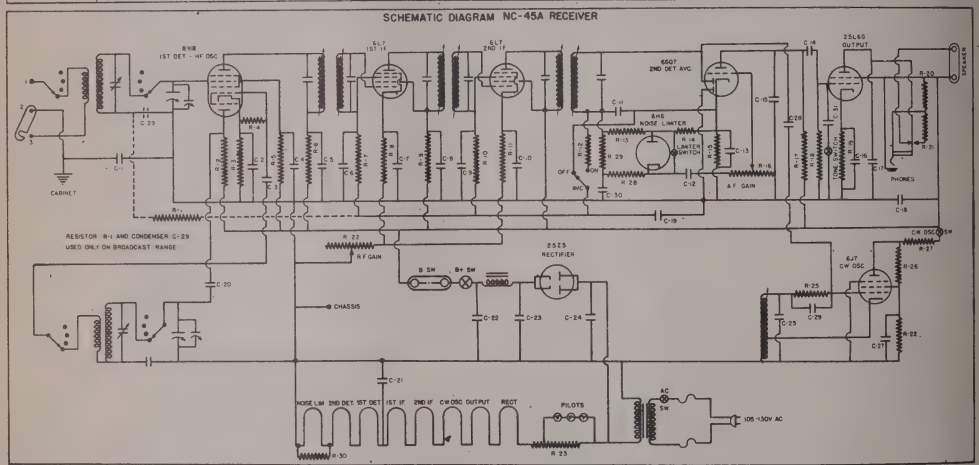
MODEL NC-45
MODEL NC-45A
MODEL NC-45B

NATIONAL CO., INC.

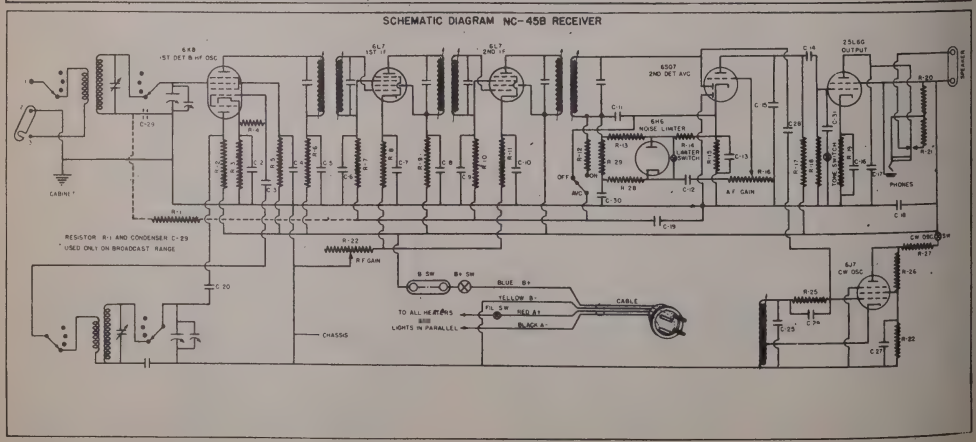
SCHEMATIC DIAGRAM NC-45 RECEIVER



SCHEMATIC DIAGRAM NC-45A RECEIVER



SCHEMATIC DIAGRAM NC-45B RECEIVER



IF PEAK 456 KC

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MODEL NC-45
MODEL NC-45A
MODEL NC-45B

NATIONAL CO., INC.

FOR CIRCUIT DESCRIPTION, OPERATING AND SERVICING DATA, SEE THAT PERTAINING TO THE NC-44 SERIES WHICH IS SIMILAR TO THE NC-45 SERIES OF RECEIVERS.

THE NC-45 RECEIVER

CAPACITORS

	mfd.	volts		mfd.	volts
C1	-.1	400	C17	-.001	mica
C2	-.1	400	C18	-.1	400
C3	-.0001	mica	C19	-.01	400
C4	-.1	400	C20	-.005	mica
C5	-.1	400	C21	-.1	400
C6	-.01	400	C22	- 40	200
C7	-.1	400	C23	- 40	200
C8	-.1	400	C24	-.1	400
C9	-.01	400	C25	-.0001	mica
C10	-.1	400	C26	-.0001	mica
C11	-.00025	mica	C27	-.1	400
C12	-.01	400	C28	-.000002	
C13	- 25	50	C29	-.01	400
C14	-.1	400	C30	-.1	400
C15	-.0005	mica	C31	-.003	mica
C16	- 25.	50			

RESISTORS

	ohms	watts		ohms	watts
R1	- .5 meg-	1/2		A.F. GAIN	
R2	-10,000	1/2	R17	-.1 meg-	1/2
R3	- 200	1/2	R18	-.5 meg-	1/2
R4	-25,000	1/2	R19	- 140	1
R5	- 1,000	1/2	R20	- 500	1/2
R6	- 1,000	1/2	R21	-1,000	2
R7	- .5 meg-	1/2	R22	-10,000	
R8	- 300	1/2		R.F. GAIN	
R9	- 1,000	1/2	R23	- 132	10
R10	- .5 meg-	1/2	R24	-.1 meg-	1/2
R11	- 300	1/2	R25	-50,000	1/2
R12	- 1. meg-	1/2	R26	-.1 meg-	1/2
R13	- .5 meg-	1/2	R27	-.1 meg-	1/2
R14	- .5 meg-	1/2	R28	- 1 meg-	1/2
R15	-5,000	1/2	R29	- 1 meg-	1/2
R16	-.5 meg-		R30	- 100	1/2

THE NC-45A RECEIVER

AC Model

Recommendations pertinent to the NC-45 (AC-DC) receiver apply also to the NC-45A (AC) model, except as follows:

The NC-45A is designed for operation from 105-130 volt, 50-60 cycle lines only and draws approximately 50 watts. Attempted operation from other AC sources or from DC lines will cause serious damage to the receiver.

The schematic diagram below shows the circuit of the NC-45A model.

Parts List same as NC-45, except that C1 is not used.

THE NC-45B RECEIVER

Battery Model

The NC-45B (Battery Operated) is basically the same as the NC-45 (AC-DC) model, the power supply being omitted. In general, the data given on pages [illegible] applies to the NC-45B. Data applicable to the NC-45B only is as follows:

The tube complement is the same as the NC-45 except that a type 6V6G tube is used in the audio output stage; the rectifier tube is omitted. The heater circuit requires 2.55 amps. at 6 volts; a "B" supply of 90-135 volts is recommended. The "B" drain is approximately 40-65 milliamperes.

SEE THE NOTES UNDER MODEL NC-44B, WHICH ALSO APPLY TO THE MODEL NC-45B.

CAPACITORS

	mfd.	volts		mfd.	volts
C1	- .1	400	C15	-.0005	mica
C2	- .1	400	C16	- 25	50
C3	- .0001	mica	C17	-.001	mica
C4	- .1	400	C18	-.1	400
C5	- .1	400	C19	-.01	400
C6	- .01	400	C20	-.005	mica
C7	- .1	400	C25	-.0001	mica
C8	- .1	400	C26	-.0001	mica
C9	- .01	400	C27	-.1	400
C10	- .1	400	C28	-.000002	
C11	- .00025	mica	C29	-.01	400
C12	- .01	400	C30	-.1	400
C13	- 25	50	C31	-.003	mica
C14	- .1	400			

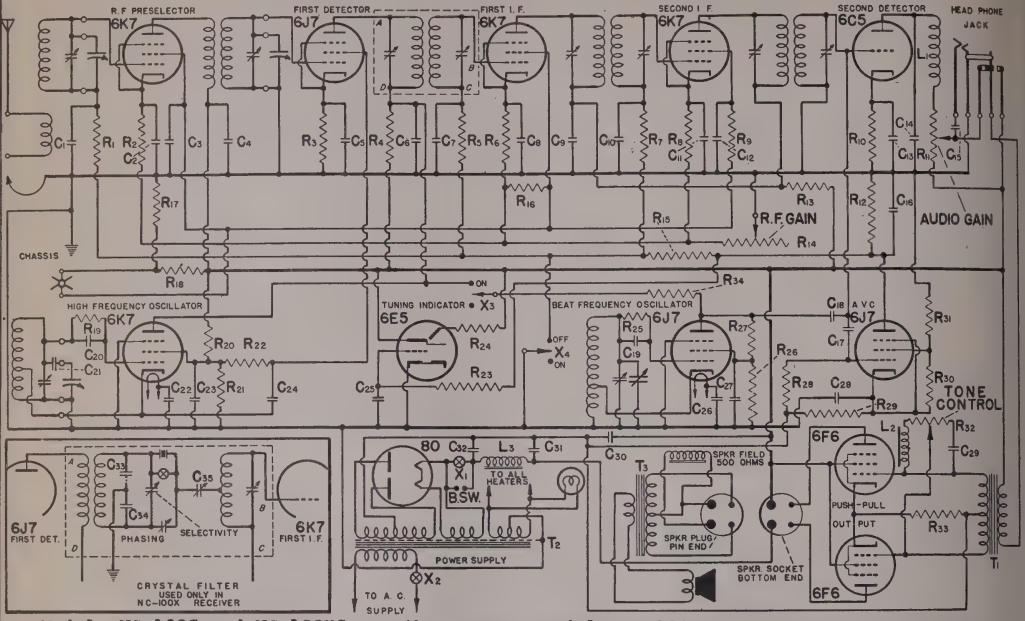
RESISTORS

	ohms	watts		ohms	watts
R1	- .5 meg-	1/2	R16	-.5 meg-	Pot.
R2	-10,000	1/2		A.F. GAIN	
R3	- 200	1/2	R17	-.1 meg-	1/2
R4	-25,000	1/2	R18	-.5 meg-	1/2
R5	- 1,000	1/2	R19	- 350	1
R6	- 1,000	1/2	R20	- 500	1/2
R7	- .5 meg-	1/2	R21	-1,000	2
R8	- 300	1/2	R22	-10,000	Rheo.
R9	- 1,000	1/2		R.F. GAIN	
R10	- .5 meg-	1/2	R24	-.1 meg-	1/2
R11	- 300	1/2	R25	-50,000	1/2
R12	-1.0 meg-	1/2	R26	-.1 meg-	1/2
R13	- .5 meg-	1/2	R27	-.1 meg-	1/2
R14	- .5 meg-	1/2	R28	-1.0 meg-	1/2
R15	- 5,000	1/2	R29	-1.0 meg-	1/2

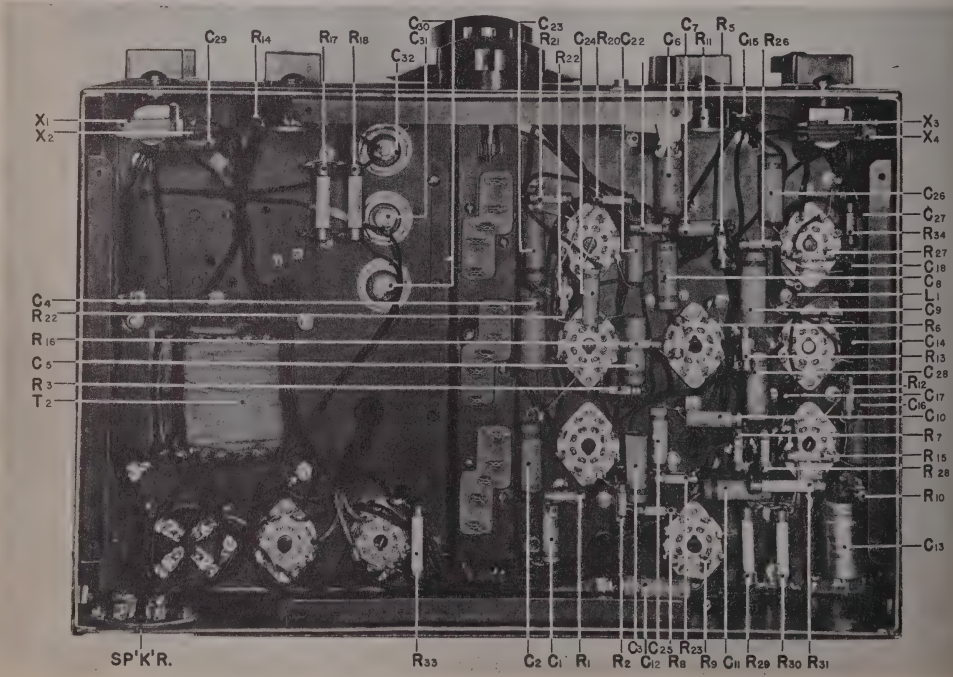
MODELS NC-100 Series

NATIONAL CO., INC.

SCHEMATIC DIAGRAM —— TYPE NC-100 RECEIVER



Models NC-100S and NC-100XS are the same as Models NC-100 and NC-100X respectively except that they have a 12-inch speaker instead of a 10-inch speaker.



FOR PARTS VALUES, SEE NEXT PAGE

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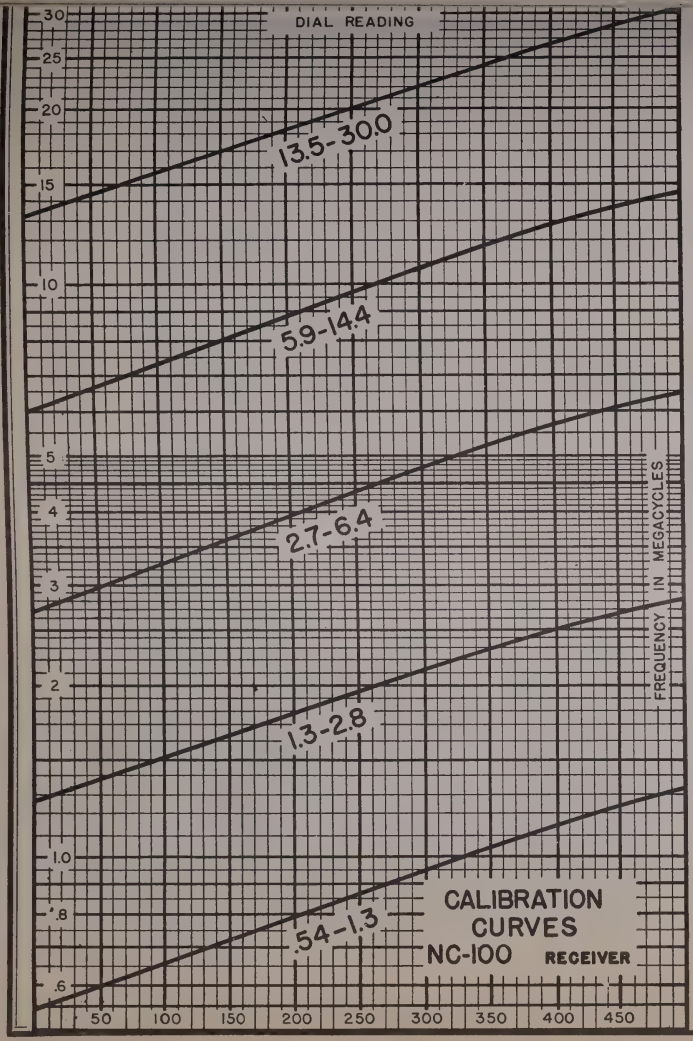

The alignment and other instructions pertaining to Model NC-100A also apply to Model NC-100 and NC-100X with the following exceptions:

Under "Preliminary Adjustments --- The I.F.", paragraph 3, The I.F. adjustments are indicated on the layout diagram, Nos. 4 to 8 inclusive.

The crystal filter output coupling condenser, adjustment No. 3, serves as a fixed I.F. gain control and, in general, should not be touched.

Resistor and Condenser List

R_1	R.F. Grid filter	.5 megohm	½ watt
R_2	R.F. Cathode Bias	350 ohms	½ watt
R_3	1st Det. Cathode Bias	5000 ohms	½ watt
R_4	H.F. Circuit B+ Filter	2000 ohms	½ watt
R_5	1st I.F. Grid Filter	.5 megohm	½ watt
R_6	1st I.F. Cathode Bias	350 ohms	½ watt
R_7	2nd I.F. Grid Filter	.5 megohm	½ watt
R_8	2nd I.F. Cathode Bias	500 ohms	½ watt
R_9	2nd I.F. Screen Filter	2000 ohms	½ watt
R_{10}	2nd Det. Cathode Bias	20,000 ohms	½ watt
R_{11}	Audio Volume Control	50,000 ohm potentiometer	
R_{12}	AVC Plate	.5 megohm	½ watt
R_{13}	I.F. B+ Filter	2000 ohms	½ watt
R_{14}	R.F. Gain Control	10,000 ohm variable	
R_{15}	Common Grid Filter	.5 megohm	½ watt
R_{16}	Gain Control Bleeder	50,000 ohms	½ watt
R_{17}	Voltage Divider	20,000 ohms	2 watt
R_{18}	Voltage Divider	20,000 ohms	2 watt
R_{19}	H.F. Oscillator Grid Leak	20,000 ohms	½ watt
R_{20}	H.F. Oscillator Voltage Divider	50,000 ohms	½ watt
R_{21}	H.F. Oscillator Voltage Divider	100,000 ohms	½ watt
R_{22}	1st Det. Screen Filter	100,000 ohms	½ watt
R_{23}	Tuning Indicator Grid Filter	.5 megohm	½ watt
R_{24}	Tuning Indicator Target	.1 megohm	½ watt
R_{25}	C.W. Oscillator Grid Leak	50,000 ohms	½ watt
R_{26}	C.W. Oscillator Voltage Divider	100,000 ohms	½ watt
R_{27}	C.W. Oscillator Voltage Divider	100,000 ohms	½ watt
R_{28}	AVC Grid Return	.5 megohm	½ watt
R_{29}	AVC Voltage Divider	350 ohms	1 watt
R_{30}	AVC Voltage Divider	1000 ohms	2 watt
R_{31}	AVC Voltage Divider	1000 ohms	2 watt
R_{32}	Tone Control	500,000 ohm potentiometer	
R_{33}	Output Cathode Bias	250 ohms	2 watt
R_{34}	C.W. Oscillator Plate Filter	.25 megohm	½ watt
C_1	R.F. Grid Filter	.01 mfd.	400 volt
C_2	R.F. Cathode Bypass	.1 mfd.	200 volt
C_3	R.F. and 1st I.F. Screen Bypass	.1 mfd.	200 volt
C_4	R.F. and H.F. Osc. Plate Bypass	1 mfd.	400 volt
C_5	1st Det. Cathode Bypass	.1 mfd.	200 volt
C_6	1st Det. Plate Filter	.1 mfd.	400 volt
C_7	1st I.F. Grid Filter	.01 mfd.	400 volt
C_8	1st I.F. Cathode Bypass	.1 mfd.	200 volt
C_9	1st and 2nd I.F. Plate Filter	.1 mfd.	400 volt
C_{10}	2nd I.F. Grid Filter	.01 mfd.	400 volt
C_{11}	2nd I.F. Cathode Bypass	.1 mfd.	200 volt
C_{12}	2nd I.F. Screen Filter	.1 mfd.	200 volt
C_{13}	2nd Det. Cathode Bypass	10. mfd.	50 volt
C_{14}	2nd Det. Plate Bypass	.001 mfd.	Mica
C_{15}	Phone Coupling	.1 mfd.	400 volt
C_{16}	AVC Plate Bypass	.1 mfd.	200 volt
C_{17}	AVC Grid Coupling	.0001 mfd.	Mica
C_{18}	C.W. Oscillator Coupling	2 mmf.	Special
C_{19}	C.W. Oscillator Grid	.001 mfd.	Mica
C_{20}	H.F. Oscillator Grid	.0001 mfd.	Mica
C_{21}	H.F. Oscillator Series Padding — Different for each range		
C_{22}	H.F. Oscillator Heater Bypass	.01 mfd.	400 volt
C_{23}	H.F. Oscillator Screen Bypass	.1 mfd.	200 volt
C_{24}	H.F. Oscillator Coupling	.01 mfd.	400 volt
C_{25}	Tuning Indicator Grid Filter	.01 mfd.	400 volt
C_{26}	C.W. Oscillator Heater Bypass	.1 mfd.	200 volt
C_{27}	C.W. Oscillator Screen Bypass	.1 mfd.	200 volt
C_{28}	AVC Cathode Bypass	.1 mfd.	200 volt
C_{29}	Tone Control	.01 mfd.	400 volt
C_{30}	B-Supply Filter	8 mfd.	450 volt
C_{31}	B-Supply Filter	8 mfd.	450 volt
C_{32}	B-Supply Filter	8 mfd.	450 volt
C_{33}	Crystal Filter Bridge	.0001 mfd.	Mica
C_{34}	Crystal Filter Bridge	.0001 mfd.	Mica
C_{35}	Crystal Filter Coupling	35 mmf.	Variable
X_1	B+ (stand-by) Switch		
X_2	AC On-Off Switch		
X_3	C.W. Oscillator Switch		
X_4	AVC On-Off Switch		
L_1	2nd Det. I.F. Choke	7. mh.	
L_2	Tone Filter Choke	18. Henry	
L_3	B-Supply Filter Choke	20. Henry	
T_1	Push-Pull Input Audio Transformer	4:1 Ratio	
T_2	Power Transformer		
T_3	Output Transformer	Mounted on Speaker	

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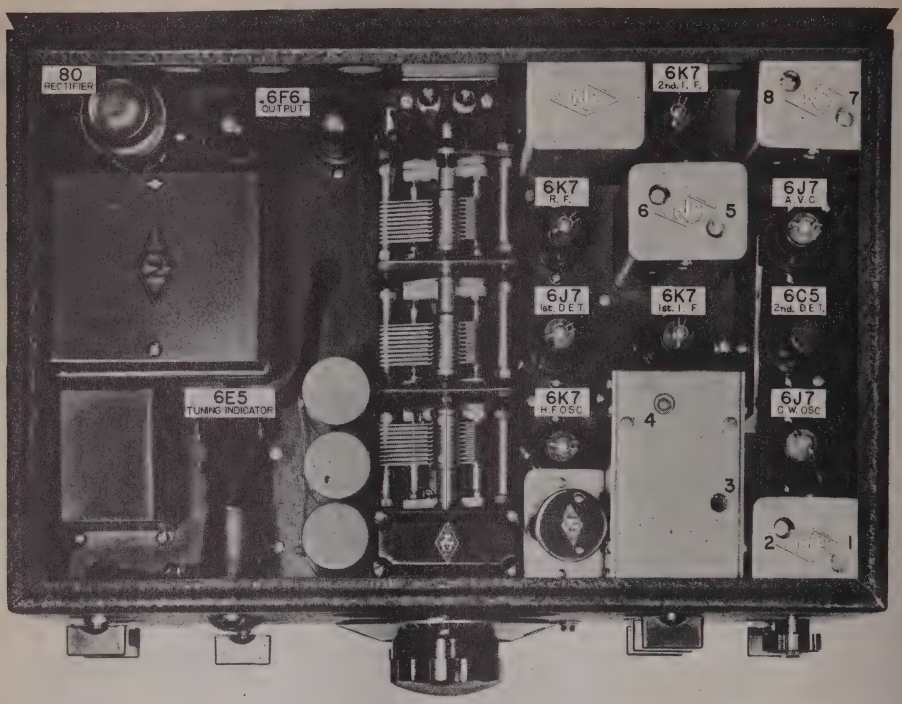


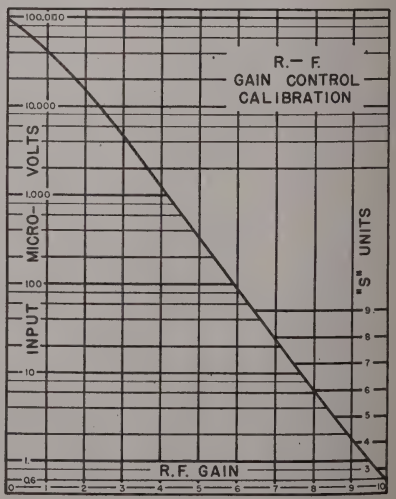
TOP VIEW OF NC- 100X RECEIVER

Measurement of Signal Strength

The combination of the R.F. gain control and tuning indicator make possible the accurate measurement of signal strength. With AVC either on or off, the R.F. gain control is advanced to the point where the electron ray tuning indicator just begins to show some change in pattern. The accompanying calibration curve shows the relation between signal input and this setting of the R.F. gain control.

The size of the shaded area will vary with the modulation of the signal when the AVC is off. This variation does not indicate over-modulation, or carrier shift, but is the normal result to be expected when using an amplified-delayed system of AVC.

For the amateur station operator who prefers to give reports in R or S units, rather than microvolts input, we suggest the use of the righthand scale of the chart. Adjacent points are 6 db. apart, this spacing giving a total range, between the weakest signal and an S-9 signal, of 48 db. Most operators seem to agree that the S-steps should be separated by a 4 to 1 power ratio (6 db.), and since the characteristics of the receiver determine the level of the weakest signals which may be received intelligibly, an "extremely strong" signal (S-9) is, on the NC-100, defined as one resulting in an input of 51 microvolts.



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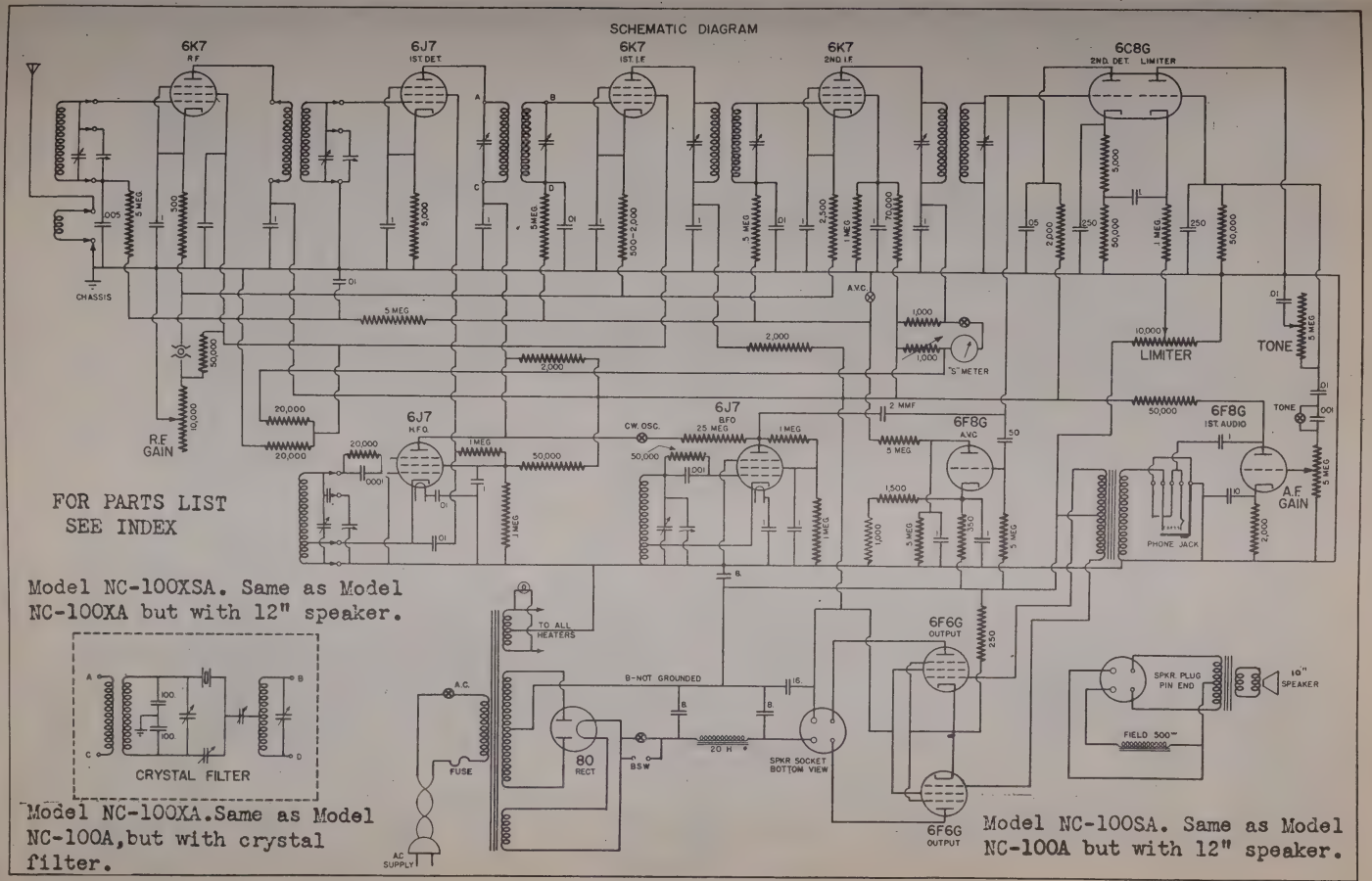

A.C. Operated NC-100A

Model NC-101XA. Same as Model NC-100XA but frequency coverage is only 160,80,40,20, and 10-meter amateur bands.

MODELS NC-100A Series

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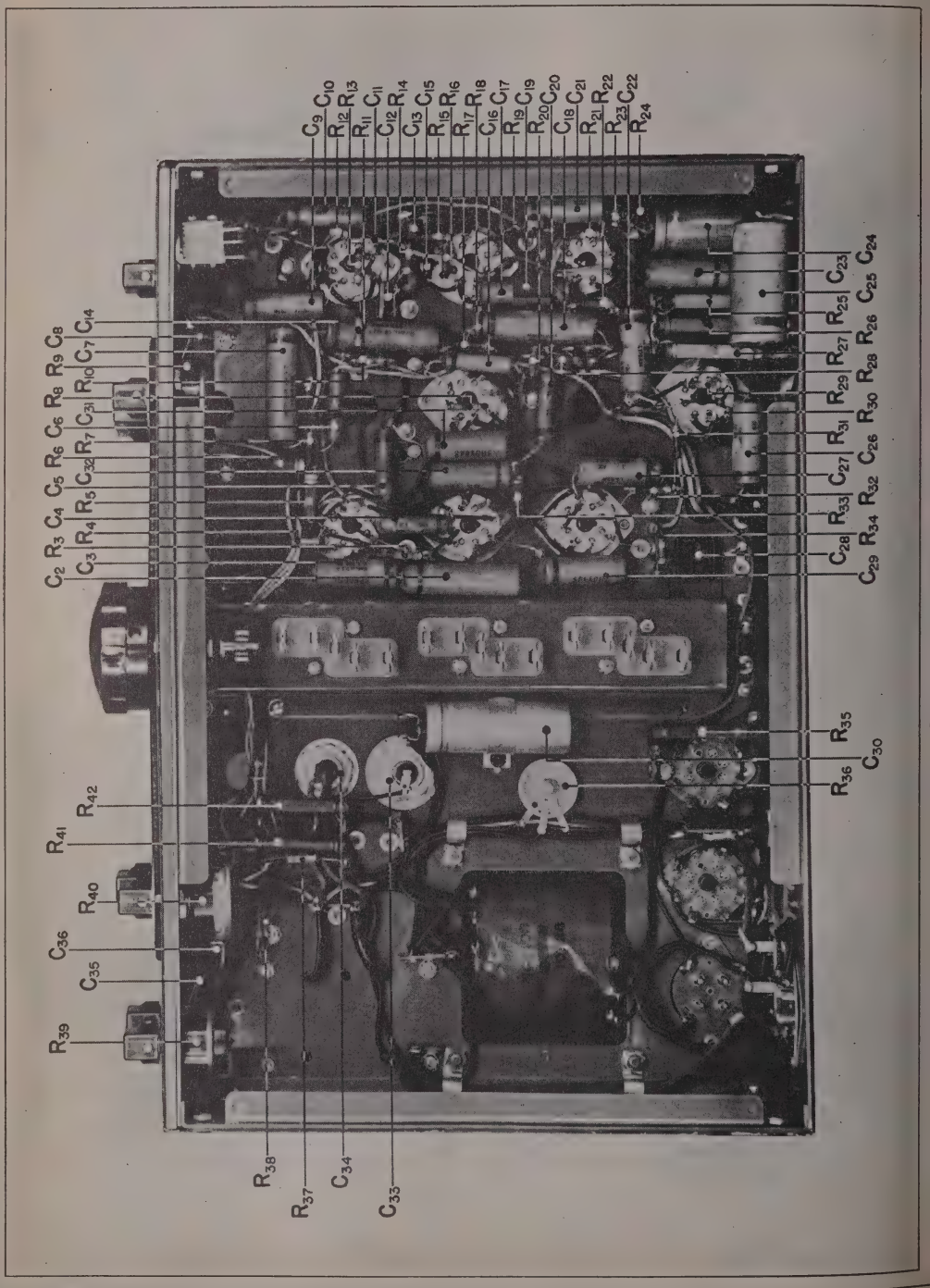

Bottom View of NC-100XA

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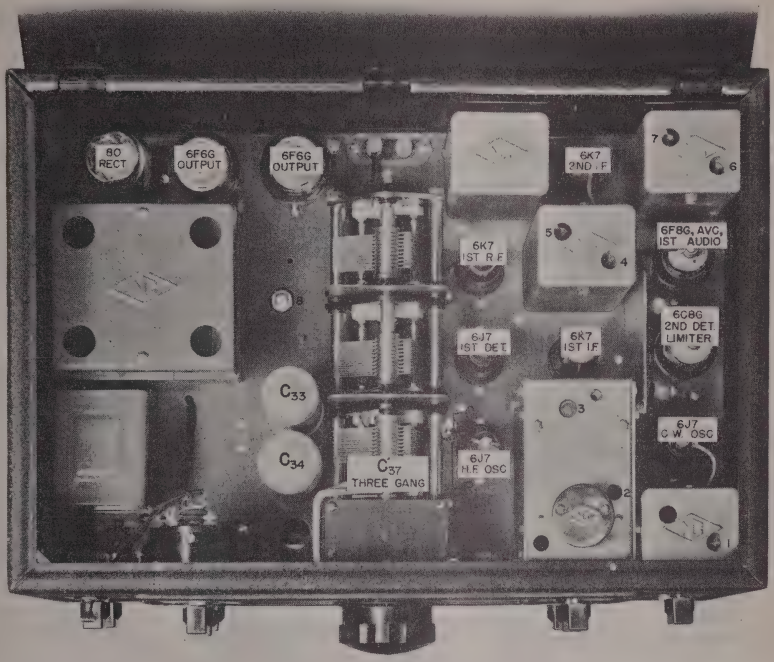
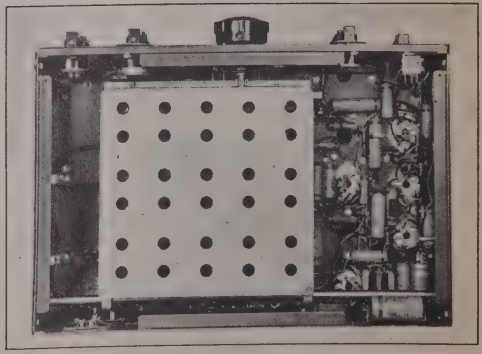


Top View of NC-100XA

THE COMPLETE COIL ASSEMBLY

Permanence of circuit characteristics is assured by the rigid cast aluminum shield and by air dielectric trimmer condensers with R-39 insulation.



BOTTOM VIEW

The coil assembly is shown midway between the 1.3-2.8 mc. and 2.7-6.4 mc. ranges.

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MODELS NC-100AB Series

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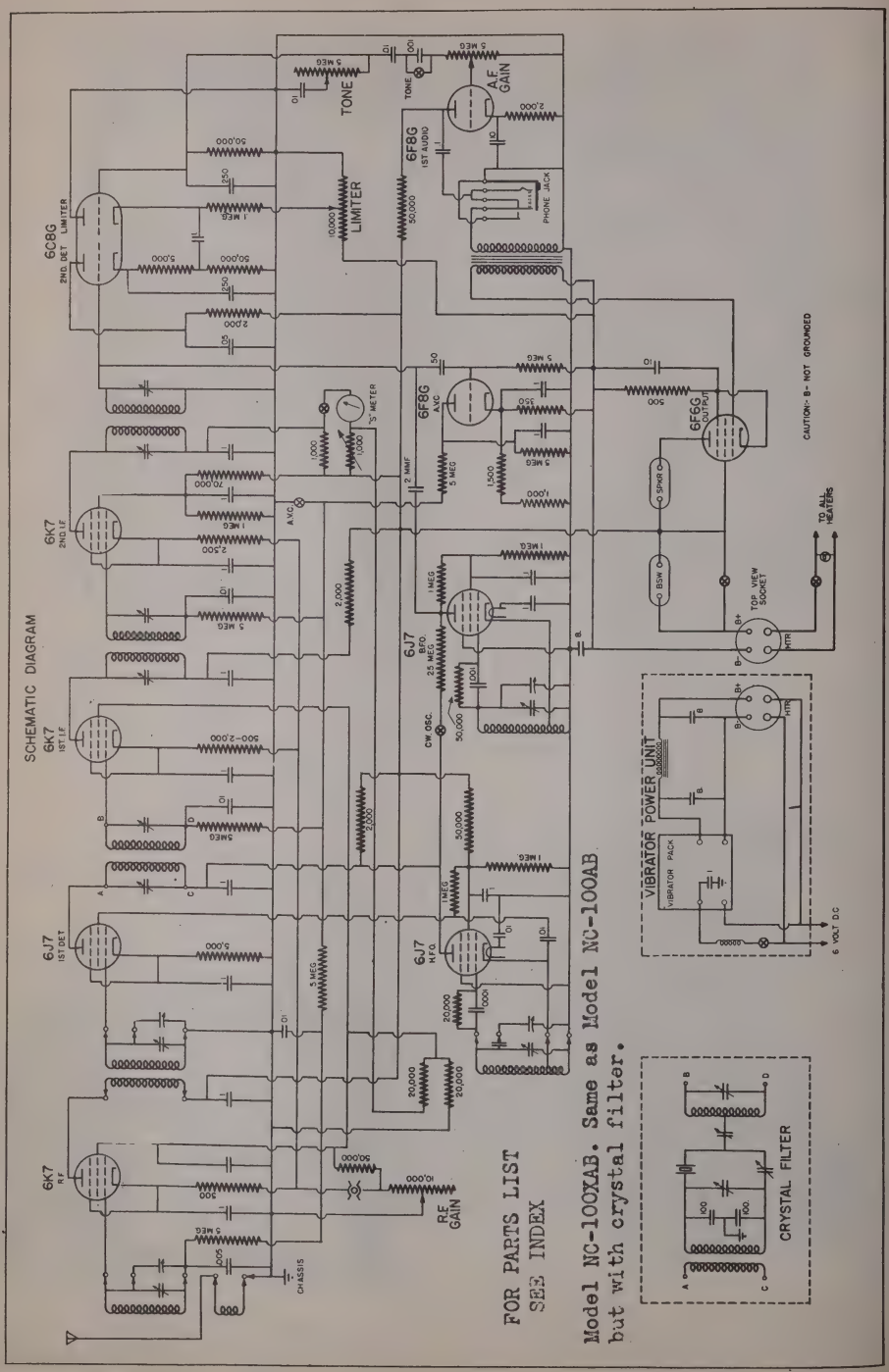

Battery Model NC-100AB

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TUBES

Individual tubes of the same type will vary slightly in their characteristics and it is well to remember this fact when replacements become necessary. Even though the circuit is designed to reduce the effect of such variations to a minimum, the high frequency oscillator and I.F. tubes should be selected with some care. A replacement high frequency oscillator should be checked in the receiver to make sure that the inter-electrode capacities are the same as those of the tube originally employed. This is easily determined by noting any change in calibration at the high frequency end of any coil range. The change should not exceed two or three dial divisions. Compensation for small variations in tube capacity may be made by changing the position of the oscillator grid lead with relation to the body of the tube.

Substitution of new tubes in the I.F. amplifier may possibly alter overall gain and selectivity characteristics. Instructions for realignment are given in detail in the following pages.

Two other points should be checked when trying the new high frequency oscillator; a fairly strong steady signal should be tuned in, preferably on some frequency above 10 mc.; the C.W. oscillator should be turned off; jarring the receiver or lightly tapping the tube, should not show any evidence of noise in the output. Next turn on the C.W. oscillator to make sure that the tube does not introduce "modulation hum" on the carrier. The tube should again be lightly tapped to see whether or not its characteristics change.

R.F. AND H.F. OSCILLATOR ALIGNMENT

All circuits are carefully and accurately aligned before shipment, using precision crystal oscillators which insure close conformation to the calibration curves. No readjustments will be required, therefore, unless the receiver is subjected to extremely rough handling. Do not attempt to make any adjustments without first determining the exact function of each trimmer condenser and the effect that it will have upon performance.

The coil group which is plugged into the circuit at any time is the one directly underneath the 3-gang tuning condenser at the center of the chassis. The coil nearest the front of the receiver is the high frequency oscillator, the middle coil is the first detector, and the coil nearest the antenna-ground binding post strip is the R.F.

As shown in the photographs, there are two holes in each coil compartment; of each pair, the one nearest the front of the receiver is directly over the trimmer condenser.

Complete alignment of any one coil range is made as follows: Set the tuning dial near the high frequency end of the range and check the dial reading by means of an accurate test oscillator or a signal of known frequency; readjustment should be made if the dial reading is in error by more than 2 per cent.

Correction for calibration is made by adjustment of the high frequency oscillator trimmer (nearest the front of the receiver). A screw driver with a metal shaft may be used, but the shaft should not touch the aluminum casting while the trimmer is being turned. If the dial reading is found to be too low, more trimmer capacity is needed and vice versa. In adjusting the R.F. and first detector trimmers, no signal is necessary, correct alignment being indicated by maximum background noise. This background noise should be fairly loud when the R.F. and audio gain controls are fully advanced, the crystal filter being switched off. Furthermore, the background noise will be approximately the same on all ranges. The first detector trimmer will have much greater effect upon the amplitude of this noise than the R.F. trimmer, but actually the setting of each is equally important.

With calibration correct at the high frequency end of the range, the dial should be rotated toward the lower numbers. The background noise may vary slightly over the range but should not get appreciably weaker except in the case of the .54 to 1.3 mc. coils. Ganging is checked by pressing one of the outside rotor plates of the oscillator condenser sideways toward the stator, but not enough to make the plates touch. The same check may be applied to the first detector and R.F. tuning condensers. Any bending of the rotor plates should make the background noise definitely weaker. A similar check can, of course, be made by bending the rotor plates out, away from the stator, care being taken not to bend the plates so far that they will not return to their original position.

On the two highest frequency ranges, it may be possible to make the initial oscillator adjustment incorrectly. There are two settings of the oscillator trimmer condenser which will tune in the desired signal at the proper point on the dial; of these, the higher frequency setting (least trimmer capacity) is correct. In checking the ganging of the 13.5 to 30 mc. range, the R.F. condenser has little effect upon the background noise at the low frequency end of the scale and at this one point it is better to use a test signal. Should any error in tracking be found on one range, it is probable that the same error will be present on all ranges and correction may be made by permanently bending the rotor plates of the tuning condenser section in question.

INSTRUCTIONS

Before attempting to check the alignment or adjust a single signal receiver it is essential that the operator be familiar with the principles involved and the type of performance to be expected.

A receiver of this type is simply a superheterodyne which may be adjusted to have extremely high selectivity on all signals. The effective width of the selectivity curve is only a few cycles, usually between 20 and 100. This means that when tuning in a given C.W. signal, tuning is going to be very sharp and the dial must be turned slowly in order to avoid missing the signal entirely. As compared to the straight superheterodyne, the single signal receiver is about 100 times as selective. The straight super will pick up a signal and will reproduce both sides of the audio beat note at about the same strength; that is, the carrier whistle may be varied from either side of zero beat up to about 3000 cycles when the receiver is tuned and the whistle will remain about the same strength at any pitch. The single signal receiver, however, being 100 times as sharp, will not perform in this manner, but as the receiver is tuned across the carrier the audio response will be very sharply peaked at one certain pitch of the carrier whistle. Detuning the receiver a small fraction of a degree, while it changes the pitch only slightly, will make the signal much weaker, since it has been detuned from the sharp selectivity peak.

The main point to remember when considering single signal receivers is that they are simply ultra selective superheterodynes, which must be tuned exactly to the signal and that the beat oscillator must be detuned from the crystal frequency in order to obtain an audible beat note.

PRELIMINARY ADJUSTMENTS—THE I.F.

From the above explanation, the reader will see that it is absolutely essential that the I.F. transformers be aligned to the crystal, since the two must work together. This alignment may be accomplished in a number of ways. If the I.F. transformers are far out of adjustment, it is necessary to connect an external crystal oscillator which uses the crystal from the receiver. This oscillator is put in operation and is coupled to the first detector of the receiver. In most cases no actual connection will be required since the field from the oscillator will be sufficiently strong to be picked up, even with the I.F. far out of adjustment. If coupling is required, a lead twisted around the grid cap of the detector tube and run near the oscillator tank coil, will be suitable. The beat oscillator is turned on and adjusted until the crystal signal is picked up. The pitch of the beat note is not important as long as it is well inside the audible range.

All the I.F. transformers are now adjusted for maximum signal. This adjustment need not be made with any great degree of precision, since the crystal will not oscillate at exactly the same frequency to which it will be resonant in the receiver. The phasing control should be set at 0.

The I.F. adjustments are indicated on the layout diagram, , Nos. 3 to 7, inclusive.

The crystal filter output coupling condenser, adjustment No. 2, serves as a fixed I.F. gain control and, in general, *should not* be touched.

The crystal may now be removed from the oscillator and installed in the receiver. Throw the switch to connect the crystal for single signal reception. Set the selectivity control for maximum selectivity; that is, with the pointer rotated all the way to the right. Now, tune in a steady signal from a local oscillator or monitor. Tuning very slowly across the carrier, there should be one point at which the signal will peak very sharply. The audio pitch of this peak will be nearly the same as the pitch of the beat used when the crystal oscillator was being picked up.

THE BEAT OSCILLATOR

Once the peak has been found, it would be well for the operator to familiarize himself with the action of the beat oscillator control by changing its tuning in order to obtain an audio note which is most pleasing to copy, or which coincides with any peaks in the loudspeaker or headphones. It makes little difference to which side of the audio beat the beat oscillator is tuned. After a satisfactory pitch has been found, tune the signal by means of the tuning dial so that the signal goes down through zero beat and up to approximately the same pitch on the other side. This response is, of course, much weaker than that of the peak and it may be necessary to turn up the volume control in order to obtain fair volume. The phasing, or balancing, condenser is now adjusted until the signal is WEAKEST. Normally, this setting is near mid-scale.

THE SELECTIVITY CONTROL

The action of the selectivity control may now be checked. With the receiver tuned exactly as it was *before adjusting the phasing condenser*, the selectivity control should be rotated and it will be found that the signal will be loudest at a certain setting. This setting is usually found with the pointer nearly vertical. The setting giving this maximum response is that at which the selectivity of the crystal filter is minimum. Since even at this minimum selectivity the crystal filter is much more selective than the straight super, the signal will be weaker than that obtainable when the crystal is cut out.

When a pure steady signal is carefully tuned to a single signal peak, the selectivity control should have practically no effect upon signal strength. If there is any form of modulation, however, the signal will be loudest when the selectivity control is set for minimum selectivity, since this adjustment allows a greater width of signal or modulation to be passed.

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FINAL I.F. ADJUSTMENT

The final adjustment of the I.F. transformers may now be made. Set the control for maximum selectivity, carefully tune in a steady signal until it is exactly on the crystal peak, and adjust each of the I.F. transformer tuning condensers for maximum signal strength. (*In almost all cases where the I.F. amplifier has once been aligned to the crystal, this check is all that would be required, and it is not necessary to put the crystal in an external oscillator.*) Even if the I.F. amplifier is considerably out of alignment, the crystal frequency may be found by employing a strong local signal from a monitor or frequency meter, slowly tuning across it while listening for a peak in the audio beat note. If the peak is found at a very high audio pitch it will be necessary to change the tuning of the beat oscillator so that the audio peak will be well inside the limits of audibility. It is probable that if the peak signal is found at all, the I.F. amplifier will not be far out of tune and the readjustments required will be small.

Since the I.F. transformers are tuned with air dielectric condensers, the adjustments when once made are permanent and need only be checked when new tubes are substituted, provided of course the receiver is not subjected to severe mechanical shocks or vibration.

CHECKING CRYSTAL ACTION

The crystal response, or crystal activity, may be easily checked as follows: With the signal tuned in exactly as mentioned in the previous paragraph and the selectivity control set at maximum selectivity, disconnecting the filter (by turning the phasing knob to 0), should weaken the signal slightly. There will, of course, be a great increase in tube hiss, background noise, and interfering signal, but the actual strength of the desired signal should be weaker. It is possible, of course, to obtain a louder signal in the straight super connection by resetting the selectivity control and this is quite normal. The fact that a signal is weakened when using the crystal filter is relatively unimportant, inasmuch as the filter is only used when interference or static is present, and such interference will be made about 100 times weaker, thereby greatly improving the readability of the signal.

A crystal which is found to be a poor resonator should be carefully removed from the holder and both crystal and plates cleaned with alcohol, gasoline, carbona, ether, or some similar fluid. In reassembling the holder care must be taken to see that the crystal is free between the plates; that is, that there is a suitable air gap (usually two or three thousandths) between the plates and the crystal and that the crystal is free to move sideways in any direction. The fibre pieces may be removed if desired as they serve only to protect the crystal in shipment.

"S" METER ADJUSTMENT

If it should happen that the "S" meter network gets out of balance, the procedure for correction is as follows: Disconnect the antenna and turn the CONTROL switch to MVC, set the R.F. GAIN full on. Then, by means of a screw driver, adjust the balancing control (No. 8, receiver top view) until the meter reads 0.

Special Instructions for the NC-101X and NC-101XA Receivers

The NC-101X is a special model of the NC-100X receiver, employing the same circuit. etc., but covering only the five low-frequency amateur bands. Each of these bands is spread out over the major portion of the dial and, as shown by the accompanying calibration curves, each band starts at 50 and ends at 450. The curves are accurate to about .25% of the operating frequency.

All operating instructions, circuit data, alignment and service notes contained in the NC-100 Instruction Manual apply to the NC-101X receiver, except those sections referring to the calibration and alignment of the high frequency circuits.

Complete alignment of any coil range is made as follows: Set the tuning dial at 450, and check the calibration curve by means of an *accurate* test oscillator. Readjustment of the high frequency oscillator trimmer condenser should be made if the calibration is in error by more than 20 dial divisions. Check the alignment of R.F. and 1st Det. circuits by setting the trimmers for maximum background noise. (See Page 9.) Re-check the H.F. Oscillator, then turn the dial to 50, and note the calibration. Ganging is tested by checking R.F. and 1st Det. trimmer adjustments.

The design of the high frequency circuits, particularly that of the H.F. Oscillator, is such that frequency drift is extremely small, after the receiver has reached its operating temperature. It should be remembered, however, that the band spread tuning arrangement tends to magnify a small change in frequency. For instance, on the 20 meter band, each dial division represents only 1000 *cycles*. Ten kilocycles will, therefore, be spread over about two-and-one-half inches of scale length, even though the actual frequency change is but .07 of one percent. Only a comparatively few amateur transmitters will maintain constant frequency to such a high degree of precision, even with crystal control.

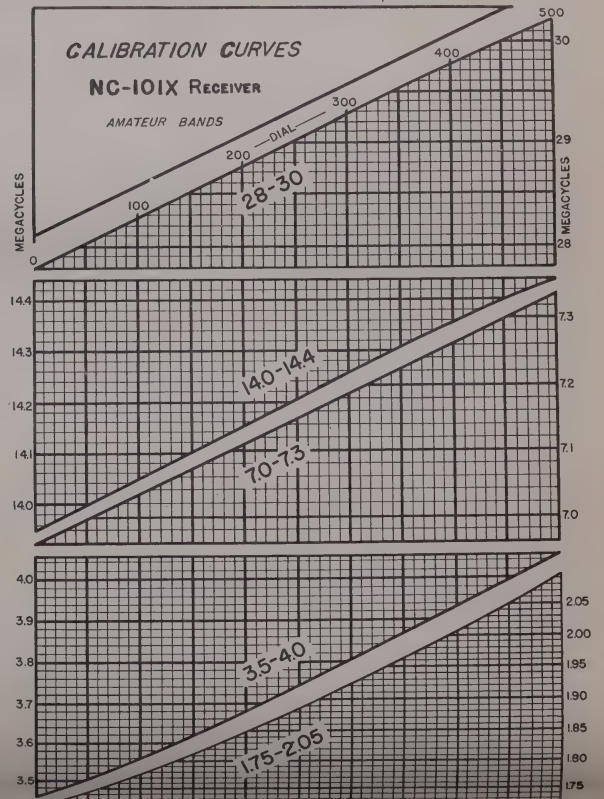
There should be ample room for air to circulate on all sides of the receiver, in order to reduce drift to a minimum. Do not pile magazines or papers on the cover and do not install the receiver in a small console or in a closely fitting compartment or bookcase.

Supplementary Instructions for Battery Models

The Battery Operated Types of the NC-100A series are identical in operation and adjustment to the standard AC models. Battery power drain is reduced by using a single 6F6G output tube. The recommended speaker is an 8-inch permanent magnet type.

Normal operation of the NC-100B series may be obtained by using either a combination of batteries or a properly filtered battery operated vibrator pack or gen-e-motor to supply 6 volts to the heater and approximately 180 volts to the receiver B circuits.

Receivers primarily designed for battery operation can be used with an external power pack, such as the National Type 5886, for operation from AC lines. When used in this manner, the four prong plug attached to the receiver power cable should be inserted in the socket outlet of the power unit. For use with other power supplies, the cable plug may be unsoldered and the wires connected to the outlet terminals of the power unit.



CAPACITOR AND RESISTOR LIST

Symbol	Function	Type	Rating
C_1	H.F. Osc. Grid	Mica	.0001 mfd., 500 Volt
C_2	R.F. B+ Bypass	Paper	.1 mfd., 600 Volt
C_3	H.F. Osc. Screen	Paper	.1 mfd., 400 Volt
C_4	H.F. Osc. Coupling	Paper	.01 mfd., 400 Volt
C_5	H.F. Osc. Heater Bypass	Paper	.01 mfd., 400 Volt
C_6	1st I.F. Grid Filter	Paper	.01 mfd., 400 Volt
C_7	1st Det. B+ Bypass	Paper	.1 mfd., 600 Volt
C_8	1st Aud.-Output Coupling	Paper	.1 mfd., 600 Volt
C_9	C.W. Osc. Heater Bypass	Paper	.1 mfd., 400 Volt
C_{10}	C.W. Osc. Screen Bypass	Paper	.1 mfd., 400 Volt
C_{11}	C.W. Osc. Coupling	Bakelite	1. mmf., 400 Volt
C_{12}	Limiter Output Bypass	Mica	.00025 mfd., 500 Volt
C_{13}	Lim.-1st Audio Coupling	Paper	.01 mfd., 400 Volt
C_{14}	1st I.F. B+ Bypass	Paper	.1 mfd., 600 Volt
C_{15}	2nd Det. Cathode Bypass	Mica	.00025 mfd., 500 Volt
C_{16}	R.F. Grid Filter	Paper	.01 mfd., 400 Volt
C_{17}	2nd Det. Plate Bypass	Paper	.05 mfd., 600 Volt
C_{18}	2nd I.F. B+ Bypass	Paper	.1 mfd., 600 Volt
C_{19}	AVC Input Coupling	Mica	.00005 mfd., 500 Volt
C_{20}	2nd I.F. Grid Filter	Paper	.01 mfd., 400 Volt
C_{21}	AVC Plate Bypass	Paper	.1 mfd., 400 Volt
C_{22}	2nd I.F. Cathode Bypass	Paper	.1 mfd., 400 Volt
C_{23}	AVC Cathode Bypass	Paper	.1 mfd., 400 Volt
C_{24}	1st Audio Cathode Bypass	Electrolytic	10. mfd., 50 Volt
C_{25}	2nd Det.-Lim. Audio Coupling	Paper	1. mfd., 200 Volt
C_{26}	2nd I.F. Screen Bypass	Paper	.1 mfd., 400 Volt
C_{27}	R.F. Screen Bypass	Paper	.1 mfd., 400 Volt
C_{28}	R.F. Grid Filter	Mica	.005 mfd., 300 Volt
C_{29}	R.F. Cathode Bypass	Paper	.1 mfd., 400 Volt
C_{30}	B− to Chassis Bypass	Electrolytic	8. mfd., 200 Volt
C_{31}	1st I.F. Cathode Bypass	Paper	.1 mfd., 400 Volt
C_{32}	1st Det. Cathode Bypass	Paper	.1 mfd., 400 Volt
C_{33}	B+ Filter	Electrolytic	16. mfd., 350 Volt
C_{34}	B+ Filter	Electrolytic	8.-8. mfd., 475 Volt
C_{35}	Tone Control	Paper	.01 mfd., 400 Volt
C_{36}	Tone Control	Mica	.001 mfd., 500 Volt
C_{37}	Main Tuning	Air	225 mmf., 3 Gang
R_1	H.F. Osc. Grid	Carbon	20,000 Ohm, ½ Watt
R_2	Limiter Control	Wire Wound	10,000 Ohm, Variable
R_3	1st Det. Screen	Carbon	100,000 Ohm, ½ Watt
R_4	H.F. Osc. Volt. Div.	Carbon	100,000 Ohm, ½ Watt
R_5	H.F. Osc. Screen	Carbon	50,000 Ohm, 1 Watt
R_6	1st Audio Plate	Carbon	50,000 Ohm, 1 Watt
R_7	1st Det. Plate Filter	Carbon	2,000 Ohm, ½ Watt
R_8	1st I.F. Cathode Bias	Carbon	500–2,000 Ohm, ½ Watt
R_9	Audio Gain Control	Composition	500,000 Ohm, Variable
R_{10}	1st I.F. Grid Filter	Carbon	500,000 Ohm, ½ Watt
R_{11}	C.W. Osc. Volt. Div.	Carbon	100,000 Ohm, ½ Watt
R_{12}	C.W. Osc. Plate Filter	Carbon	250,000 Ohm, ½ Watt
R_{13}	C.W. Osc. Screen	Carbon	100,000 Ohm, ½ Watt
R_{14}	Limiter Output	Carbon	50,000 Ohm, ½ Watt
R_{15}	2nd Det. Load	Carbon	50,000 Ohm, ½ Watt
R_{16}	2nd Det. I.F. Filter	Carbon	5,000 Ohm, ½ Watt
R_{17}	1st I.F. Plate Filter	Carbon	2,000 Ohm, ½ Watt
R_{18}	2nd Det. Plate Filter	Carbon	2,000 Ohm, ½ Watt
R_{19}	Limiter Input	Carbon	100,000 Ohm, ½ Watt
R_{20}	R.F. Grid Filter	Carbon	500,000 Ohm, ½ Watt
R_{21}	AVC Plate Filter	Carbon	500,000 Ohm, ½ Watt
R_{22}	AVC Grid	Carbon	5. Megohm, ½ Watt
R_{23}	AVC Plate	Carbon	500,000 Ohm, ½ Watt
R_{24}	1st Audio Cathode Bias	Carbon	2,000 Ohm, ½ Watt
R_{25}	AVC Volt. Div.	Carbon	1,000 Ohm, 2 Watt
R_{26}	AVC Volt. Div.	Carbon	1,500 Ohm, 2 Watt
R_{27}	AVC Cathode Bias	Carbon	350 Ohm, 2 Watt
R_{28}	2nd I.F. Grid Filter	Carbon	500,000 Ohm, ½ Watt
R_{29}	2nd I.F. Volt. Div.	Carbon	100,000 Ohm, ½ Watt
R_{30}	2nd I.F. Screen	Carbon	70,000 Ohm, ½ Watt
R_{31}	2nd I.F. Cathode	Carbon	2,500 Ohm, ½ Watt
R_{32}	R.F. Cathode Bias	Carbon	500 Ohm, ½ Watt
R_{33}	1st Det. Cathode Bias	Carbon	5,000 Ohm, ½ Watt
R_{34}	R.F. Grid Filter	Carbon	500,000 Ohm, ½ Watt
R_{35}	Output Cathode Bias	Carbon	250 Ohm, 2 Watt
R_{36}	S Meter Adjustment	Wire Wound	1,000 Ohm, Variable
R_{37}	S Meter Bridge	Carbon	1,000 Ohm, ½ Watt
R_{38}	R.F. Gain Bleeder	Carbon	50,000 Ohm, ½ Watt
R_{39}	Tone Control	Composition	500,000 Ohm, Variable
R_{40}	R.F. Gain Control	Wire Wound	10,000 Ohm, Variable
R_{41}	B+ Volt. Div.	Carbon	20,000 Ohm, 2 Watt
R_{42}	B+ Volt. Div.	Carbon	20,000 Ohm, 2 Watt

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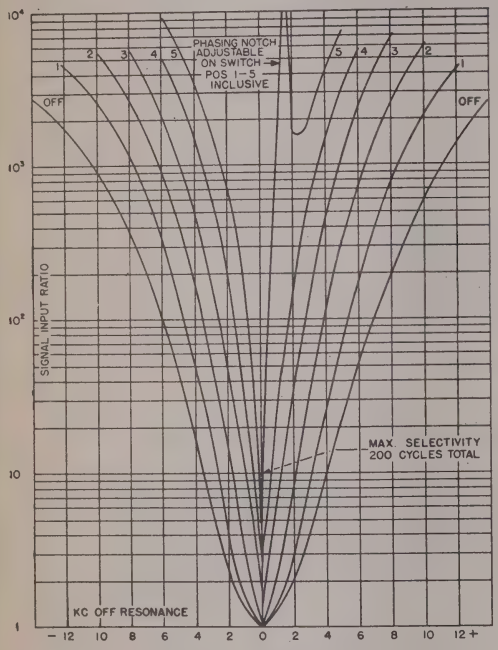
Six uniform steps of selectivity, as shown in Dwg. No. 1, and a variable phasing control allow the receiver to be adjusted to almost any operating condition, a highly desirable feature for both short wave communication and broadcast band reception. The curves show that any degree of selectivity between that of full single signal operation and wide band broadcast reception is available, the ratio between the two being almost forty to one.



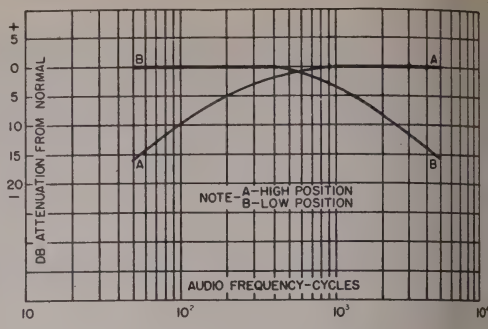
Dwg. No. 1. Typical Selectivity Characteristics

Signal Strength Meter

A 0 to 1 milliammeter, serving as a signal strength meter, is front panel mounted. It is fitted with a scale graduated in S-units from 1 to 9 and in db above S-9 from 0 to 40 db. The bridge circuit, in which the meter is connected, makes possible accurate signal input readings from below 1 microvolt to 1,000 microvolts.

Antenna Input

Antenna input terminals are located at the rear of the receiver chassis near the center. The input circuit is suitable for use with a single wire antenna, a balanced feed-line or a low impedance concentric transmission line. Average input impedance is 500 ohms.



Dwg. No. 2. Tone Control Action

Tone Control

The tone control is used to vary the frequency characteristic of the audio amplifier as shown in the accompanying curves, Dwg. No. 2. The control is particularly helpful when receiving weak signals through interference, as explained in Section 3.

Audio Output

Two audio output circuits are provided:

(1) A headphone jack is mounted on the front panel and is wired so as to silence the loud speaker when the phone plug is inserted. The correct load impedance for the headphone output is 20,000 ohms, this being the usual impedance of phones having a DC resistance of between 2000 and 3000 ohms. Maximum audio output available at the phone jack is 15 milliwatts.

(2) A five prong speaker socket (X-1) is provided at the rear of the receiver chassis. To this socket are brought the audio output leads. The proper load impedance (total) for the output circuit is 10,000 ohms. Maximum undistorted audio power output available is 8 watts.

Power Supply

The standard NC-200 Receiver is designed for operation from a 110/120 volt, 50/60 cycle power source. Normal power consumption is approximately 100 volt-amps. The built-in power supply delivers all voltages required by the heater and B supply circuits — 4.5 amperes at 6.3 volts and 100 milliamperes at 250 volts, respectively. One side of the AC input line is connected through a 2 ampere fuse housed in an extractor post marked "FUSE" which is mounted at the rear of the receiver chassis.

All NC-200 Receivers are equipped with a seven prong plug and socket combination to permit portable or emergency operation from batteries.

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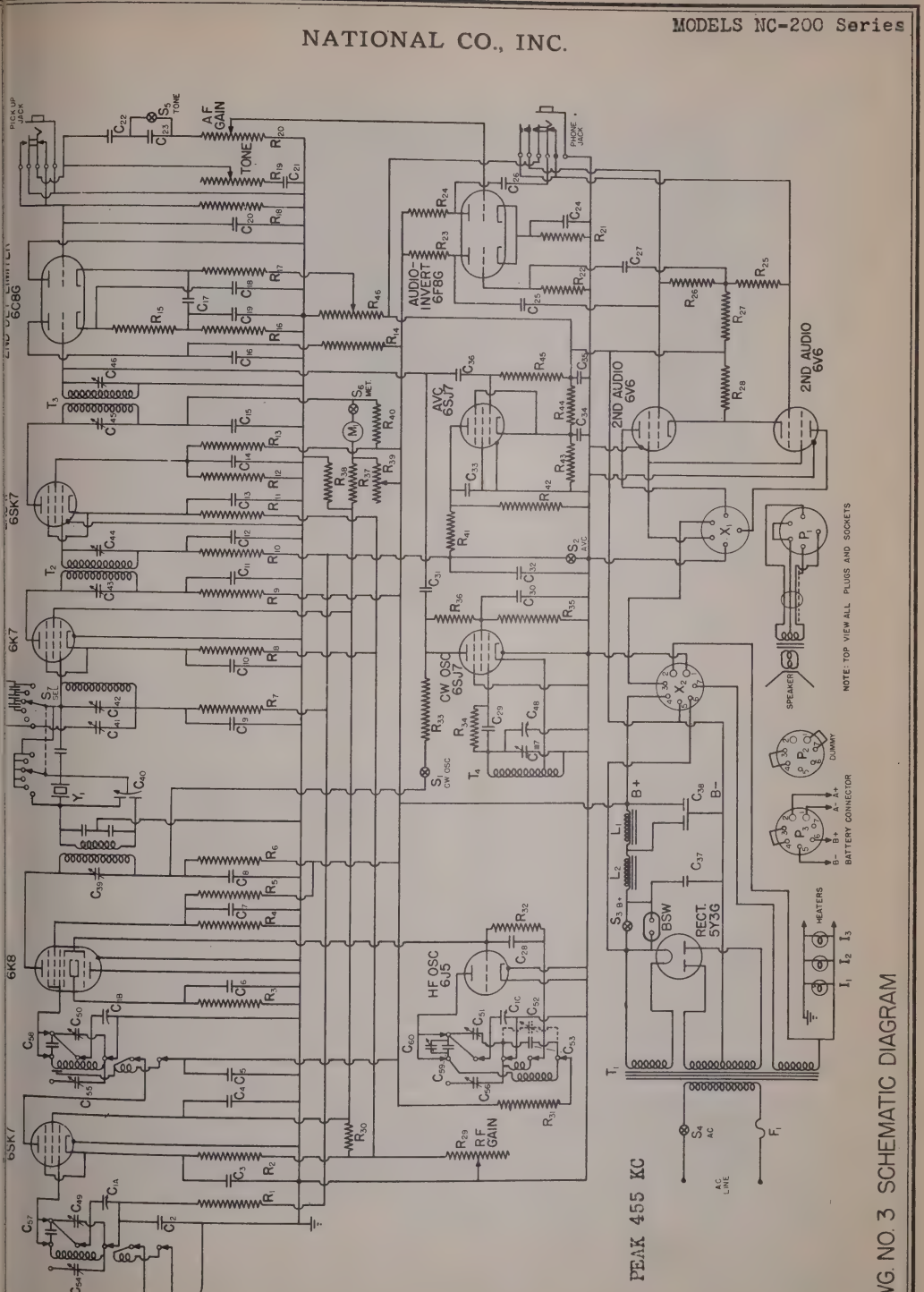
MODELS NC-200 Series



MODELS NC-200 Series

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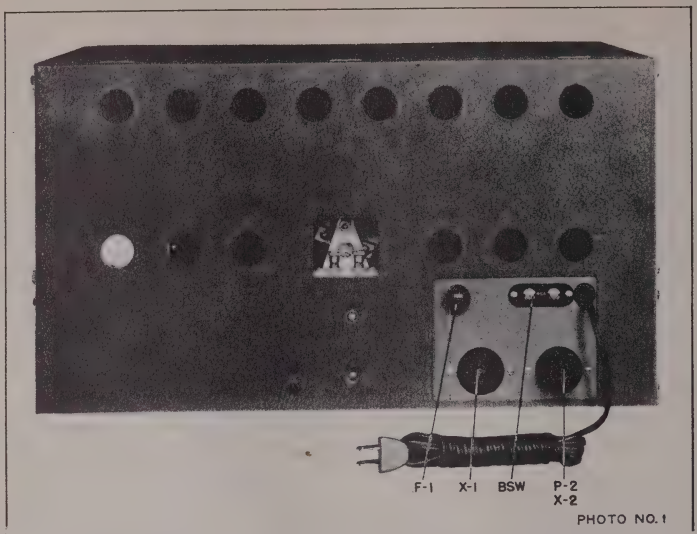

PHOTO NO. 1

Model NC-200 TG and Model NC-200 TGM are the same except that the latter does not have the amateur band spread feature. Model NC-200 RG same as Model NC-200 TG except that the NC-200 RG is for rack mounting.

Pick-up Jack

A pick-up jack mounted on the front panel of the Receiver may be used to connect auxiliary apparatus, such as a phonograph pick-up, to the audio system of the NC-200 Radio Receiver. This input circuit is high impedance and feeds into the 6F8G Audio Amplifier-Phase Inverter tube. The TONE and AF GAIN controls are operative with this connection.

Antenna Recommendations

When using a single-wire antenna, the lead-in should be connected to one antenna input terminal and the short flexible lead, which is attached to the chassis, should be fastened to the other terminal. The dimensions of the single-wire antenna system are not critical, the recommended length, including lead-in, being from 75 to 100 feet, although any length between 25 and 200 feet may be used.

Feed-lines of doublet systems should be connected to the two input terminals. The flexible lead is not used.

The inner conductor of a concentric transmission line should be connected to one input terminal. The outer conductor and the flexible grounding lead should be connected to the other terminal.

An external ground connection to the chassis may or may not be necessary. It should be used unless it reduces signal strength.

Battery Operation

The NC-200 may be operated in portable or emergency service by connecting batteries to the terminals of battery connector plug P-3 and inserting it in socket X-2, in place of plug P-2. See Dwg. No. 3. For normal operation with somewhat reduced loud speaker output, a 6 volt heater supply (storage battery) should be connected to terminals 1 and 2 of plug P-3, and a 180 volt B supply should be connected to plug terminals 5 and 6. The jumper between terminals 3 and 4 (of P-3) completes the plate and screen supply circuits of the 6V6 output tubes. It may be omitted, with greater battery economy, when operation with head-phones only is desired. A suggested refinement is to connect a switch between terminals 3 and 4, thus permitting the 6V6 B supply to be opened at will. Alternatively, removal of speaker plug P-1 from socket X-1 will open the 6V6 B supply in the same manner, without harming the output tubes. A further economy of battery power may be effected by removing the 6V6 tubes from their sockets.

Do not attempt to use plug P-2 for battery connection, since the jumper between terminals 1 and 7 would be incorrect.

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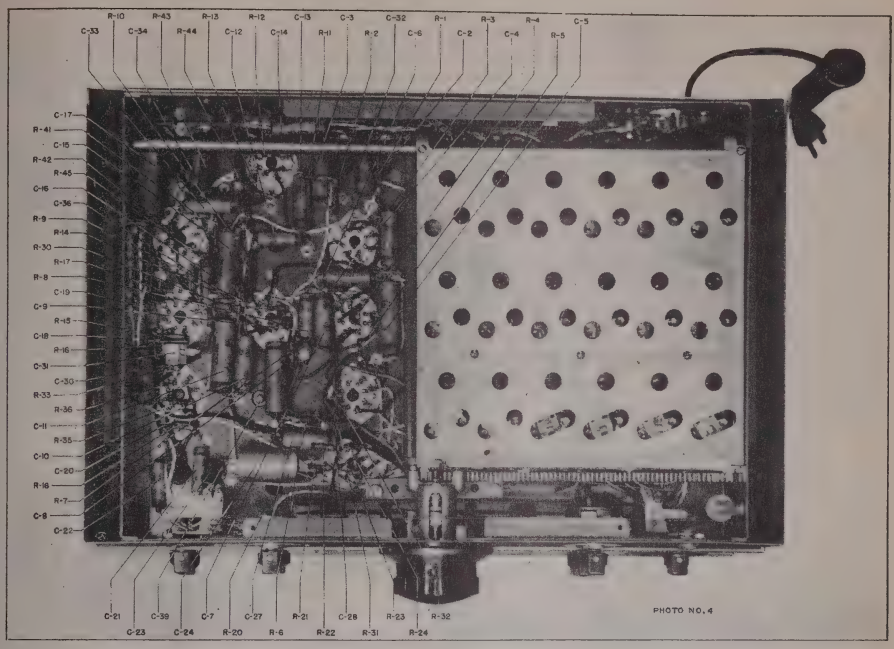

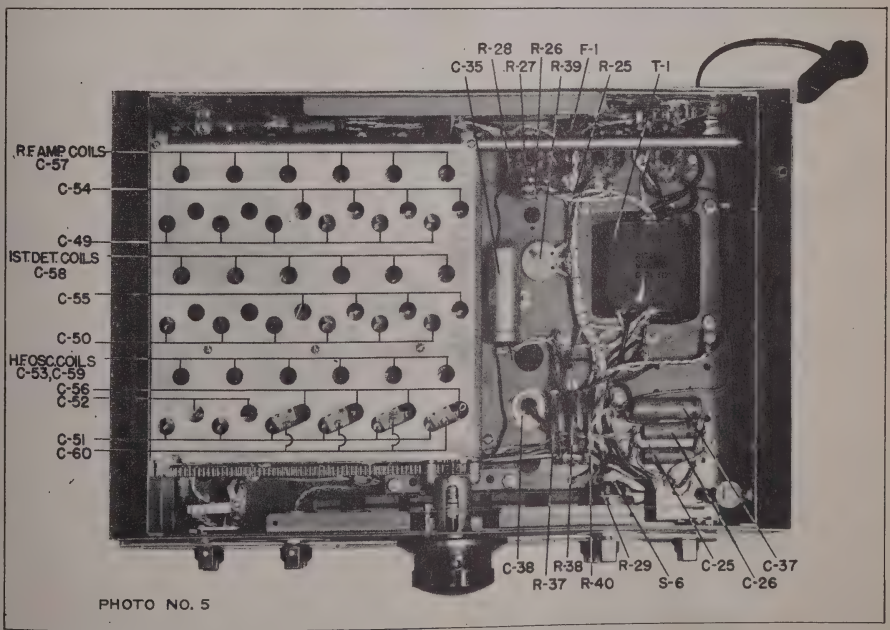

The two bottom views above show the NC-200 Receiver with the coil carriage at the extreme ends of its travel. It will be noted that such construction makes all components readily accessible for test or replacement.

MODELS NC-200 Series

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ALIGNMENT DATA

General

All circuits are carefully aligned, before shipment, using precision crystal oscillators which insure close conformability to the dial calibration. No readjustment will be required, therefore, unless the receiver is tampered with or damaged.

To determine the necessity for realignment, the receiver should first be carefully checked against its normal performance as described in Section 3. In no case should realignment be attempted unless tests indicate that such realignment is necessary. Even then, it must be remembered that the NC-200 is a communications receiver and should not be serviced or realigned by any individual who does not have a complete understanding of the functioning of the equipment and who has not had previous experience adjusting a similar type of receiver.

The coil group which is plugged into the circuit at any time is the one directly underneath the three gang master tuning capacitor. The coil nearest the front panel of the receiver is in the H.F. oscillator circuit, the middle coil is in the first detector circuit and the coil nearest the antenna input terminal panel is in the R.F. amplifier circuit. See Photo No. 5.

All coils have individual general coverage trimmer capacitors. The H.F. oscillator circuits of broadcast ranges E & F have, also, general coverage variable series padding capacitors. All coils of ranges A, B, C and D have band-spread trimmer capacitors. Variable series padding capacitors are used in all H.F. oscillator band-spread circuits. These capacitors are identified on Photo No. 5.

Adjustment of general coverage circuits affects the alignment of the band-spread circuits. On the other hand, band-spread circuit adjustments have little effect on general coverage circuit alignment. This fact must be kept in mind when any high frequency circuit is adjusted. A screw driver having a metal shaft may be used to make adjustments in the high frequency circuits but capacity effects will be noticeable, and the shaft should not touch any part of the aluminum casting.

Before proceeding with the alignment of any circuit of the receiver, the equipment must be set up as specified in Section 2, except that the antenna lead-in or transmission line must be disconnected. An output meter having a 20,000 ohm resistive load should be connected to the phone output jack. The POWER SUPPLY knob should be set at B+ ON and the R.F. GAIN knob set at 9. The TONE control knob should be set at N and the LIMITER knob should be retarded to 0.

Alignment of the equipment may be divided into three major steps:

(1) I.F. Amplifier Alignment
(2) General Coverage Alignment
  (a) H.F. Oscillator
  (b) First Detector and R.F. Amplifier
  (c) Tracking of H.F. Circuits
(3) Band Spread Alignment
  (a) H.F. Oscillator
  (b) First Detector and R.F. Amplifier
  (c) Tracking of H.F. Circuits

The circuits *MUST* be tuned in the above order when complete alignment is necessary.

I.F. Amplifier Alignment

The intermediate frequency of the NC-200 Receiver is 455 kilocycles, plus or minus 2 kilocycles. The exact frequency is determined by the quartz crystal resonator Y-1.

Tuning capacitors are provided on the crystal filter and on each I.F. transformer. These capacitors are designated by symbol numbers C-39 and C-41 to C-46, inclusive, on Photo Nos. 3 and 4.

The high output lead of an accurately calibrated signal generator should be connected to the grid terminal of the first detector tube and the grounded lead to any convenient point on the chassis. The flexible lead need not be disconnected from the grid of the tube. Connection is made directly from the output jack of the signal generator, the dummy antenna being omitted. The CONTROL SWITCH of the receiver should be in the CWO position and the modulation of the signal generator turned off to provide a steady C.W. test signal. The PHASING control of the receiver should be set at 0 and the SELECTIVITY control at 5. The A.F. GAIN control should be fully advanced.

Adjust the output attenuator of the signal generator to provide a signal of approximately 100 microvolts and vary the tuning control of the signal generator slowly between the frequencies of 453 and 457 kilocycles. At some frequency between these limits the I.F. amplifier of the receiver will show a very sharply peaked response, as indicated on the output meter. The output attenuator of the signal generator should be retarded after the signal generator has been tuned to the I.F. peak in order to avoid I.F. or audio overload; the C.W. OSC. control must be set to provide an audio beat note in the middle of the audio range (between 400 and 1000 cycles).

The I.F. tuning capacitors C-39 and C-43 to C-46,

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nclusive, should each be carefully adjusted to give a naximum reading on the output meter. The order in which the adjustments are made is not important. While making I.F. amplifier adjustments, it will be necessary to retard the attenuator of the signal generator if the readjustment increases I.F. amplifier gain to the point where overload occurs.

The crystal filter SELECTIVITY knob should then be set at 1 and the signal generator detuned between 3 and 4 kilocycles either side of the crystal frequency. Capacitor C-42 should be tuned for maximum output meter reading. After this adjustment is made, the SELECTIVITY knob should be set at OFF and the signal generator retuned to *exact* crystal frequency. Compensator capacitor C-41 should then be adjusted for maximum reading on the output meter.

The performance of the I.F. amplifier and audio circuits may be checked against the stage gain data in Section 4–3 after alignment has been completed. Selectivity may be checked against the curves of Dwg. No. 1.

After alignment of the I.F. amplifier has been completed, the C.W. OSC. control should be set at 0 at which setting the CW. oscillator should be at zero beat with the test signal. If zero beat does not occur at 0, readjust capacitor C-47 of transformer T-4, as shown in Photo No. 3.

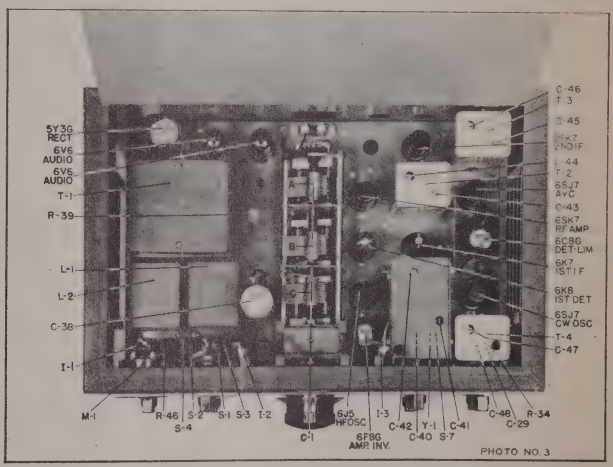
The quartz crystal resonator Y-1 may be checked at the conclusion of I.F. amplifier alignment as follows: The SELECTIVITY control should be set at 5 and the signal generator tuned to the crystal frequency. The output meter reading should be noted. When the SELECTIVITY knob is turned to OFF, the meter reading should decrease 1 to 2 db. provided the PHASING knob is at 0. An increase in meter reading can, in most cases, be traced to an improper adjustment in the I.F. amplifier, since the crystal resonator is mounted in a sealed holder, and it is rather unlikely that trouble will be had from that source.

General Coverage Alignment

(a) H.F. Oscillator

Alignment is effected as follows: With the coil range to be aligned connected in the circuit and with the receiver controls set as recommended in Section 4-1, the MAIN TUNING dial should be set near the high frequency end of the range. A signal generator should be connected to the antenna input terminals through a standard IRE dummy antenna and accurately tuned to deliver a signal of the same frequency as that indicated by the receiver dial setting. If, when this signal is tuned in, the dial reading is too high, the capacity of the H.F. oscillator general coverage circuit trimmer C-51 should be decreased to make correction. Conversely, low dial readings are corrected by increasing the capacity of trimmer C-51.

It is imperative that the high frequency oscillator circuits operate at a higher frequency than that of the first detector and R.F. amplifier circuits. This can be checked by tuning in the image signal, which should appear at a dial reading approximately 910 kilocycles below that of the real signal. The image signal should be considerably weaker if the R.F. amplifier is correctly aligned and a stronger test signal may be required before the image can be found. If the image does not appear at the lower frequency dial setting, the H.F. oscillator circuit is incorrectly adjusted and the capacity of the H.F. oscillator trimmer capacitor in question must be decreased until the real signal and image signal appear at the proper points on the dial.



(b) First Detector and R.F. Amplifier

With the signal generator adjusted to deliver a modulated signal near the high frequency limit of the range to be checked, the receiver should be tuned to give maximum output, as indicated by the output meter. The first detector and R.F. amplifier trimmer capacitors C-50 and C-49, respectively, should then be varied until the output meter reads maximum. On the highest frequency bands, adjustment of the first detector and R.F. amplifier trimmers may change the calibration of the high frequency oscil-

lator, necessitating retuning of the MAIN TUNING dial. If these trimmers should require considerable realignment, it may be necessary to readjust the high frequency oscillator trimmer C-51 in order to maintain correct calibration.

A very simple and quick method of first detector and R.F. trimmer alignment may be used if a signal generator is not available. This method consists of setting the trimmers at the adjustment which provides maximum circuit or background noise. It will be found that trimmer settings under this method are sufficiently sharp to provide good alignment, although the adjustment must be made with care to avoid alignment to the image frequency.

(c) Tracking of H.F. Circuits

After the H.F. oscillator, first detector and R.F. amplifier trimmers have been properly set at the high frequency limit of the range, the receiver should be tuned to a frequency toward the low frequency end. Tracking at any point up to the low frequency limit may be checked by adjusting the signal generator to the proper frequency and testing the settings of the first detector and R.F. amplifier trimmers for maximum gain. Calibration may be checked also at these points. After such a test, all trimmers checked should be reset at the high frequency end of the band since their settings are most critical at this point.

Errors in tracking near the low frequency limit of the band can be caused by defects in any of three circuit elements.

(1) The tuning capacitor section.
(2) The circuit inductance.
(3) The H.F. oscillator series padding capacitor.

In order to determine if one or more sections of the master tuning capacitor C-1 are the cause of any mistracking present, it is necessary to make the check described above on two or more different bands. If the same tracking error appears on all bands, the master tuning capacitor is definitely at fault. The error should be corrected by permanently bending the rotor or stator plates to provide the proper capacity.

If the tracking error appears only in the R.F. amplifier or first detector stage and on only one band, the inductance of the tuned circuit of the stage is incorrect. Should the tracking checks indicate that the H.F. oscillator circuit of a particular band is at fault, either the inductance of the circuit, the series padding capacitor or both may be responsible.

After any change or readjustment is made to any high frequency circuit inductance or series padding capacity, it will be necessary to realign the associated trimmer at the high frequency limit of the coil range. Tracking should then be rechecked.

Band-Spread Alignment

(a) H.F. Oscillator

The method of adjusting the H.F. oscillator band-spread trimmer C-56 of any range is the same as that described under Section 5–3 (a) above. As stated previously (Section 5–1), the adjustment of the general coverage trimmers must not be altered at this time.

(b) First Detector and R.F. Amplifier

The method of adjusting the band-spread trimmers C-58 and C-57 of the first detector and R.F. Amplifier circuits is the same as that described under Section 5–3 (b).

(c) Tracking of H.F. Circuits

After steps (a) and (b) have been completed, the MAIN TUNING control should be turned to the low frequency band limit, and the accuracy of the dial reading checked. If the dial reading is too low, the capacity of the series padding capacitor C-60 (see Photo No. 5) should be increased until the dial reading is correct, and vice versa. The MAIN TUNING control should then be reset at the high frequency band limit, and step (a) repeated. Recheck the low frequency dial reading and repeat the whole procedure if necessary.

The detector and R.F. amplifier stages have fixed band-spread series padding capacitors. These circuits will, therefore, track properly with the H.F. oscillator stage provided that the general coverage circuits are properly aligned and that the band-spread H.F. oscillator circuits are accurately tuned.

S-Meter Adjustment

The S-meter balancing resistor R-39, shown in Photo No. 3, is used to obtain zero meter reading in the absence of signal input to the receiver. The adjustment is as follows: Set the R.F. GAIN control at 10, CONTROL SWITCH at MVC, and disconnect the antenna leads; adjust R-39 until the S-meter reads zero.

Band Indicator Adjustment

An adjustment for centering the band indicator markers in the horizontal slots of the dial face is located in back of the MAIN TUNING knob. It is recommended that the MAIN TUNING knob be pulled out to engage the band changing mechanism, and turned clockwise to the last position before the stop. The red band marker should then indicate 28 to 30 mc. (10 meter) band-spread. To make the adjustment, simply remove the tuning knob and set the ¼″ hex-head screw as may be required. The screw is self-locking.

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Stage Gain Measurements

The sensitivity measurements listed below are made with the equipment set up as specified in Section 5-1. The CONTROL SWITCH should be set at MVC, the A.F. GAIN at 10, the SELECTIVITY at OFF and the PHASING at 0. The signal generator should be adjusted to deliver a test signal of 455 plus or minus 2 kc. either modulated or unmodulated. The high output lead should be attached to the grid of the tube specified in the table below and the ground lead connected to the receiver chassis.

With 1 milliwatt output at the phone jack, the test signal should be within the limits specified below.

Terminal	*Test Signal*
First Det. Grid	50 ± 10 Microvolts
First I.F. Grid	250 ± 50 Microvolts
Sec. I.F. Grid	50,000 ± 10,000 Microvolts
Sec. Det. Grid	Over 1 volt

Voltage Tabulation

All measurements of voltages should be made with the equipment connected for normal operation with AC supply of 115 volt, 50/60 cycle. Except as noted, the R.F. GAIN knob is set at 9, the LIMITER knob set at 0 and the CONTROL SWITCH knob set at MVC. A DC Voltmeter of 1000 ohms per volt sensitivity should be used. The following table must not be considered as a list of the actual operating voltages since loading effects of the measuring instrument will disturb many of the circuits and alter normal voltage distribution. All voltages are measured between specified terminal and chassis.

Tube Terminal	*DC Volts* ±15%
R.F. Amp. Grid	0
R.F. Amp. Cathode	3 A
R.F. Amp. Cathode	25 A*
R.F. Amp. Screen	80 B
R.F. Amp. Plate	230 B
First Det. Grid	0
First Det. Cathode	1 A
First Det. Screen	80 B
First Det. Plate	225 B
H.F. Osc. Grid	C
H.F. Osc. Cathode	0
H.F. Osc. Plate	90 B
First I.F. Grid	0
First I.F. Cathode	3 A
First I.F. Cathode	25 A*
First I.F. Screen	80 B
First I.F. Plate	225 B
Sec. I.F. Grid	0
Sec. I.F. Cathode	5 A
Sec. I.F. Cathode	25 A*
Sec. I.F. Screen	95 B
Sec. I.F. Plate	225 B
Sec. Det. Grid	0
Sec. Det. Cathode	8 A
Sec. Det. Plate	225 B
Limiter Grid	−3 A
Limiter Cathode	4.5 A
Limiter Cathode	0 #
Limiter Plate	0
AVC Grid	−25 A†
AVC Cathode	−45 A†
AVC Screen	0 †
AVC Plate	0 †
B.F. Osc. Grid	C
B.F. Osc. Cathode	0 §
B.F. Osc. Screen	10 A§
B.F. Osc. Plate	25 A§
Amp.-Inv. Grids	0
Amp.-Inv. Cathode	4.5 A
Amp.-Inv. Plates	115 B
Audio Grids	−20 A
Audio Cathodes	−40 A
Audio Screens	230 B
Audio Plates	215 B
B+ Common	230 B
B− Common	−50 B

A — 0 to 50 volt meter scale
B — 0 to 250 volt meter scale
C — Accurate measurement cannot be made
* — R.F. GAIN knob set at 0
# — LIMITER knob set at 10
† — CONTROL SWITCH knob set at AVC
§ — CONTROL SWITCH knob set at CWO

The Power Output Tubes used in the NC-200 Radio Receiver may be the metal type 6V6 or the glass type 6V6GT/G. It is necessary, however, to provide glass type 6V6GT/G output tubes with metal shields to avoid oscillation in the audio amplifier. The recommended shield is Goat type G1222K with type G1004 connector.

Symbol	*Function*	*Type*	*Rating*
	CAPACITORS		
C_{1A}	R.F. Amplifier Tuning	Air	225 mmf. max.
C_{1B}	First Detector Tuning	Air	225 mmf. max.
C_{1C}	H.F. Oscillator Tuning	Air	225 mmf. max.
C_2	R.F. Grid Filter	Mica	.005 mfd., 300 v. d.c. w.
C_3	R.F. Cathode By-pass	Paper	.1 mfd., 400 v. d.c. w.
C_4	R.F. Screen By-pass	Paper	.1 mfd., 400 v. d.c. w.
C_5	R.F. B+ By-pass	Paper	.1 mfd., 600 v. d.c. w.
C_6	First Det. Cathode By-pass	Paper	.1 mfd., 400 v. d.c. w.
C_7	First Det. Screen By-pass	Paper	.1 mfd., 400 v. d.c. w.
C_8	First Det. B+ By-pass	Paper	.1 mfd., 600 v. d.c. w.
C_9	First I.F. Grid Filter	Paper	.01 mfd., 600 v. d.c. w.
C_{10}	First I.F. Cathode By-pass	Paper	.1 mfd., 400 v. d.c. w.
C_{11}	First I.F. B+ By-pass	Paper	.1 mfd., 600 v. d.c. w.
C_{12}	Sec. I.F. Grid Filter	Paper	.01 mfd., 600 v. d.c. w.
C_{13}	Sec. I.F. Cathode By-pass	Paper	.1 mfd., 400 v. d.c. w.
C_{14}	Sec. I.F. Screen By-pass	Paper	.1 mfd., 400 v. d.c. w.
C_{15}	Sec. I.F. B+ By-pass	Paper	.1 mfd., 600 v. d.c. w.
C_{16}	Sec. Det. Plate By-pass	Paper	.01 mfd., 600 v. d.c. w.
C_{17}	Sec. Det. to Limiter Audio Coupling	Paper	1. mfd., 200 v. d.c. w.
C_{18}	Sec. Det. Cathode By-pass	Ceramic	.00025 mfd., 1,000 v. d.c. w.
C_{19}	Sec. Det. I.F. By-pass	Mica	.001 mfd., 500 v. d.c. w.
C_{20}	Limiter Output By-pass	Ceramic	.00025 mfd., 1,000 v. d.c. w.
C_{21}	Tone Control	Paper	.01 mfd., 600 v. d.c. w.
C_{22}	Limiter to Inverter-Audio Coupling	Paper	.01 mfd., 600 v. d.c. w.
C_{23}	Tone Control	Mica	.001 mfd., 500 v. d.c. w.
C_{24}	Inverter-Audio Cathode By-pass	Elec.	10 mfd., 50 v. d.c. w.
C_{25}	Inverter-Audio to Output Coupling	Paper	.1 mfd., 400 v. d.c. w.
C_{26}	Inverter-Audio to Output Coupling	Paper	.1 mfd., 400 v. d.c. w.
C_{27}	Inverter Feedback Coupling	Paper	.1 mfd., 400 v. d.c. w.
C_{28}	H.F. Oscillator Grid	Ceramic	.0001 mfd., 1,000 v. d.c. w.
C_{29}	Beat Oscillator Grid	Mica	.001 mfd., 500 v. d.c. w.
C_{30}	Beat Oscillator Screen By-pass	Paper	.1 mfd., 400 v. d.c. w.
C_{31}	Beat Osc. to Sec. Det. Coupling	Bakelite	1 mmf., 400 v. d.c. w.
C_{32}	AVC Output By-pass	Paper	.1 mfd., 400 v. d.c. w.
C_{33}	AVC Plate By-pass	Paper	.1 mfd., 400 v. d.c. w.
C_{34}	AVC Cathode By-pass	Paper	.1 mfd., 400 v. d.c. w.
C_{35}	B Minus By-pass	Elec.	8 mfd., 200 v. d.c. w.
C_{36}	AVC to Sec. Det. Coupling	Ceramic	.00005 mfd., 1,000 v. d.c. w.
C_{37}	Power Supply Filter	Paper	.1 mfd., 600 v. d.c. w.
C_{38}	Power Supply Filter	Elec.	8 and 8 mfd., 475 v. d.c. w
C_{39}	Crystal Filter Input Tuning	Air	6 to 85 mmf.
C_{40}	Crystal Filter Phasing Control	Air	5 and 5 mmf.
C_{41}	Crystal Filter Compensating	Ceramic	2 to 6 mmf.
C_{42}	Crystal Filter Output Tuning	Air	6 to 85 mmf.
C_{43}	T-2 Primary Tuning	Air	6 to 85 mmf.
C_{44}	T-2 Secondary Tuning	Air	6 to 85 mmf.
C_{45}	T-3 Primary Tuning	Air	6 to 85 mmf.

Continued on next page

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PARTS LIST (*Continued*)

Symbol	Function	Type	Rating
	CAPACITORS (*Continued*)		
C_{46}	T-3 Secondary Tuning	Air	6 to 85 mmf.
C_{47}	T-4 Tuning	Air	6 to 85 mmf.
C_{48}	C.W. Osc. Control	Air	1 to 10 mmf.
C_{49}	Gen. Cov. R.F. Amplifier Trimmer	Air	See Note No. 1
C_{50}	Gen. Cov. 1st Det. Trimmer	Air	See Note No. 1
C_{51}	Gen. Cov. H.F. Osc. Trimmer	Air	See Note No. 1
C_{52}	Gen. Cov. H.F. Osc. Padder	Air	See Note No. 1
C_{53}	Gen. Cov. H.F. Osc. Padder	Mica	See Note No. 1
C_{54}	Band-Spread R.F. Amplifier Trimmer	Air	See Note No. 1
C_{55}	Band-Spread 1st Det. Trimmer	Air	See Note No. 1
C_{56}	Band-Spread H.F. Osc. Trimmer	Air	See Note No. 1
C_{57}	Band-Spread R.F. Amp. Padder	Ceramic	See Note No. 1
C_{58}	Band-Spread 1st Det. Padder	Ceramic	See Note No. 1
C_{59}	Band-Spread H.F. Osc. Padder	Ceramic	See Note No. 1
C_{60}	Band-Spread H.F. Osc. Padder	Ceramic	2 to 6 mmf.
	RESISTORS		
R_1	R.F. Grid Filter	Fixed	500,000 Ohm, ½ w.
R_2	R.F. Cathode Bias	Fixed	500 Ohm, ½ w.
R_3	First Det. Cathode Bias	Fixed	250 Ohm, ½ w.
R_4	First Det. Screen Bleeder	Fixed	100,000 Ohm, ½ w.
R_5	First Det. Screen Dropping	Fixed	50,000 Ohm, ½ w.
R_6	First Det. Plate Filter	Fixed	2,000 Ohm, ½ w.
R_7	First I.F. Grid Filter	Fixed	20,000 Ohm, ½ w.
R_8	First I.F. Cathode Bias	Fixed	See Note No, 2, ½ w.
R_9	First I.F. Plate Filter	Fixed	2,000 Ohm, ½ w.
R_{10}	Sec. I.F. Grid Filter	Fixed	500,000 Ohm, ½ w.
R_{11}	Sec. I.F. Cathode Bias	Fixed	See Note No, 2, ½ w.
R_{12}	Sec. I.F. Screen Bleeder	Fixed	100,000 Ohm, ½ w.
R_{13}	Sec. I.F. Screen Dropping	Fixed	70,000 Ohm, ½ w.
R_{14}	Sec. Det. Plate Filter	Fixed	2,000 Ohm, ½ w.
R_{15}	Sec. Det. I.F. Filter	Fixed	5,000 Ohm, ½ w.
R_{16}	Sec. Det. Load	Fixed	25,000 Ohm, ½ w.
R_{17}	Limiter Input	Fixed	50,000 Ohm, ½ w.
R_{18}	Limiter Output	Fixed	50,000 Ohm, ½ w.
R_{19}	Tone Control	Comp. Var.	500,000 Ohm, 1 w.
R_{20}	A.F. Gain Control	Comp. Var.	500,000 Ohm, 1 w.
R_{21}	Inverter-Audio Cathode Bias	Fixed	1,000 Ohm, ½ w.
R_{22}	Inverter Grid	Fixed	500,000 Ohm, ½ w.
R_{23}	First Audio Plate	Fixed	50,000 Ohm, ½ w.
R_{24}	First Audio Plate	Fixed	50,000 Ohm, ½ w.
R_{25}	Output Grid	Fixed	250,000 Ohm, ½ w.
R_{26}	Output Grid	Fixed	250,000 Ohm, ½ w.
R_{27}	Inverter Feedback Coupling	Fixed	250,000 Ohm, ½ w.
R_{28}	Output Cathode Bias	Fixed	200 Ohm, 2 w.
R_{29}	R.F. Gain Control With Switch	W. W. Var.	10,000 Ohm, 1½ w.
R_{30}	R.F. Gain Bleeder	Fixed	50,000 Ohm, ½ w.

PARTS LIST (*Continued*)

Symbol	Function	Type	Rating
	RESISTORS (*Continued*)		
R_{31}	H.F. Osc. B+ Dropping	Fixed	50,000 Ohm, 1 w.
R_{32}	H.F. Osc. Grid	Fixed	50,000 Ohm, ½ w.
R_{33}	Beat Osc. Plate Filter	Fixed	250,000 Ohm, ½ w.
R_{34}	Beat Osc. Grid	Fixed	50,000 Ohm, ½ w.
R_{35}	Beat Osc. Screen Bleeder	Fixed	100,000 Ohm, ½ w.
R_{36}	Beat Osc. Screen Dropping	Fixed	100,000 Ohm, ½ w.
R_{37}	B+ Voltage Divider	Fixed	20,000 Ohm, 2 w.
R_{38}	B+ Voltage Divider	Fixed	20,000 Ohm, 2 w.
R_{39}	S-Meter Adjustment	W. W. Var.	1,000 Ohm, 1 w.
R_{40}	S-Meter Bridge	Fixed	1,000 Ohm, ½ w.
R_{41}	AVC Plate Filter	Fixed	500,000 Ohm, ½ w.
R_{42}	AVC Plate	Fixed	500,000 Ohm, ½ w.
R_{43}	AVC Voltage Divider	Fixed	1,500 Ohm, 2 w.
R_{44}	AVC Cathode Bias	Fixed	500 Ohm, 2 w.
R_{45}	AVC Grid	Fixed	5,000,000 Ohm, ½ w.
R_{46}	Limiter Control	W. W. Var.	10,000 Ohm, 1½ w.
	MISCELLANEOUS		
F_1	AC Line Fuse	Glass Encl.	2 Amp.
I_1	S-Meter Lamp	No. 40	6 v., .15 a.
I_2	Dial Lamp	No. 47	6 v., .15 a.
I_3	Dial Lamp	No. 47	6 v., .15 a.
L_1	Power Supply Filter Choke	Potted	17 h., 100 ma.
L_2	Power Supply Filter Choke	Potted	17 h., 100 ma.
M_1	Signal Strength Meter	"S" Scale	0 to 1 ma.
P_1	Loud Speaker Connector Plug	Molded	5 Prong
P_2	Dummy Plug for AC Operation	Molded	7 Prong
P_3	Battery Connector Plug	Molded	7 Prong
S_1, S_2	Control Switch	Two Gang	SPST 250 v., 1 a.
S_3, S_4	Power Supply Switch	Two Gang	SPST 250 v., 1 a.
S_5	Tone Control Switch	Part of R-19	SPST
S_6	S-Meter Switch	Part of R-29	SPST
S_7	Selectivity Control Switch	Rotary	2 Section, Ganged
T_1	Power Transformer	150 Watt	115 Volt, 60 Cycle
T_2	I.F. Transformer	Air Tuned	455 kc.
T_3	I.F. Transformer	Air Tuned	455 kc.
T_4	Beat Osc. Transformer	Air Tuned	455 kc.
X_1	Audio Output Socket	Bakelite	5 Prong
X_2	Battery Connector Socket	Bakelite	7 Prong
Y_1	Crystal Resonator	Quartz	455 kc.

Note No. 1. Capacitor rating is different in each coil range and is individually adjusted as circuit conditions may require. Definite rating cannot be listed. C-52 used in E and F ranges only. C-54 to C-60, inclusive, used in A, B, C and D ranges only.

Note No. 2. Resistors R-8 and R-11 may have values between 300 and 5,000 ohms since they are chosen to meet the circuit requirements of the particular receiver. The resistance values are determined after careful laboratory test and cannot be changed without impairing performance.

NOTICE—Due to the exigencies of the War Program, the manufacturer may have found it necessary to employ substitute, interchangeable parts in certain receivers. Such parts do not impair performance in any way, but should replacement become necessary it is suggested that the type indicated in the Parts List be obtained, if possible.

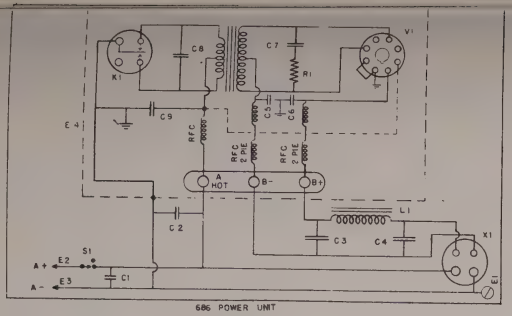

FIGURE 1

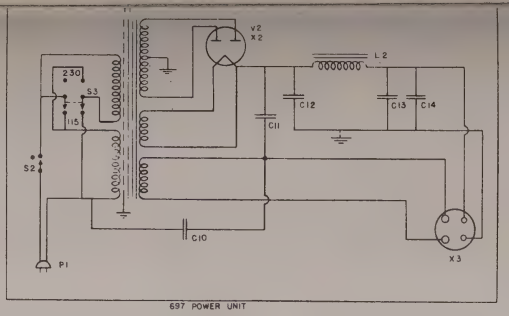

FIGURE 2

TABLE I

TYPICAL OPERATING CONDITIONS

VARIABLE	686	1286	697
Primary Voltage	6 V D.C.	12 V D.C.	115 or 230 V A.C.
Frequency	0	0	50/60 cycles/sec.
Heater Voltage	6 V D.C.	12 V D.C.	6.2 V A.C.
Heater Current	3 Amp.	- -	3.4 Amp. A.C.
B Voltage	165 V D.C.	165 V D.C.	240 V D.C.
B Milliamperes	45 D.C.	45 D.C.	70 D.C.
Line Current	6.3 Amp.	- -	.65 Amp.
Power Consumption	38. Watt	- -	70 Watt

Note:- The Type 0Z4 Rectifier Tube is used in the 1286 Power Unit and may be used in the 686 Power Unit in which case the rectifier filament connection (shown dotted) is not needed.

NOTE:

THE 115-230 VOLT FEATURE HAS BEEN OMITTED FROM THE SCHEMATIC, FIG.2

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NATIONAL TYPE 686 TABLE MODEL POWER UNIT

The National Type 686 Table Model Power Unit operates from a 6 volt DC supply to provide approximately 165 volts at 45 milliamperes DC. The circuit diagram of this unit is shown in Figure 1. Battery clips are provided for convenient connection to a 6 volt storage battery or similar source of power. Output voltages for both A and B supply are available at a four prong socket for convenient plug and cable connection to associated apparatus. Table No. I lists typical operating voltages and currents when used with the National Type HRO Radio Receiver. Parts Lists are given in Table No. II. The Power Unit consists of a Mallory Type 6B200 Vibrapack and a condenser input single section filter. The Vibrapack uses a 6X5 (or 0Z4) type rectifier tube and a Mallory Type 626 vibrator. It should be noted that B- is not connected to the Power Unit chassis; A- is connected to the chassis.

NATIONAL TYPE 1286 TABLE MODEL POWER UNIT

The National Type 1286 Power Unit is similar to the Type 686 Power Unit except that it is designed to operate from 12 volts DC. The Vibrapack is a Mallory 12B200 with a G626 vibrator and an 0Z4 rectifier tube. The voltages available at the output socket are 12 volts DC and 165 volts at 45 milliamperes DC. Table No. I lists typical operating voltages and currents when used with the National HRO-12S Radio Receiver.

NATIONAL TYPE 697 TABLE MODEL POWER UNIT

The National Type 697 Table Model Power Unit operates from 115 or 230 volts AC, 50/60 cycles, to provide 240 volts at 70 milliamperes DC and 6.2 volts at 3.4 amperes AC. The circuit diagram of this unit is shown in Figure 2. Output voltages for both A and B supply are available at a four prong socket for convenient plug and cable connection to associated apparatus. Table No. I lists typical operating voltages and currents when used with the National Type HRO Radio Receiver. Parts Lists are given in Table III.

The Type 697 Power Unit consists of a power transformer, glass Type 80 rectifier tube, and a single section condenser input filter. B- is connected to the Power Unit chassis. The transformer primary and B+ input to the filter are by-passed to one side of the heater supply winding for R.F. filtering. A primary tap selector switch is provided to permit operation from either 115 or 230 volt supply lines.

NATIONAL RACK MOUNTING POWER UNITS

Either of the Table Models 686 or 697 Power Units are available for rack mounting. The National Type numbers for the 686 and 697 Power Units, rack mounted, are SPU-686 and SPU-697, respectively.

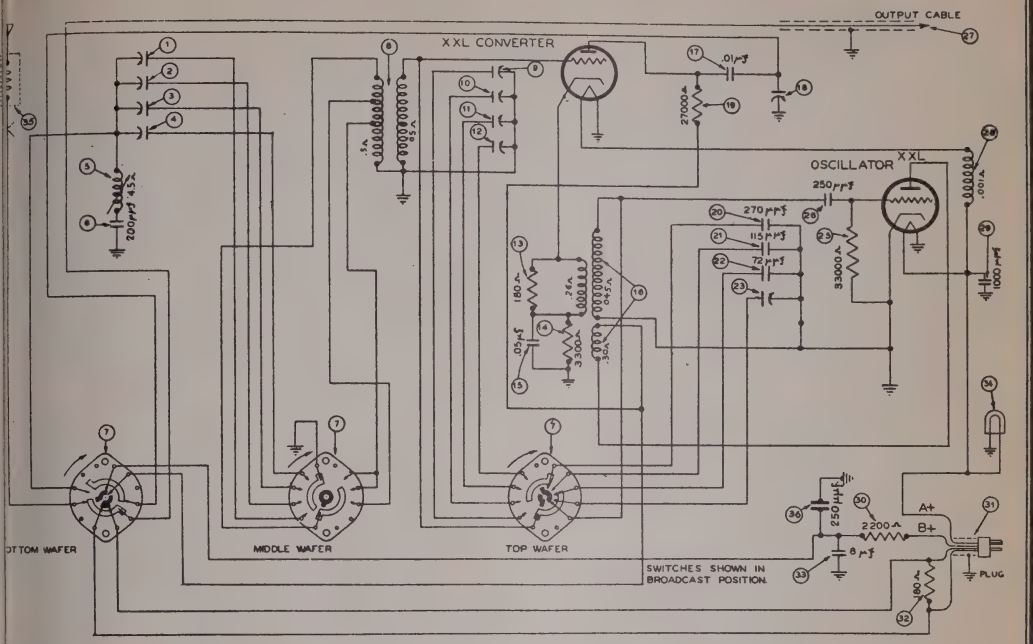
TABLE III
PARTS LIST

NO.	SYMBOL	MFR. DESIG.	DESCRIPTION	MFR.
		TYPE 697 POWER UNIT		
1	P-1	Allied 150	Cord and Plug	9
1	S-2	20599NU	SPST Toggle	2
1	S-3	20905-H	DPDT Toggle	2
2	C-10,11	1450	Mica: .01 mfd. 300 V DC W	1
1	C-12,13,14	D-7166	Elec: 8-8-8 mfd. 475 V DC W	8
1	L-2	80	17 Henry Choke	6
1	T-1	3385	110-220 V. Power Transformer	6
1	V-2	-80	Rectifier Tube	7
1	X-3	X-18	4-Prong Socket	3
1	X-2	X-18	4-Prong Socket Marked 80	3
		TYPE 686 OR 1286 POWER UNIT		
1	E-4	6B200	Vibrapack (686 only)	4
1	E-4	12B200	Vibrapack (1286 only)	4
2	E-2,3	24A	Battery Clips	5
1	S-1	20994	SPST Toggle Switch	2
1	C-1	1467	Mica: .005 mfd. ±10%, 300 V DC W	1
1	C-2	G014AB	Paper: .1 mfd. +20-10%, 400 V DC W	8
1	C-3,4	D-7165	Elec.: 8-8 mfd. 475 V DC W	8
1	L-1	80	17 Henry ±20% Inductance	6
1	X-1	X-18	4-Prong Socket	3
1	E-1	HCLUG	Screw Terminal Battery Cable	6
1	V-1	6X5	Rectifier Tube (686 only)	
1	V-1	0Z4	Rectifier Tube (1286 only)	7
1	K-1	626	Vibrator (686 only)	4
1	K-1	G626	Vibrator (1286 only)	4

LIST OF MANUFACTURERS

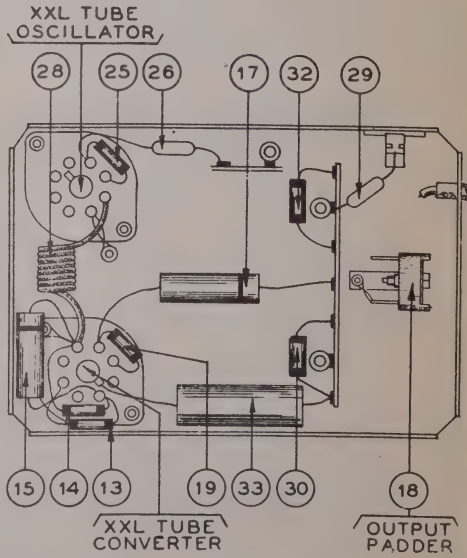
1 Aerovox Corporation, New Bedford, Mass.
2 Arrow-Hart & Hegeman, Hartford, Conn.
3 Cinch Mfg. Company, Chicago, Illinois
4 P.R. Mallory & Co, Indienapolis, Ind.
5 Mueller Elec. Co., Cleveland, Ohio
6 National Company, Inc. Malden, Mass.
7 RCA Mfg. Company, Harrison, N.J.
8 Sprague Products Co. No. Adams, Mass.
9 Cornish Wire Co., New York, N.Y.

PHILCO RADIO & TELEVISION CORP.



PARTS LIST — MODEL SW-1

No.	Description	Part No.
(1)	Antenna Padder (Primary 6 MC)	77-0771
(2)	Antenna Padder (Primary 9 MC)	Part of (1)
(3)	Antenna Padder (Primary 11 MC)	Part of (1)
(4)	Antenna Padder (Primary 15 MC)	Part of (1)
(5)	Wave Trap	65-0416
(6)	Condenser (200 Mmfd.)	60-120327
(7)	Wave Switch	77-0913
(8)	Antenna Transformer	65-0417
(9)	Antenna Padder (Secondary 6 MC)	77-0772
(10)	Antenna Padder (Secondary 9 MC)	Part of (9)
(11)	Antenna Padder (Secondary 11 MC)	Part of (9)
(12)	Antenna Padder (Secondary 15 MC)	Part of (9)
(13)	Resistor (180 ohms)	33-118334
(14)	Resistor (3300 ohms)	33-233154
(15)	Condenser (.05 Mfd.)	61-0101
(16)	Oscillator Transformer	65-0436
(17)	Condenser (.01 Mfd.)	61-0176
(18)	Output Padder	63-0054
(19)	Resistor (27000 ohms)	33-327334
(20)	Silver Mica Condenser (270 Mmfd.)	61-0167
(21)	Silver Mica Condenser (115 Mmfd.)	61-0166
(22)	Silver Mica Condenser (72 Mmfd.)	61-0142
(23)	Oscillator Padder (15 MC)	63-0076
(25)	Resistor (33,000 ohms)	33-333334
(26)	Condenser (250 Mmfd.)	60-125157
(27)	Output Cable	95-0200
(28)	Filament Choke	32-1644
(29)	Condenser (1000 Mmfd.)	60-210157
(30)	Resistor (2200 ohms)	33-222334
(31)	Power Cable	95-0188
(32)	Resistor (180 ohms)	33-118334
(33)	Condenser (8 Mfd.)	61-0164
(34)	Pilot Lamp	34-2068
(35)	Antenna Choke	77-0785
(36)	Condenser (250 Mmfd.)	60-125157
	Housing (Distributor)	77-0761FC59
	(Chrysler Export)	77-0761FC64
	(Ford Export)	77-0761FC51
	(Studebaker)	77-0761FC54
	(Packard)	77-0761FC51
	Bottom Cover	57-0749FA3
	Tube Socket	27-6151
	Knob (Distributor)	77-0856
	(Chrysler Export)	77-0688
	(Ford Export)	77-0835
	(Packard)	77-0849
	(Studebaker)	77-0835
	Flexible Shaft (Distributor)	77-0841
	(Chrysler Export)	77-0841
	(Ford Export)	77-0841
	(Packard)	77-0842
	(Studebaker)	77-2115
	Complete Control (Distributor)	85-0140
	(Chrysler Export)	85-0136
	(Ford Export)	85-0139
	(Packard)	85-0142
	(Studebaker)	85-0141
	Drum Assy.	318-2431
	Pilot Lamp Assy.	77-0787
	Stud (Unit Mtg.)	97-0184FA3
	Spacer (Unit Mtg.)	57-0750FA3
	Nut (Unit Mtg.)	W55FA3
	Lockwasher (Unit Mtg.)	W471FE7
	Screw (Control Mtg.)	W1459FA3
	Washer (Control Mtg.)	W1972
	Ignition Switch Condenser (Chrysler)	30-4007
	Voltage Regulator Condenser (Chrysler)	30-4490
	Voltage Regulator Condenser (Chrysler)	61-0172
	Steering Column Braid (Chrysler)	95-0205
	Distributor Point Filter (Chrysler)	77-0927
	Ground Strap (Chrysler)	77-0843
	Ground Strap (Chrysler)	77-0844
	Temperature Gauge Condenser (Ford)	61-0087
	Voltage Regulator Condenser (Ford)	61-0087
	Horn Button Condenser (Ford)	61-0104
	Gas Gauge Condenser (Ford)	30-4663
	Generator Armature Condenser (Ford)	30-4007
	Braid (Body to Frame) (Ford)	95-0145
	Steering Column Braid (Ford)	77-0336
	Antenna Cable (Ford)	95-0199
	Spark Plug Suppressor (Chrysler-Ford-Packard)	33-1015
	Interference Condenser (Packard)	61-0173
	Braid (Packard)	49-140120
	Spark Plug Suppressor (Studebaker)	33-1195
	Distributor Suppressor (Studebaker)	33-1196
	Fuse Block Condenser (Studebaker)	30-4007
	Switch Condenser (Champion) (Studebaker)	61-0168
	Steering Column Ground Strap (Studebaker)	77-0336
	Motor Block Ground Strap (Studebaker)	38-7425



MODEL SW-1

PHILCO RADIO & TELEVISION CORP.

MODEL SW-1 — ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

EQUIPMENT — Fully charged heavy duty storage battery or 6 volt power pack, 077 or 177 Philco Signal Generator, 027 Philco Vacuum tube voltmeter and set test or audio output meter, 45-2610 padding screw driver.

GENERATOR — VACUUM TUBE VOLTMETER. The model 027 Vacuum tube voltmeter is an extremely sensitive and accurate test instrument and is recommended for use when aligning and adjusting auto radios. Connect the negative (minus) terminal of the Vacuum Tube Voltmeter to the high side (ungrounded side) of the volume control. Connect the positive (plus) terminal to the housing. Connect the "AC" cord to a 110 volt AC socket. Press the VTVM button and the 10 volt button. Turn the "Set Zero Ohms—VTVM" control clockwise until a click is heard. Allow the tubes to heat up for a few minutes. Short the 150 megs. VTVM terminals and adjust the "Set Zero Ohms—VTVM" control until the meter reads zero on the 0-10 range scale (Green Scale). The needle will deflect from right to left.

AUDIO OUTPUT METER. If an audio output meter is used, connect the leads across the voice coil of the speaker. Use the 0-30 volt scale.

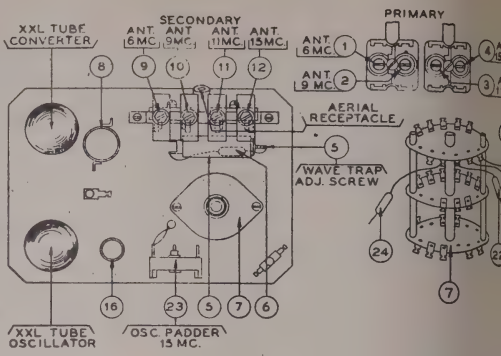
Any Philco Auto Radio that has a Short Wave Tuner receptacle can be used when padding the tuner.

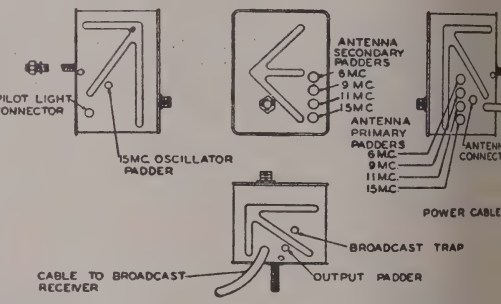
Remove the connector clip and connect the power cable to the tuner receptacle on the radio. Connect the R.F. cable from the tuner to the aerial receptacle in the radio.

With the radio, signal generator and short wave tuner, set up at the prescribed frequency and proper dummy (See note), turn the radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the meter. The signal in the speaker should be audible but not loud.

The shielding on the aerial lead should be connected to the (plus) terminal of the signal generator.

WHEN MAKING ADJUSTMENTS TO THE CHRYSLER EXPORT, FORD EXPORT, STUDEBAKER, AND DISTRIBUTOR SHORT WAVE TUNERS, IT IS NECESSARY THAT THE AERIAL LEAD BE CONNECTED TO THE CHOKE, PART NO. 77-0885, WHICH IS PACKED WITH THE RADIO.





OPERATION	SIGNAL GENERATOR FREQUENCY	DUMMY CAPACITY	SPECIAL INSTRUCTIONS AND PADDER ADJUSTMENTS
1	Push in the knob on the tuning control or radio until stations can be tuned in by manual tuning.		
2	1400 K.C.	See Note	Set the tuner to broadcast position, and adjust the manual control to 1400 K.C. Adjust the aerial padder on the radio.
3	6.1 MC	See Note	Set tuner on 6 MC position. Tune in the 6.1 MC signal and adjust the 6 MC primary and secondary padders and the output padder.
4	9.6 MC	See Note	Set tuner on 9 MC position. Tune in the 9.6 MC signal and adjust the 9 MC primary and secondary padders. If two peaks are obtained when adjusting the primary padder use the inner peak.
5	11.8 MC	See Note	Set tuner on 11 MC position. Tune in the 11.8 MC signal and adjust the 11 MC primary and secondary. If two peaks are obtained when adjusting the primary padder use the inner peak.
6	15.225 MC	See Note	Set tuner on 15 MC position — four turns clockwise, and the pointer on the dial to 1375 K.C. Adjust the 15 MC oscillator padder and 15 MC primary and secondary padders. If two peaks are obtained when adjusting the primary and secondary padders, use the outer peak on each.
7	15.1 MC	See Note	Signal should come in approximately 1250 K.C. on dial.
8	15.35 MC	See Note	Signal should come in approximately 1500 on dial.
9	1400 K.C.	See Note	Set tuner on the 6 MC position. Adjust the broadcast trap padder for MINIMUM signal on a strong local station between 1100 and 1500 KC on the dial.

The tuner must have the housing and cover in place.

Make all adjustments for maximum reading on the meter unless otherwise specified.

NOTE: Connect the aerial lead, Part No. 95-0185, to the aerial choke, Part No. 77-0885, and then connect the choke in the aerial receptacle on the tuner. (DO NOT USE CHOKE ON PACKARD). Connect an additional capacity in series between the signal generator and aerial lead on the following:

For Chrysler Export (SWC-1E)—Use a 25 Mmfd. condenser.
For Ford Export (SWF-1E)—Use a 20 Mmfd. condenser.
For Packard (SWP-1)—Use 45 Mmfd. condenser. No aerial choke
For Studebaker (SWS-1)—Use 35 Mmfd. condenser.
For Distributor (SWD-1)—Use 35 Mmfd. condenser.

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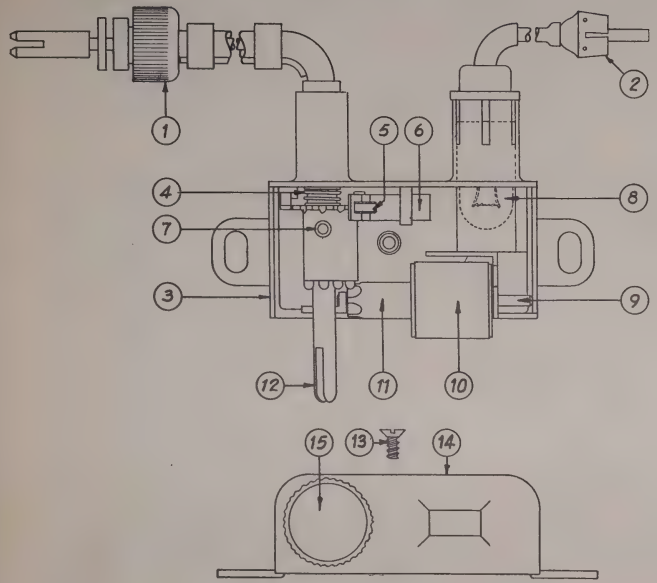
CONTROL UNIT FOR SHORT WAVE TUNER MODEL SW1



PARTS LIST

Description	Part No.	List Price
Complete Control (Distributor)	85-0140	$5.00
(Chrysler Export)	85-0138	5.00
(Packard)	85-0142	5.50
(Studebaker)	85-0141	4.75
(Ford Export)	85-0139	4.75
(1) Flexible Shaft (Distributor, Chrysler Export, Ford Export)	77-0841	1.25
(Packard)	77-0842	1.50
(Studebaker)	77-0912	1.50
(2) Pilot Lamp Assy	77-0787	.50
(3) Housing (Distributor)	57-1954PC59	.75
(Chrysler Export)	57-1954PC52	.75
(Packard)	57-1954PC53	.75
(Studebaker, Ford Export)	57-1954PC54	.75
(4) Backlash Spring	57-1840PA5	.01
(5) Wheel, Index	57-1955PA5	.10
(6) Spring, Index	57-1956PA5	1.50 Per C

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

Description	Part No.	List Price
(7) Set Screw	W-1785PBF	.05
(8) Pilot Lamp	34-2068	.12
(9) Pin	57-1959PA5	.10
(10) Dial Drum Strip	55-1233	.35
(11) Dial Drum	55-1231	.20
(12) Switch Shaft	57-1958	.35
(13) Cover Mounting Screw	W-1906PA5	1.25 Per C
(14) Cover (Distributor)	57-1953PC59	.50
(Chrysler Export)	57-1953PC52	.50
(Packard)	57-1953PC53	.50
(Studebaker, Ford Export)	57-1953PC54	.50
(15) Knob (Distributor)	77-0848	.35
(Chrysler Export)	77-0888	.25
(Packard)	77-0849	.45
(Studebaker, Ford Export)	77-0855	.15
Drum Assembly	318-2431	.00

IGNITION INTERFERENCE ELIMINATION WHEN USING THE SHORT WAVE TUNER WITH THE 1941 STUDEBAKER AND DISTRIBUTOR AUTO RADIOS

A new antenna filter choke, Part No. 77-0885, has been added to the Short Wave Tuner to further reduce stubborn cases of ignition interference.

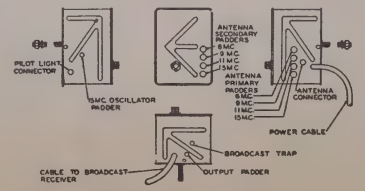
In early production the Tuners did not have this choke. However, when an installation is made, and motor interference persists, it may be necessary to use this new choke. On Tuners which did not originally have this choke and it is necessary to add this new part, the antenna primary and secondary padders MUST be readjusted. The padding procedure is as follows:

1. Connect a 10 mmfd. condenser in series between the signal generator lead and the aerial lead, Part No. 95-0185. Plug the aerial lead into the tuner and set the generator to 1500 K.C. Turn the short wave tuner switch to the broadcast position (extreme counter-clockwise). Tune in the signal and adjust the antenna padder IN THE RADIO to maximum.
2. Turn the tuner switch to the No. 2 position (6 m.c. band). Set the signal generator at 6.1 m.c. and tune in the signal with the tuning control knob. Pad the 6 m.c. primary and secondary padders (see illustration) for maximum response.
3. Pad the output padder (see illustration) for maximum signal. Do not readjust this padder again.
4. Turn the short wave switch to the No. 3 position (9 megacycles band) and set the signal generator to 9.6 megacycles. Tune in the signal with the tuning control knob and pad the (9 m.c.) antenna primary and secondary padders (see illustration) for maximum signal.
5. Turn the short wave switch to the No. 4 position (11 megacycle band) and set the signal generator to 11.8 megacycles. Tune in the signal with the tuning control knob and pad the (11 m.c.) antenna primary and secondary padders (see illustration) for maximum signal.
6. Turn the short wave switch to the No. 5 position (15 megacycle band) and set the signal generator to 15.225 megacycles. Tune in the signal with the tuning control knob and pad the (15 m.c.) antenna primary and secondary padders (see illustration) for maximum signal.

NOTE: When a replacement choke is used, it is not necessary to readjust the padders.

It is rather difficult to perform the above operations with the tuner in the car. Whenever possible the tuner should be removed and repadded on the bench. It does not matter what model radio is used with the tuner to pad it, provided the radio has a power socket.

After the tuner is re-installed in the car, the antenna padders should not be touched. The usual variation of antenna capacities in car installations have no material effect on the sensitivity of the tuner. Simply follow the usual installation instructions supplied with the tuner.



MODEL 41-KR

PHILCO RADIO & TELEVISION CORP.

SPECIFICATIONS

Model 41-KR is a combination Radio and Clock. The radio consists of a five tube superheterodyne circuit covering a tuning frequency range from 54 to 1600 K. C.; built-in loop Aerial, Automatic Volume Control; Philco Loktal tubes; and a beam power audio output stage.

INTERMEDIATE FREQUENCY: 455 K. C.

POWER SUPPLY This Model is designed for operation from a 115 Volt alternating current (A. C.) power supply.

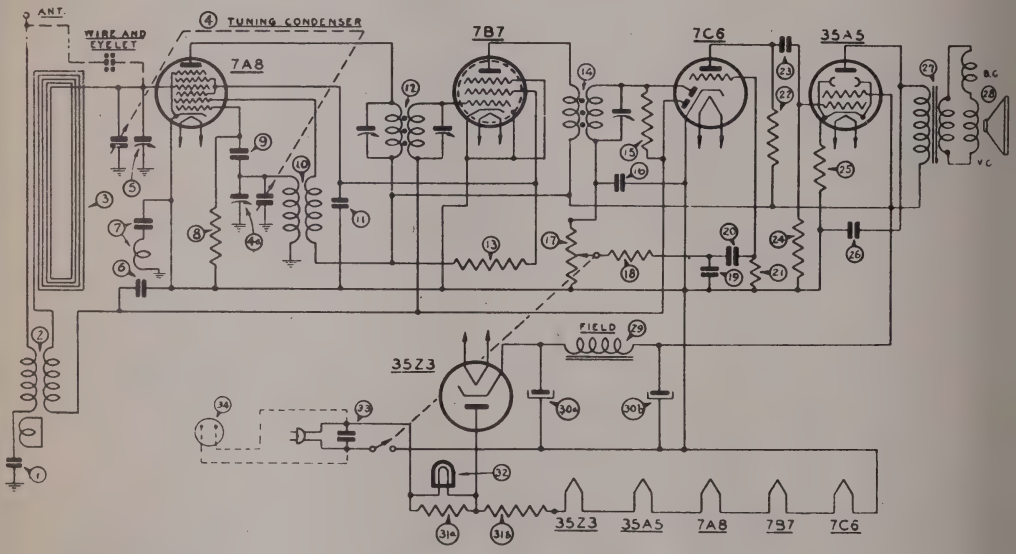
POWER CONSUMPTION: 35 Watts.

PHILCO TUBES USED: One 7A8, converter; one 7B7, I. F. amplifier; one 7C6, 2nd detector, 1st audio; one 35A5, audio output and one 35Z3, rectifier.

AERIAL AND GROUND: To obtain maximum performance in steel reinforced buildings, apartment house and other shielded locations where signal strength is weak, provisions are also provided at the rear of the cabinet for outside aerial.

ALIGNING PROCEDURE

THE INSTRUCTIONS FOR ALIGNING THE R-F AND I-F CONDENSERS ARE THE SAME AS THOSE FOR MODEL 42-KR-3.



WIRING DIAGRAM, PHILCO RADIO MODEL 41-KR

Replacement Parts — Model 41-KR

SCHEM. No.	DESCRIPTION	PART No.
1	Tubular Condenser (.0015 mf., 200 V.)	30-4555S
2	Antenna Transformer	32-3394
3	Loop Antenna	32-3435
4	Tuning Condenser	31-2439
5	Padding Condenser	31-6344
6	Tubular Condenser (.1 mf., 200 V.)	30-4499S
7	Condenser and Choke Assy.	76-1019
8	Resistor (22,000 ohms, ¼ watt)	33-322154
9	Mica Condenser (110 mmf.)	30-1130
10	Oscillator Transformer	32-3182
11	Tubular Condenser (.05 mf., 200 V.)	30-4519S
12	1st I. F. Transformer	32-3390
13	Resistor (22,000 ohms, ½ watt)	33-322334
14	2nd I. F. Transformer	32-3391
15	Resistor (2.2 meg., ¼ watt)	33-522154
16	Mica Condenser (250 mmf.)	61-0033
17	Volume Control (500,000 ohms)	33-5306
18	Resistor (47,000 ohms, ¼ watt)	33-347154
19	Mica Condenser (250 mmf.)	61-0033
20	Tubular Condenser (.01 mf., 200 V.)	30-4479S
21	Resistor (4.7 meg., ¼ watt)	33-547154
22	Resistor (220,000 ohms, ¼ watt)	33-422154
23	Tubular Condenser (.01 mf., 400 V)	30-4572S
24	Resistor (470,000 ohms, ¼ watt)	33-447154
25	Resistor (130 ohms, ½ watt)	33-113336
26	Tubular Condenser (.04 mf., 400 V.)	30-4119S
27	Output Transformer	
	For Speaker 36-1469-1	32-8047
	For Speaker 36-1469-9	36-8044
	For Speaker 36-1469-2	32-8044
28	Speaker	36-1469
	Cone Assembly	
	For Speaker 36-1469-9	36-4113
	For Speaker 36-1469-1	36-4115
	For Speaker 36-1469-2	36-4132
29	Field Coil—Part of Speaker No.	36-1469
30	Electrolytic Condenser (20-20 mf., 150 V)	30-2382
31	Line Resistor	33-3367
32	Pilot Lamp	34-2068
33	Tubular Condenser (.04 mf., 400 V.)	30-4119S
34	Clock (115 Volts, 60 Cycle)	45-2804
	Clock (115 Volts, 50 Cycle)	45-2803
35	Cable	41-3538

MISCELLANEOUS PARTS

Cabinet	10480A
Cardboard Back	27-9659
Cable (Power)	L-3199
Clip (Coil Mtg.)	28-5002
Dial Scale	27-5588
Dial Pointer	27-4972
Drive Cord	31-2358
Spring Drive Cord	28-8954
Knob Assembly	54-4004
Sockets (Tubes)	27-6157-2
Socket Assembly (Pilot Lamp)	76-1177
Tuning Shaft	31-2370

MOUNTING PARTS

Screw (Clock Mtg.)	W-218
Screw (Back Mtg.) (8 required)	W-2023
Screw (Back Mtg.) (3 required)	W-2030

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MODEL 41-RP-2
MODEL 41-RP-5

PHILCO RADIO & TELEVISION CORP.

MODEL 41-RP-2 IS THE SAME AS MODEL 41-RP-5 WITH THE EXCEPTION THAT THE LINE TRANSFORMER IS NOT ADJUSTABLE FOR TWO VOLTAGES. SEE SCHEMATIC BELOW. FOR OPERATING AND ADJUSTMENT DATA, SEE MODEL 42-RP-1. ALSO SEE FIG.3, MODEL 42-RP-2 FOR LOCATION OF ADJUSTMENT SCREW.

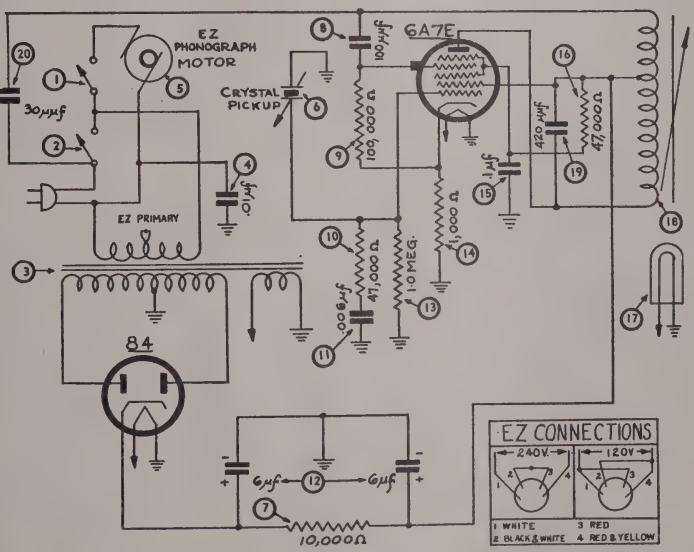
Replacement Parts — Model 41-RP-2 Wireless Record Player

SCHEM. No.	DESCRIPTION	PART No.
1	Motor Switch	42-1557
2	Master Switch	42-1406-2
3	Power Transformer	32-8043
4	Line Condenser (.01 mfd., 600 v.)	3903-SG
5	Motor (115 volts, 60 cycles)	35-1222
	Motor (115 volts, 50 cycles)	35-1250
	Screw	W-89
6	Crystal Pickup and Tone Arm	35-2068
7	Filter Resistor (10,000 ohms, ½ watt)	33-310334
8	Oscillator Grid Cond. (100 mmfd.)	60-110157
9	Oscillator Grid Resistor (100,000 ohms, ¼ watt)	33-410154
	Comp. Resistor (47,000 ohms, ¼ watt)	33-347154
11	Comp. Condenser (.006 mf., 400 v.)	30-4591
12	Electrolytic Condenser (6 mf.—6 mf., 150 v.)	30-2388
13	Grid Resistor (1 meg. ¼ watt)	33-510154
14	Cathode Bias Resistor (1000 ohms, ¼ watt)	33-210154
15	Screen By-Pass (.1 mf., 400 v.)	30-4455
16	Screen Resistor (47,000 ohms, ¼ watt)	33-347154
19	Oscillator Condenser (420 mmf.)	30-1116
20	Coupling Cond. (30 mmf.)	60-030157

MISCELLANEOUS PARTS

SCHEM. No.	DESCRIPTION	PART No.
	Cabinet	10513A
	Bottom Cover	27-9356
	Rubber Feet	27-4817
	Screw	W-2177
	Snap Button	W-1767
	Switch Plate	56-1383
	Screw	W-560
	Socket (84 tube)	27-6035
	Socket (6A7 tube)	27-6037
	Turntable (Motor)	35-3044
	Washer (Chassis)	W-751

FOR OPERATING AND ADJUSTMENT DATA, SEE MODEL 42-RP-1. ALSO SEE FIG. 3, MODEL 42-RP-2 FOR LOCATION OF ADJUSTMENT SCREW.



Replacement Parts — Model 41-RP-5 Wireless Record Player

SCHEM. No.	DESCRIPTION	PART No.
	Motor Switch	42-1557
	Master Switch	42-1562
	Power Transformer	32-8134
	Line Cond. (.01 mfd., 600 V)	3903-SG
	Motor	35-1226
	Crystal Pickup & Tone Arm	35-2068
	Filter Resistor (10,000 ohms, ½ watt)	33-310334
	Oscillator Grid Cond. (100 mmf.)	60-110157
	Oscillator Grid Resistor (100,000 ohms, ½ watt)	33-410334
	Comp. Resistor (47,000 ohms, ½ watt)	33-347334
	Comp. Condenser (.006 mmf., 400 V)	30-4591
12	Electrolytic Condenser (6 mf.—6 mf., 150 V)	30-2388
13	Grid Resistor (1 meg., ½ watt)	33-510334
14	Cathode Bias Resistor (1,000 ohms, ½ watt)	33-210334
15	Screen By Pass (.1 mfd., 200 V)	30-4499-S
16	Screen Resistor (47,000 ohms, ½ watt)	33-347334
17	Pilot Light (6-8 V., .250 amp.)	34-2064E
18	Oscillator Coil	32-3192
19	Oscillator Condenser (420 mmf.)	30-1116
20	Coupling Condenser (30 mmf.)	60-030137

MISCELLANEOUS PARTS

SCHEM. No.	DESCRIPTION	PART No.
	Cabinet	10476A
	Cable (Power)	L-3298
	Clamp (Electro Cond.)	56-1346
	Snap Button	W-1767
	Switch Plate	56-1383
	Screw	W-560
	Socket (84 tube)	27-6035
	Socket (6A7 tube)	27-6037
	Turntable	35-1217
	Screw Motor Mtg.)	W-89
	Screw (Chassis Mtg.)	W-218
	Washer (Chassis Mtg.)	W-751

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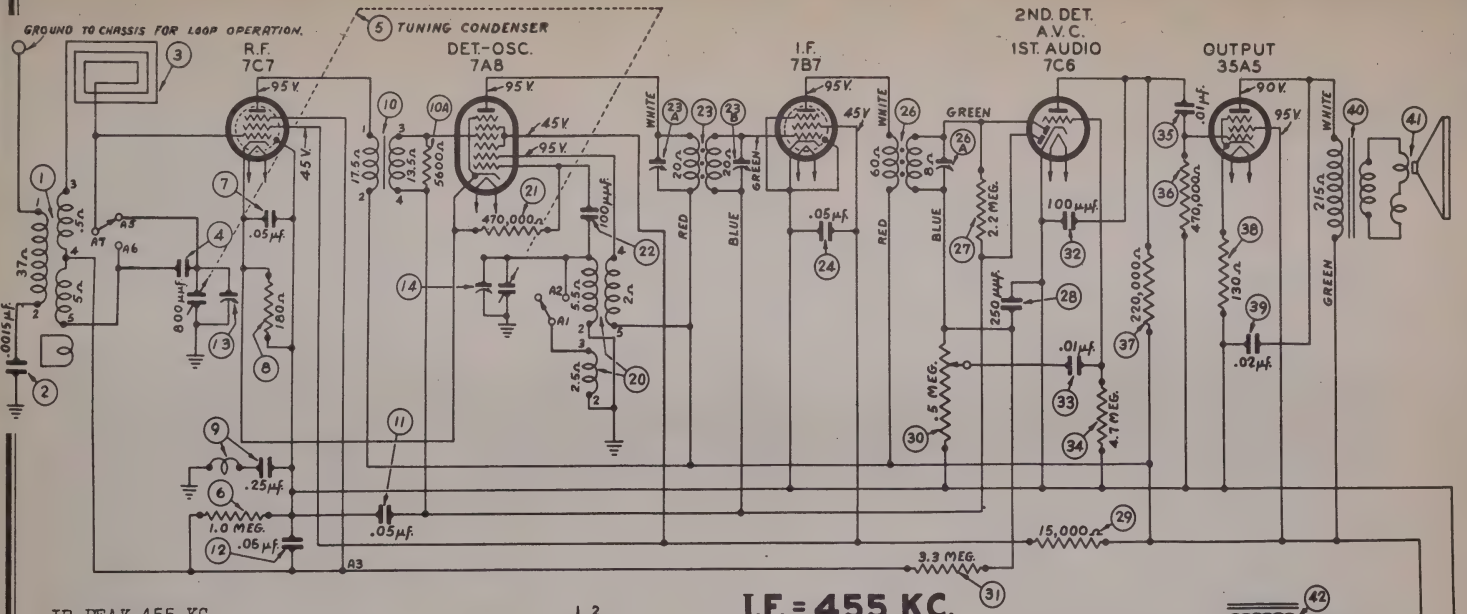
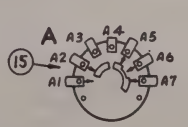
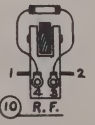


IF PEAK 455 KC



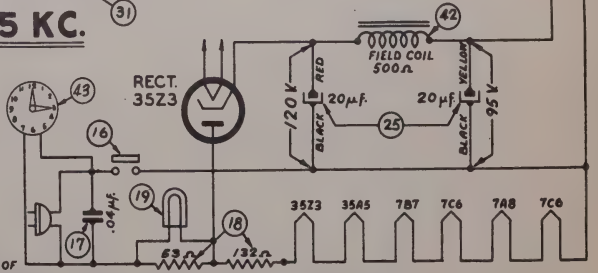
(1) ANTENNA



(10) R.F.

(20) OSC.

I.F. = 455 KC.



SWITCHES SHOWN FROM REAR OF CHASSIS, BOTTOM VIEW, IN THE 1ST POSITION (Broadcast)

DIRECTION OF ROTATION FROM REAR OF SWITCH.

MODEL 41-22CL

Model 41-22CL is a combination radio and clock, designed for operation on a 115 volt A. C. supply only, and employing the same radio chassis as Model 41-220. The cabinet and several parts of Model 41-22CL differ from Model 41-220. These parts are as follows:

Dial Scale	27-5700	Loop Aerial	32-3645
Dial Pointer	27-4891	Cardboard Back	27-9867
Cable (Clock)	41-3484	Cabinet	10539A
Clock Complete	45-2855		

With the exception of the above parts, the service information for Model 41-220 applies to Model 41-22CL.

FOR ALIGNMENT AND PARTS LIST, SEE INDEX

SCHEMATIC DIAGRAM — MODEL 42-22CL

THE D.C. VOLTAGES INDICATED IN THE ABOVE DIAGRAM WERE MEASURED AT THE TUBE SOCKET CONTACTS WITH A 1,000 OHMS PER VOLT, VOLTMETER PHILCO MODEL 027 — LINE VOLTAGE 117 VOLTS A.C.

SEE PAGE 4 FOR REPLACEMENT PARTS

PHILCO RADIO & TELEVISION CORP.

MODEL 41-722

MODEL 41-722
MODEL 41-758

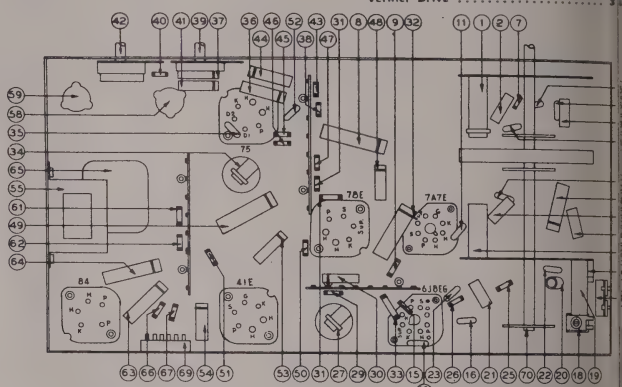
PHILCO RADIO & TELEVISION CORP.

Replacement Parts — Model 41-722

SCHE. No.	DESCRIPTION	PART No.
1	Antenna Transformer (Broadcast)	32-3422
2	Antenna Transformer (S. W. 1)	32-3419
3	Antenna Transformer (S. W. 2)	32-3415
4	Mica Condenser (10 mmfd.)	60-010337
5	Mica Condenser (15 mmfd.)	60-015337
6	Mica Condenser (100 mmfd.)	60-010537
7	Mica Condenser (15 mmfd.)	60-015537
8	Resistor (470,000 ohms, ½ watt)	33-447339
9	Tubular Condenser (.05 mfd.)	30-4609
10	Resistor (15,000 ohms, ½ watt)	33-315339
11	Mica Condenser (5 mmfd.)	60-005357
11	Mica Condenser (50 mmfd.)	60-125457
12	R. F. Transformer (Broadcast)	32-3417
13	R. F. Transformer (S. W. 1)	32-3420
14	R. F. Transformer (S. W. 2)	32-3416
15	Resistor (22,000 ohms, ½ watt)	33-322339
16	Mica Condenser (250 mmfd.)	60-125457
16A	Mica Condenser (5 mmfd.)	60-005357
17	Compensator (2 section)	31-6287
18	Compensator	31-6260
19	Oscillator Transformer (Broadcast)	32-3423
20	Oscillator Transformer (S. W. 1)	32-3421
21	Oscillator Transformer (S. W. 2)	32-3418
22	Mica Condenser (3000 mmfd.)	60-230124
23	Mica Condenser (100 mmfd.)	60-110457
24	Compensator	31-6345
25	Resistor (100 ohms, ½ watt)	33-110339
26	Resistor (68,000 ohms, ½ watt)	33-368339
27	1st I. F. Transformer Assembly	32-3429
28	Tubular Condenser (.05 mfd.)	30-4609
29	Resistor (1000 ohms, ½ watt)	33-210339
30	Tubular Condenser (.01 mfd.)	30-4572
31	Resistor (33,000 ohms, ½ watt)	33-333339
32	Tubular Condenser (.2 mfd.)	30-4587
33	Resistor (22,000 ohms, 1 watt)	33-322439
34	2nd I. F. Transformer Assembly	32-3430
34E	Resistor (47,000 ohms, ½ watt)	33-347339
35	Mica Condenser (100 mmfd.)	60-110457
36	Tubular Condenser (.006 mfd.)	30-4591
37	Tubular Condenser (.002 mfd.)	30-4579
38	Resistor (330,000 ohms, ½ watt)	33-433339
39	Volume Control (2.0 meg.)	33-5392
40	Resistor (47,000 ohms, ½ watt)	33-347339
41	Tubular Condenser (.006 mfd.)	30-4591
42	Tone Control (6.0 meg.)	33-5293
43	Resistor (10.0 meg., ½ watt)	33-610339
44	Tubular Condenser (.006 mfd.)	30-4591
45	Resistor (4.5 meg., ½ watt)	33-515339
46	Resistor (1.0 meg., ½ watt)	33-510339
47	Resistor (470,000 ohms, ½ watt)	33-447339
48	Tubular Condenser (.01 mfd.)	30-4572
49	Tubular Condenser (.2 mfd.)	30-4587
50	Resistor (470,000 ohms, ½ watt)	33-447339
51	Resistor (470,000 ohms, ½ watt)	33-447339
52	Mica Condenser (100 mmfd.)	60-110457
53	Tubular Condenser (.006 mfd.)	30-4610
54	Tubular Condenser (.006 mfd.)	30-4591
55	Output Transformer	32-8018
56	Cone and Voice Coil Assembly (Speaker Part No. 36-1452-2)	36-4103
57	Field Coil (Replace Spkr. Part No. 36-1452)	
58	Electrolytic Condenser (15 mfd., 350 V.)	30-2464
59	Electrolytic Condenser (15 mfd., 350 V.)	30-2464
60	Resistor (33 000 ohms, ½ watt)	33-333339
61	Resistor (150,000 ohms, ½ watt)	33-415339
62	Resistor (1.0 meg., ½ watt)	33-510339
63	Tubular Condenser (.003 mfd.)	30-4608
64	Tubular Condenser (.003 mfd.)	30-4608
65	Power Trans. (115-230 V., 50-60 cycles)	32-8108
	Power Trans. (115 V., 25 cycles)	32-8030
66	Resistor (150,000 ohms, ½ watt)	33-415339
67	Resistor (150,000 ohms, ½ watt)	33-415339
68	Pilot Lamps	44-1446
69	Voltage Change Switch	42-1564
70	Wave Switch	42-1564
71	Tuning Condenser Assembly	31-2444

MISCELLANEOUS PARTS

DESCRIPTION	PART No.
Cable and Plug (Power Supply)	L-3248
Special Export A. C. Plug	L-1367
Cabinet	10469A
Clip (Coil Mounting)	28-5002
Dial	27-5583
Drive Cord Assembly	31-2458
Knob (Tuning)	27-4330
Knob (Tuning)	2
Knob (Tone Control)	2
Knob (Volume and Wave Switch)	2
Pointer	2
Socket (type 80 tube)	1
Socket (type 76 tube)	2
Socket (type 78E, 42E and 75 tubes)	2
Socket (octal, type 6J8EG tube)	1
Socket (loktal, type 7A7E tube)	2
Speaker	1
Spring Clip (Coil Mounting)	3
Spring (Drive Cord)	2
Station Card Holder	1
Rubber Disc (Coupling Assembly)	2
Tube Shield (7A7E Tube)	1
Tube Shield	2
Tube Shield Base	1
Arm and Hub (Coupling Assembly)	1
Tuning Drum and Shaft	1
Vernier Drive	1



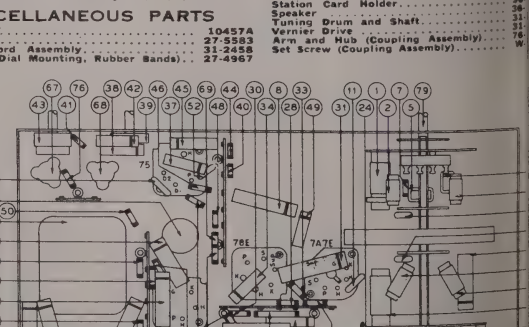
MODEL 41-722 — PART LOCATIONS, UNDERSIDE OF CHASSIS.

Replacement Parts — Model 41-758

SCHE. No.	DESCRIPTION	PART No.
1	Antenna Transformer (Broadcast)	32-3422
2	Antenna Transformer (S. W. 1)	32-3419
3	Antenna Transformer (S. W. 2)	32-3415
4	Mica Condenser (10 mmfd.)	60-010337
5	Mica Condenser (100 mmfd.)	60-110457
6	Mica Condenser (15 mmfd.)	60-015337
7	Resistor (470,000 ohms, ½ watt)	33-447339
8	Tubular Condenser (.05 mfd.)	30-4609
9	Resistor (15,000 ohms, 1 watt)	33-315439
10	Mica Condenser (5 mmfd.)	60-005357
11	Mica Condenser (250 mmfd.)	60-125457
12	R. F. Transformer (Broadcast)	32-3417
13	R. F. Transformer (S. W. 1)	32-3420
14	R. F. Transformer (S. W. 2)	32-3416
15	Tubular Condenser (.05 mfd.)	30-4609
16	Resistor (22,000 ohms, ½ watt)	33-322339
17	Mica Condenser (250 mmfd.)	60-125457
17A	Mica Condenser (5 mmfd.)	60-005357
18	Compensator (Brdcst. & S. W. 1 Osc.)	31-6287
19	Oscillator Transformer (Broadcast)	32-3423
20	Oscillator Transformer (S. W. 1)	32-3421
21	Oscillator Transformer (S. W. 2)	32-3418
22	Compensator (Broadcast Tracker)	31-6260
23	Mica Condenser (3000 mmfd.)	60-230124
24	Mica Condenser (100 mmfd.)	60-110457
25	Compensator	31-
26	Resistor (100 ohms, ½ watt)	33-110339
27	Resistor (68,000 ohms, ½ watt)	33-368339
28	Resistor (1000 ohms, ½ watt)	33-210339
29	Tubular Condenser (.01 mfd.)	30-4572
30	Resistor (33,000 ohms, ½ watt)	33-333339
31	Tubular Condenser (.2 mfd.)	30-4594
32	Resistor (15,000 ohms, 1 watt)	33-315439
33	Resistor (330 ohms, ½ watt)	33-133336
34	Tubular Condenser (.05 mfd.)	30-4519
35	1st I. F. Transformer Assembly	30-3429
36	2nd I. F. Transformer Assembly	30-2430
37	Tubular Condenser (.006 mfd.)	30-4591
38	Tubular Condenser (.002 mfd.)	30-4579
39	Volume Control (2.0 meg.)	33-5392
40	Resistor (330,000 ohms, ½ watt)	33-433339
41	Resistor (47,000 ohms, ½ watt)	33-347339
42	Tubular Condenser (.01 mfd.)	30-4581
43	Tone Control (6.0 meg.)	33-5393
44	Resistor (10.0 meg., ½ watt)	33-610339
45	Tubular Condenser (.006 mfd.)	30-4591
46	Resistor (2.2 meg., ½ watt)	33-522339
47	Resistor (1.0 meg., ½ watt)	33-510339
48	Resistor (470,000 ohms, ½ watt)	33-447339
49	Tubular Condenser (.01 mfd.)	30-4572
50	Resistor (100,000 ohms, ½ watt)	33-410339
51	Mica Condenser (100 mmfd.)	60-110457
52	Mica Condenser (250 mmfd.)	60-125457
53	Tubular Condenser (.006 mfd.)	30-4610
54	Resistor (470,000 ohms, ½ watt)	33-447339
55	Resistor (4700 ohms, ½ watt)	33-247339
56	Resistor (27,000 ohms, ½ watt)	33-327339
57	Tubular Condenser (.006 mfd.)	30-4610
58	Tubular Condenser (.2 mfd.)	30-4587
59	Resistor (33,000 ohms, ½ watt)	33-333339
60	Resistor (470,000 ohms, ½ watt)	33-447339
61	Resistor (470,000 ohms, ½ watt)	33-447339
62	Tubular Condenser (.006 mfd.)	30-4610
63	Tubular Condenser (.004 mfd.)	30-4578
64	Output Transformer	32-8110
65	Cone and Voice Coil Assembly (Speaker Part No. 36-1453)	36-4104
66	Field Coil (Replace Spkr. Part No. 36-1453)	
67	Electrolytic Cond. (15 mfd., 450 V.)	30-2465
68	Electrolytic Cond. (40 mfd., 450 V.)	30-2445
69	Resistor (33,000 ohms, ½ watt)	33-3333399
70	Resistor (150,000 ohms, ½ watt)	33-415339
71	Resistor (1.0 meg., ½ watt)	33-510339
72	Tubular Condenser (.003 mfd.)	30-4606
73	Tubular Condenser (.003 mfd.)	30-4608
74	Power Trans. (115-230 V., 50-60 cycles)	32-8109
75	Voltage Change Switch	42-1569
76	Resistor (150,000 ohms, ½ watt)	33-415339
77	Resistor (150,000 ohms, ½ watt)	33-415339
78	Pilot Lamps	34-2064E
79	Wave Switch	42-1564
80	Tuning Condenser Assembly	31-2444

MISCELLANEOUS PARTS

DESCRIPTION	PART No.
Cabinet	10457A
Dial	27-5583
Drive Cord Assembly	31-2458
Gasket (Dial Mounting, Rubber Bands)	27-4967
Knob (Tuning)	27
Knob (Tone Control)	27
Knob (Volume and Wave Switch)	56
Pointer	27
Rubber Disc (Coupling Assembly)	27
Rubber Bands (Dial Gasket)	27
Socket (5 prong, type 84 tube)	27
Socket (6 prg., type 78E, 41E, 75 tubes)	28
Socket (8 prong, octal)	27
Socket (loktal)	27
Station Card Shield	1
Spring (Drive Cord)	2
Shield (7A7E tube)	56
Station Card Holder	1
Tube Shield Base	3
Tuning Drum and Shaft	1
Vernier Drive	1
Arm and Hub (Coupling Assembly)	1
Set Screw (Coupling Assembly)	W



MODEL 41-758 — PART LOCATIONS, UNDERSIDE OF CHASSIS.

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PHILCO RADIO & TELEVISION CORP.

MODEL 41-722
MODEL 41-745
MODEL 41-758
MODEL 41-759

SPECIFICATIONS

MODEL 41-722

TYPE OF CIRCUIT: Six (6) tube, A. C. operated superheterodyne circuit with three tuning ranges covering standard, police and shortwave stations. Other features of design included in this model are: Phonograph connections; tuned R. F. stage; bass compensation; variable tone control; automatic volume control and a pentode audio output stage.

TUNING RANGES:
540 to 1720 K. C. 2.3 to 7.1 M. C. 7.0 to 22.2 M. C.

I. F. FREQUENCY: 455 K. C.

AUDIO OUTPUT: 2 watts.

POWER SUPPLY: Operates on 115 or 230 volts, 50-60 cycle alternating current. To operate the receiver on either of the above voltages, move the changeover switch on the rear of the chassis to position required.

MODEL 41-758

TYPE OF CIRCUIT: Eight (8) tube, A. C. operated superheterodyne circuit with three tuning ranges covering standard, police, and shortwave stations. In addition, other features of design are: Phonograph connections; tuned R. F. stage; bass compensation; variable tone control and a pentode audio output stage.

TUNING RANGES:
540 to 1720 K. C. 2.3 to 7.1 M. C. 7.0 to 22 M. C.

I. F. RANGES: 455 K. C.

AUDIO OUTPUT: 6 watts.

POWER SUPPLY: Operates on 115 or 230 volts, 50-60 cycle alternating current. To operate the receiver on either of the above voltages, move the changeover switch on the rear of the chassis to the position required.

Operations in Order	SIGNAL GENERATOR			RECEIVER				SPECIAL INSTRUCTIONS
	Leads to Receiver	Dummy Aerial Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators for Maximum Signal		
						Model 41-722	Model 41-758	
1	Grid 6J8EG	.1 mfd.	455 K. C.	580 K. C.	Range Sw. Brdcst. Volume "Max."	27A, 27B, 34A, 34B	35A, 35B, 36A, 36B	
2	Aerial Lead	400 ohms	21 M. C.	21 M. C.	Range Switch "S. W. 2"	24, 70B, 70A	25, 80B, 80A	Note B, C
3	Aerial Lead	400 ohms	6.0 M. C.	6.0 M. C.	Range Switch "S. W. 1"	17A	18A	Roll Gang
4	Aerial Lead	200 mmfd.	1500 K. C.	1500 K. C.	Range Switch "Broadcast"	17	18	Roll Gang
5	Aerial Lead	200 mmfd.	580 K. C.	580 K. C.	Range Switch "Broadcast"	18	22	Roll Gang

NOTE A — The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (hi side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale.

NOTE C — When adjusting compensator (24) Model 41-722 and (25) Model 41-758 be sure to tune in the fundamental signal (21 M. C.) instead of the image signal. If the compensator is correctly adjusted, the image signal will be found by turning dial 910 K. C. below the fundamental signal, which will be 20.090 M. C.

MODEL 41-745

TYPE OF CIRCUIT: Seven (7) tube superheterodyne circuit with three tuning ranges and designed for operation entirely from a six volt storage battery. The high voltage D. C. supply is obtained from a synchronous vibrator. Other features incorporated in the model are: preselector tuned R. F. stage; Provision for connecting a phonograph pickup; bass compensation; continuously variable tone control, automatic volume control; and a push-pull audio output stage.

TUNING RANGES:
540 to 1720 K. C. 2.3 to 7.1 M. C. 7.0 to 22.2 M. C.

INTERMEDIATE FREQUENCY: 455 K. C.

AUDIO OUTPUT: 2 watts.

POWER SUPPLY: 6 Volt storage battery.

MODEL 41-759

TYPE OF CIRCUIT: Eight (8) tube superheterodyne circuit with three tuning ranges and designed for operation from a 110 or 220 volts A. C. or D. C. power supply. Other features included in the model are: Tuned R. F. stage; provisions for connecting a phonograph pickup; bass compensation; continuously variable tone control; automatic volume control; and a push-pull audio output stage.

TUNING RANGES:
540 to 1720 K. C. 2.3 to 7.1 M. C. 7.0 to 22 M. C.

INTERMEDIATE FREQUENCY: 455 K. C.

AUDIO OUTPUT: 3.0 watts at 115 V. 4.5 watts at 230 V.

POWER SUPPLY: To operate the receiver on either 110 or 220 volt A. C. or D. C. power circuits, insert the ballast resistor (on rear of chassis) in the position desired. The ballast resistor is marked to indicate the proper socket position for either power circuit.

Operations in Order	SIGNAL GENERATOR			RECEIVER				SPECIAL INSTRUCTIONS
	Leads to Receiver	Dummy Aerial Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators for Maximum Signal		
						Model 41-745	Model 41-759	
1	Grid 6J8EG	.1 mfd.	455 K. C.	580 K. C.	Range Sw. Brdcst. Volume "Max."	34A, 34B, 32A, 32B	42A, 42B, 37A, 37B	
2	Aerial Lead	400 ohms	21 M. C.	21 M. C.	Range Switch "S. W. 2"	29, 77B, 77A	36, 81B, 81A	Note B, C
3	Aerial Lead	400 ohms	6.0 M. C.	6.0 M. C.	Range Switch "S. W. 1"	26A	32A	Roll Gang
4	Aerial Lead	200 mmfd.	1500 K. C.	1500 K. C.	Range Switch "Broadcast"	26	32	Roll Gang
5	Aerial Lead	200 mmfd.	580 K. C.	580 K. C.	Range Switch "Broadcast"	25	31	Roll Gang

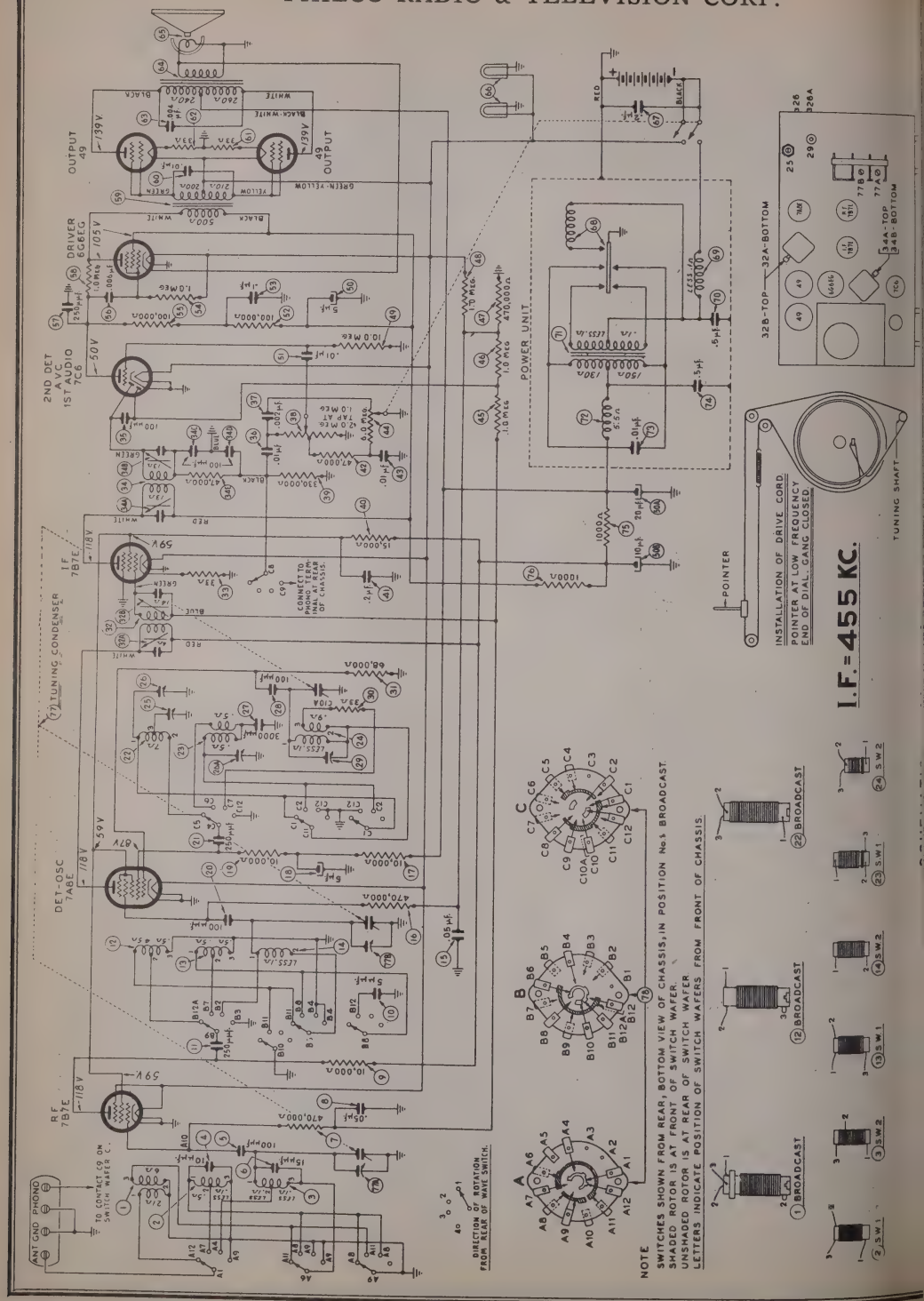
NOTE A — The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (hi side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale.

NOTE C — When adjusting compensator (29) Model 41-745 and (36) Model 41-759 be sure to tune in the fundamental signal (21 M. C.) instead of the image signal. If the compensator is correctly adjusted, the image signal will be found by turning dial 910 K. C. below the fundamental signal, which will be 20.090 M. C.

MODEL 41-745

PHILCO RADIO & TELEVISION CORP.



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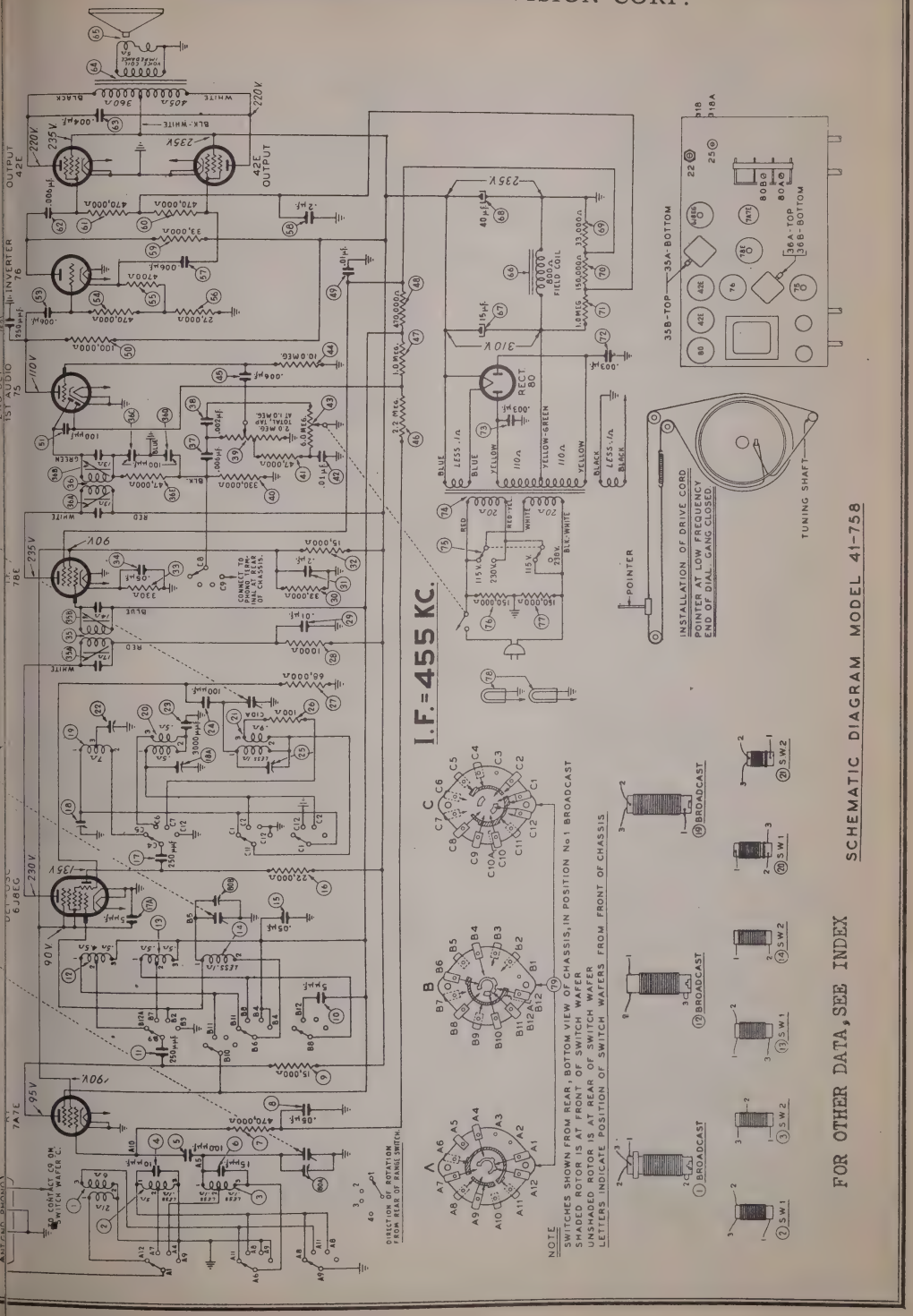
MODEL 41-758



MODEL 41-759

PHILCO RADIO & TELEVISION CORP.

I.F. = 455 KC.

SCHEMATIC DIAGRAM MODEL 41-759

FOR ALIGNMENT, SEE INDEX

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MODEL 41-745
MODEL 41-759

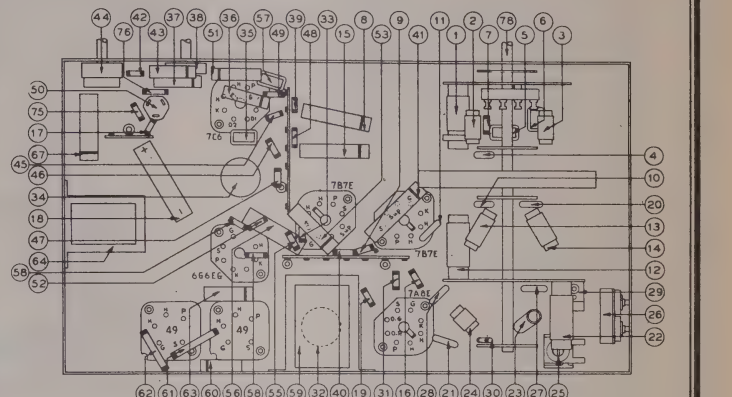
PHILCO RADIO & TELEVISION CORP.

PRODUCTION CHANGES

To improve the sensitivity of the Model 41-759 I. F. circuit, a 68 ohm resistor, Part No. 33-068336 was connected in series with the cathode of the 7SE tube and B minus.

Replacement Parts — Model 41-745

SCH. No.	DESCRIPTION	PART No.
1	Antenna Transformer (Broadcast)	32-3422
2	Antenna Transformer (S. W. 1)	32-3419
3	Antenna Transformer (S. W. 2)	32-3415
4	Mica Condenser (10 mmfd.)	60-010337
5	Mica Condenser (100 mmfd.)	60-110457
6	Mica Condenser (15 mmfd.)	60-015337
7	Resistor (470,000 ohms, ½ watt)	33-447339
8	Tubular Condenser (.05 mfd.)	30-4609
9	Resistor (10,000 ohms, ½ watt)	33-310339
10	Mica Condenser (5 mmfd.)	60-005357
11	Mica Condenser (250 mmfd.)	60-125457
12	R. F. Transformer (Broadcast)	32-3417
13	R. F. Transformer (S. W. 1)	32-3420
14	R. F. Transformer (S. W. 2)	32-3416
15	Tubular Condenser (.05 mfd.)	30-4609
16	Resistor (470,000 ohms, ½ watt)	33-447339
17	Resistor (10,000 ohms, ½ watt)	33-310339
18	Electrolytic Condenser (5 mfd., 150 V.)	30-2469
19	Resistor (10,000 ohms, ½ watt)	33-310339
20	Mica Condenser (100 mmfd.)	60-110457
21	Mica Condenser (250 mmfd.)	60-125457
22	Oscillator Transformer (Broadcast)	32-3423
23	Oscillator Transformer (S. W. 1)	32-3421
24	Oscillator Transformer (S. W. 2)	32-3414
25	Compensator	31-6260
26	Compensator (2 section)	31-6287
27	Mica Condenser (3000 mmfd.)	60-230124
28	Mica Condenser (100 mmfd.)	60-110457
29	Compensator	31-6345
30	Resistor (33 ohms, ½ watt)	33-033339
31	Resistor (68,000 ohms, ½ watt)	33-368339
32	1st I. F. Transformer Assembly	32-3442
33	Resistor (33 ohms, ½ watt)	33-033339
34	2nd I. F. Transformer Assembly	32-3440
35	Mica Condenser (100 mmfd.)	60-110457
36	Electrolytic Cond. (.01 mfd., 450 V.)	30-4572
37	Tubular Condenser (.002 mfd.)	30-4579
38	Volume Control (2.0 meg.)	33-5192
39	Resistor (330,000 ohms, ½ watt)	33-433339
40	Resistor (15,000 ohms, ½ watt)	33-315339
41	Tubular Condenser (.2 mfd.)	30-4587
42	Resistor (47,000 ohms, ½ watt)	33-347339
43	Tubular Condenser (.01 mfd.)	30-4572
44	Tone Control and On-Off Switch	33-5394
45	Resistor (1.0 meg., ½ watt)	33-510339
46	Resistor (1.0 meg., ½ watt)	33-510339
47	Resistor (470,000 ohms, ½ watt)	33-447339
48	Resistor (1.0 meg., ½ watt)	33-510339
49	Resistor (10.0 meg., ½ watt)	33-610339
50	Electrolytic Cond. (8-10-20 mfd., 150 V.)	30-2468
51	Tubular Condenser (.01 mfd.)	35-4572
52	Resistor (100,000 ohms, ½ watt)	33-410339
53	Tubular Condenser (.1 mfd.)	30-4586
54	Resistor (1.0 meg., ½ watt)	33-510339
55	Resistor (100,000 ohms, ½ watt)	33-410339
56	Tubular Condenser (.006 mfd.)	30-4610
57	Mica Condenser (250 mmfd.)	60-125457
58	Resistor (1.0 meg., ½ watt)	33-510339
59	Driver Transformer	32-3802*
60	Tubular Condenser (.01 mfd.)	30-4572
61	Resistor (33 ohms, 1 watt)	33-033436
62	Resistor (33 ohms, 1 watt)	33-033436
63	Tubular Condenser (.004 mfd.)	30-4578

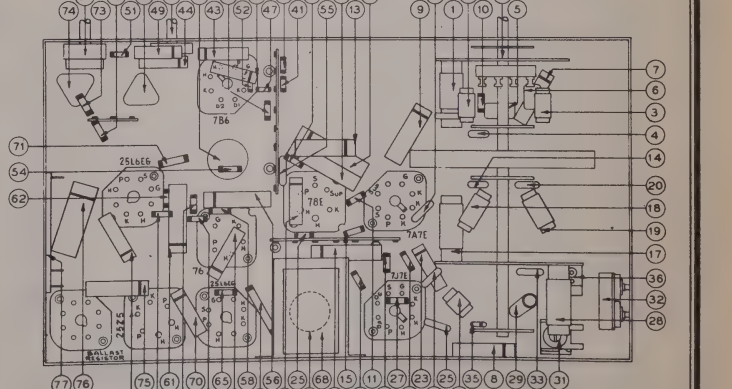


MODEL 41-745 — PART LOCATIONS, UNDERSIDE OF CHASSIS

SCHE. No.	DESCRIPTION	PART No.
64	Output Transformer	32-8113
65	Cone and Voice Coil Assembly (Speaker Part No. 36-1508)	36-4161
66	Pilot Lamps	34-2066E
67	Tubular Condenser (.2 mfd.)	30-4587
68	Vibrator	41-3222
69	"A" Filter Choke	32-1954
70	Tubular Condenser (.5 mfd.)	30-4296
71	Power Transformer	32-7682
72	"B" Filter Choke	32-2925
73	Tubular Condenser (.01 mfd.)	30-4598
74	Tubular Condenser (.5 mfd.)	30-4296
75	Resistor (1000 ohms, ½ watt)	33-210339
76	Resistor (1000 ohms, ½ watt)	33-210339
77	Tuning Condenser Assembly	31-2444
78	Wave Switch	42-1564

Replacement Parts — Model 41-759

SCH. No.	DESCRIPTION	PART No.
1	Antenna Transformer (Broadcast)	32-3422
2	Antenna Transformer (S. W. 1)	32-3419
3	Antenna Transformer (S. W. 2)	32-3415
4	Mica Condenser (10 mmfd.)	60-010337
5	Mica Condenser (100 mmfd.)	60-110457
6	Mica Condenser (15 mmfd.)	60-015337
7	Tubular Condenser (.002 mfd.)	30-4579
8	Tubular Condenser (.002 mfd.)	30-4579
9	Tubular Condenser (.1 mfd.)	30-4527
10	Resistor (220,000 ohms, ½ watt)	33-422339
11	Resistor (22 ohms, ½ watt)	33-022339
12	Tubular Condenser (.05 mfd.)	30-4609
13	Tubular Condenser (.1 mfd.)	30-4527
14	Mica Condenser (5 mmfd.)	60-005357
15	Resistor (10,000 ohms, ½ watt)	33-310339
16	Mica Condenser (15 mmfd.)	60-015337
17	R. F. Transformer (Broadcast)	32-3417
18	R. F. Transformer (S. W. 1)	32-3420
19	R. F. Transformer (S. W. 2)	32-3416
20	Mica Condenser (100 mmfd.)	60-110457
21	Resistor 220,000 ohms, ½ watt)	33-422339
22	Resistor (4700 ohms, ½ watt)	33-247339
23	Tubular Condenser (.05 mfd.)	30-4518
24	Tubular Condenser (.05 mfd.)	30-4519
25	Resistor (330 ohms, ½ watt)	33-133339
26	Mica Condenser (250 mmfd.)	60-125457
27	Resistor (68,000 ohms, ½ watt)	33-368339
28	Oscillator Transformer (Broadcast)	32-3423
29	Oscillator Transformer (S. W. 1)	32-3421
30	Oscillator Transformer (S. W. 2)	32-3414
31	Compensator	31-6260
32	Compensator (2 section)	31-6287
33	Mica Condenser (3000 mmfd.)	60-230124
34	Mica Condenser (100 mmfd.)	60-110457
35	Resistor (68 ohms, ½ watt)	33-068339
36	Compensator	31-6345
37	1st I. F. Transformer Assembly	32-3429
38	Resistor (47,000 ohms, ½ watt)	33-347339
39	Tubular Condenser (.01 mfd.)	30-4609
40	Resistor (15,000 ohms, ½ watt)	33-315339
41	Tubular Condenser (.2 mfd.)	30-4587
42	Resistor (1.0 meg., ½ watt)	33-510339
43	2nd I. F. Transformer Assembly	32-3433
44	Tubular Condenser (.02 mfd.)	30-4516
45	Tubular Condenser (.002 mfd.)	30-4579
46	Volume Control (2.0 meg.)	33-5392
47	Resistor (220,000 ohms, ½ watt)	33-422339
48	Resistor (100,000 ohms, ½ watt)	33-410339
49	Resistor (470,000 ohms, ½ watt)	33-447339
50	Tubular Condenser (.01 mfd.)	30-4572
51	Tone Control and On-Off Switch	33-5393
52	Resistor (47,000 ohms, ½ watt)	33-347339
53	Resistor (10.0 meg., ½ watt)	33-610339
54	Tubular Condenser (.006 mfd.)	30-4591
55	Resistor (330,000 ohms, ½ watt)	33-433339
56	Mica Condenser (250 mmfd.)	60-125457
57	Tubular Condenser (.006 mfd.)	30-4610
58	Resistor (470,000 ohms, ½ watt)	33-447339
59	Resistor (47,000 ohms, ½ watt)	33-347339
60	Resistor (27,000 ohms, ½ watt)	33-327339
61	Tubular Condenser (.02 mfd.)	30-4518
62	Tubular Condenser (.006 mfd.)	30-4610
63	Resistor (330,000 ohms, ½ watt)	33-433339
64	Resistor (150 ohms, 1 watt)	33-115439
65	Electrolytic Condenser (20 mfd., 25 V.)	30-2435
66	Electrolytic Condenser (20 mfd., 150 V.)	30-2435
67	Electrolytic Condenser (20 mfd., 150 V.)	30-2435
68	Resistor (330,000 ohms, ½ watt)	33-433339
69	Resistor (33,000 ohms, ½ watt)	33-333339



MODEL 41-759 — PART LOCATIONS, UNDERSIDE OF CHASSIS

SCHE. No.	DESCRIPTION	PART No.
67	Tubular Condenser (.01 mfd.)	30-4572
68	Output Transformer	32-8112
69	Cone and Voice Coil Assembly (Speaker Part No. 36-1508-3)	36-4161
70	Tubular Condenser (.01 mfd.)	30-4572
71	Resistor (1000 ohms, 1 watt)	33-210439
72	Resistor (330 ohms, ½ watt)	33-133339
73	Resistor (2200 ohms, 1 watt)	33-222439
74	Electrolytic Cond. (40 mfd., 350 V.)	30-2486
75	Tubular Condenser (.02 mfd.)	30-4599
76	Tubular Condenser (.5 mfd.)	30-4590
77	S. C. Resistor (Wirewound)	33-3390
78	Pilot Lamps	34-2397
79	Ballast Resistor	33-3391
80	Wave Switch	42-1564
81	Tuning Condenser Assembly	31-2441

MODELS 42-KR-3, 42-KR-5
MODEL 42-22CL

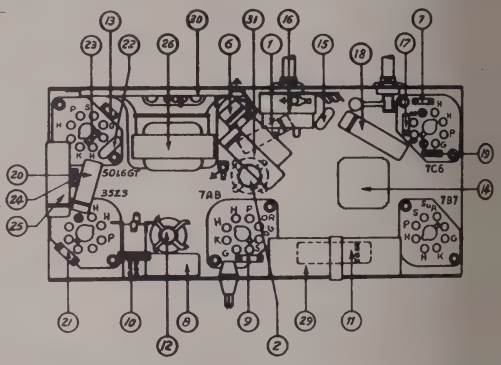
PHILCO RADIO & TELEVISION CORP.

42-KR-3, 42-KR-5

SCHEM. No.	DESCRIPTION	PART No.
1.	Condenser (.0015 mfd., 200 volts)	30-4621
2.	Aerial Transformer	32-3394
3.	Loop Aerial (42-KR-3)	32-3767
	Loop Aerial (42-KR-5)	32-3752
4.	Tuning Condenser	31-2567
	Drive Cord	31-2358
	Drive Shaft	31-2568
	Spring Drive Cord	28-8954
	Spacer (Tuning Cond. Mtg.)	56-1669
5.	Compensator (Aerial)	31-6344
6.	Condenser and Choke Assembly	76-1161
7.	Resistor (4.7 megohms)	33-547339
8.	Condenser (.1 mfd., 200 volts)	61-0104
9.	Resistor (22,000 ohms)	33-322339
10.	Oscillator Transformer	32-3562
11.	Condenser (.05 mfd.)	30-4519
12.	1st I. F. Transformer	32-3390
13.	Resistor (27,000 ohms)	33-327339
14.	2nd I. F. Transformer	32-3391
15.	Condenser (250 mmfd.)	60-125157
16.	Volume Control	33-5456
17.	Resistor (4.7 megohms)	33-547339
18.	Condenser (.01 mfd., 400 volts)	30-4572
19.	Resistor (4.7 megohms)	33-547339
20.	Condenser (.01 mfd., 400 volts)	30-4572
21.	Resistor (470,000 ohms)	33-447339
22.	Mica Condenser (250 mmfd.)	60-125157
23.	Resistor (470,000 ohms)	33-447339
24.	Resistor (130 ohms)	33-113336
25.	Condenser (.02 mfd., 400 volts)	30-4516
26.	Output Transformer	32-8144
27.	Cone Assembly (for Speaker 36-1512-9)	36-4167
28.	Field Coil (replace Speaker 36-1512-9)	
29A, B.	Electrolytic Condenser (20-20 mfd.) Clamp	30-2382 56-1346
30.	Resistor (40-80 ohms)	33-3401
31.	Condenser (.04 mfd., 400 volts)	30-4119
32.	Pilot Lamp	34-2068
33.	Cable Clock	41-3538
	Clock (115 volt & 60 cycle)	45-2890
	Clock (115 volt & 50 cycle)	45-2891
	Screw (Clock Mtg.)	W-1837

MISCELLANEOUS PARTS

	Cabinet 42-KR-3	18564A
	Cabinet 42-KR-5	18568A
	Cabinet Back 42-KR-3	27-9967
	Cabinet Back 42-KR-5	27-9896
	Clip (Coil Mtg.)	28-5062
	Cord (Power)	L-3199
	Disc Feet (Cabinet)	27-4964
	Dial Scale (42-KR-5)	27-5732
	Dial Scale (42-KR-3)	27-5731
	Dial Pointer	27-4972
	Knob (42-KR-3)	54-4004
	Knob (42-KR-5)	27-4824
	Rubber Grommet (Tuning Cond.)	27-4611
	Speaker	36-1512
	Socket (Loktal tubes)	27-6182
	Socket (Octal)	27-8162
	Socket Assembly (Pilot Lamp)	76-1172
	Screw (Chassis Mtg.)	W-2834
	Screw (Back Mtg.)	W-2874
	Screw (Back Mtg.) (42-KR-3)	W-2824
	Washer (Chassis Mtg.)	W-4102
	Washer (Chassis Mtg.)	W-1524



LOCATIONS OF PARTS — UNDERSIDE OF CHASSIS

REPLACEMENT PARTS MODELS 42-KR-3, 42-KR-5

MODEL 42-22CL

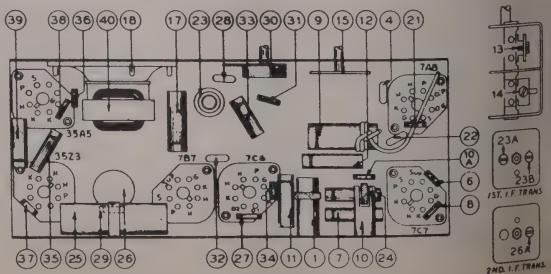
SCHEM. No.	DESCRIPTION	PART No.
1.	Aerial Transformer	32-3649
2.	Condenser (.0015 mfd., 200 volts)	30-4555
3.	Loop Aerial	32-3645
4.	Mica Condenser (800 mmfd.)	60-180127
5.	Tuning Condenser	31-2492
	Drive Cord	31-2489
	Drive Shaft	31-2370
	Grommet (Mtg. Cond.)	27-4610
	Nut (Mtg. Cond.)	W-1543
	Sleeve (Mtg. Cond.)	28-5583
	Spring (Drive Cord)	28-8954
6.	Resistor (1 megohm)	33-510339
7.	Condenser (.05 mfd., 200 volts)	30-4519
8.	Resistor (180 ohms)	33-118336
9.	Condenser (.25 mfd.) and Choke	76-1226
10.	R. F. Transformer	32-3273
10A.	Resistor (5.600 ohms) part of 10	33-256339
11.	Condenser (.05 mfd., 200 volts)	30-4519
12.	Condenser (.05 mfd., 200 volts)	30-4519
13.	Compensator part of 5	
14.	Compensator part of 5	
15.	Range Switch	42-1505
16.	Off-On Switch part of 30	
17.	Condenser (.04 mfd., 400 volts)	30-4119
18.	Resistor (53-132 ohms)	33-3375
19.	Pilot Lamp	34-2068
20.	Oscillator Transformer	32-3256
21.	Resistor (47,000 ohms)	33-347339
22.	Condenser (100 mmfd.)	60-110157
23.	1st I. F. Transformer	32-3489
24.	Condenser (.05 mfd.)	30-4519
25A.	Electrolytic Cond. (20 mfd., 20 mfd.)	30-2403
25B.	Electrolytic Cond. (20 mfd.) part of 25A	
26.	2nd I. F. Transformer	32-3304
27.	Resistor (2.2 megohms)	33-522154
28.	Mica Condenser (250 mmfd.)	60-125157
29.	Resistor (15,000 ohms)	33-315339
30.	Volume Control	33-5405
	Mtg. Nut	W-2157
31.	Resistor (3.3 megohms)	33-533339
32.	Condenser (100 mfd.)	61-0033
33.	Condenser (.01 mfd., 200 volts)	30-4572
34.	Resistor (4.7 megohms)	33-547154
35.	Condenser (.01 mfd., 400 volts)	61-0100
36.	Resistor (470,000 ohms)	33-447339
37.	Resistor (220,000 ohms)	33-422339
38.	Resistor (130 ohms)	33-113336
39.	Condenser (.02 mfd., 400 volts)	30-4516
40.	Output Transformer	32-8144
41.	Cone Assembly (for Speaker 36-1512-9)	36-4167
42.	Field Coil (replace Speaker 36-1512)	
43.	Clock (115 volts, 60 cycles)	45-2855
	Clock (115 volts, 50 cycles)	45-2877
	Screw (Clock Mtg.)	W-1824
	Cable (Clock)	41-3484

MISCELLANEOUS PARTS

	Cabinet	18539A
	Cardboard Back	27-9867
	Screw	W-2023
	Cord (Power)	L-3199
	Dial Scale	27-5691
	Dial Pointer	27-4891
	Knob (Tuning-Volume)	27-4880
	Knob (Range Switch)	54-4004
	Socket (Tubes)	27-6152
	Socket Assembly (Pilot Lamp)	76-1172

MOUNTING PARTS

	Clip (R. F. Coil Mounting)	28-5002
	Clamp (Electro-Condenser)	56-1340
	Palnut (Vol. Cont. Drive Shaft Mtg.)	W-2152
	Palnut (1st & 2nd I. F. Mtg.)	W-1942
	Screw (Dial Scale Mounting)	W-6852
	Screw (Chassis Mtg.)	W-2032
	Washer (Chassis Mtg.)	W-4102
	Screw (Chassis Mtg.)	W-2832
	Eyelet (Mtg. Socket)	W-1852



LOCATIONS OF PARTS — UNDERSIDE OF CHASSIS
MODEL 42-22CL

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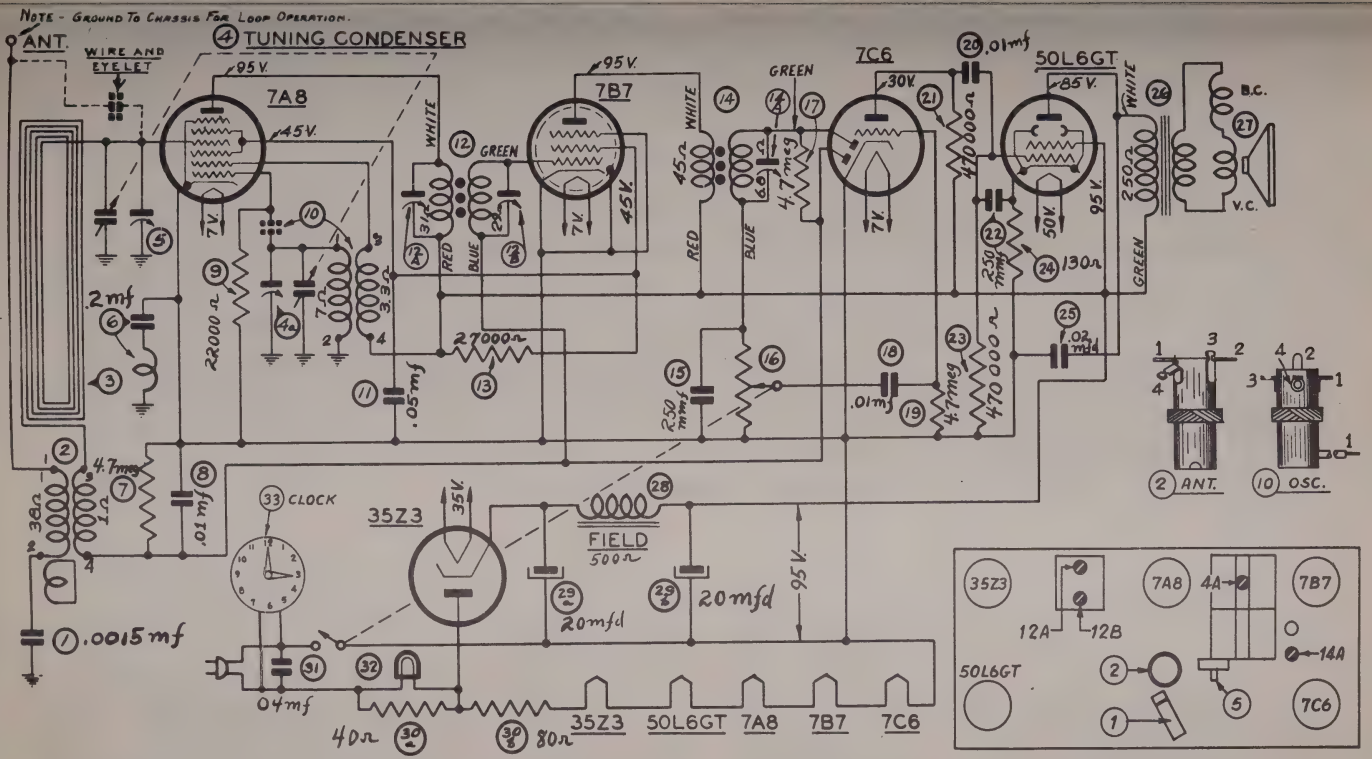

IF PEAK 455 KC

SCHEMATIC DIAGRAM, MODELS 42-KR-3, 42-KR-5

THE D.C. VOLTAGES INDICATED IN THE ABOVE DIAGRAM WERE MEASURED AT THE TUBE SOCKET CONTACTS WITH A 1,000 OHMS PER VOLT, VOLTMETER PHILCO MODEL 027 — LINE VOLTAGE 117 VOLTS A.C.

SEE PAGE 4 FOR REPLACEMENT PARTS

FOR ALIGNMENT AND PARTS LIST, SEE INDEX

Joh F. Rider

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SPECIFICATIONS

MODELS 42-KR-3, 42-KR-5

Models KR-3 and KR5 are five (5) tube superheterodyne compact radios employing a built-in loop aerial. These models are similar with the exception of the cabinet, clock and power supply.

Model KR-5 includes a clock and is designed for operation on 115 volts, 60 cycles A.C. current only. Model KR-3 is designed for operation on a 115 volt, A.C. or D.C. power supply.

In addition each model includes a tuning band from 540 to 1600 K.C.; automatic volume control; beam power pentode audio output stage; PHILCO LOKTAL tubes, and a permanent magnet speaker.

INTERMEDIATE FREQUENCY: 455 K.C.

POWER SUPPLY: 115 Volts, A.C. or D.C

MODEL 42-22CL

Model 42-22CL is a combination Clock and Radio which operates on a 115 volt, 50 or 60 cycle power supply. The radio consists of a six (6) tube superheterodyne circuit with two tuning ranges covering standard, State and City Police, aircraft and amateur broadcast frequencies; built-in loop aerial system; R. F. stage; beam power audio stage; automatic volume control; and PHILCO LOKTAL tubes.

TUNING BAND FREQUENCIES: 540 to 1600 K.C. and 1.6 to 3.3 M.C.

INTERMEDIATE FREQUENCY: 455 K.C.

AUDIO OUTPUT: 1 Watt.

POWER SUPPLY: The radio will operate on a 115 volt, 50 or 60 cycle power supply. The clock, however, is designed to operate on a single frequency only. The 115 volt, 50 cycle clock and 115 volt, 60 cycle clock are indicated in the replacement parts list.

OUTSIDE AERIAL AND GROUND

AERIAL AND GROUND: Under ordinary operating conditions the loop aerial is sufficient for reception of stations, and an outside aerial or ground is not required. In some locations, however, such as steel reinforced buildings and other shielded areas, an outside aerial should be used for maximum performance. For this purpose an outside aerial connection is located on the rear lower left corner of the chassis. Simply remove the lug from under the screw and attach the aerial lead to the lug. The PHILCO SAFETY AERIAL, Part No. 40-6370, is recommended for these models.

CONNECTING ALIGNING INSTRUMENTS

Audio Output Meter: If this type of aligning meter is used, connect it to the voice coil terminals of the speaker or from the plate of the output tube to "B" (—) negative. Adjust the meter for the 0 to 10 volt scale.

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator, make the following connections: Attach the negative (—) terminal of the voltmeter to any point in the circuit where the A. V. C. voltage can be obtained. Connect the positive (+) terminal of the vacuum tube voltmeter to the chassis.

Signal Generator: When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to the antenna section of the tuning condenser. Connect the ground or low side of the generator to the chassis.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled.

After connecting the aligning instruments adjust the compensators as shown in the tabulation below.

If the indicating meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations in Order	SIGNAL GENERATOR		RECEIVER				SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order: Models KR-3, KR-5	Adjust Compensators in Order: Model 42-22CL	
1	Ant. Section of Tuning	455 K.C.	540 K.C. Tuning Cond. Closed	Vol. Max. Range Switch Brdcst.	12A, 12B, 14A	26A, 23B, 23A	Compensator Locations on Diagram, and Base
2	Loop see above instructions	1600 K.C.	1600 K.C.	Vol. Max. Range Switch Brdcst.	4A	14	Note A Note B
3	Loop see above instructions	1500 K.C.	1500 K.C.	Vol. Max. Range Switch Brdcst.	5	13	

NOTE A — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this posi-

NOTE B — The police tuning range of Model 42-22CL is automatically aligned when the broadcast band compensators are adjusted.

PHILCO RADIO & TELEVISION CORP.

MODELS 42-PT-2, 42-PT-4, 42-PT-7(121,122)

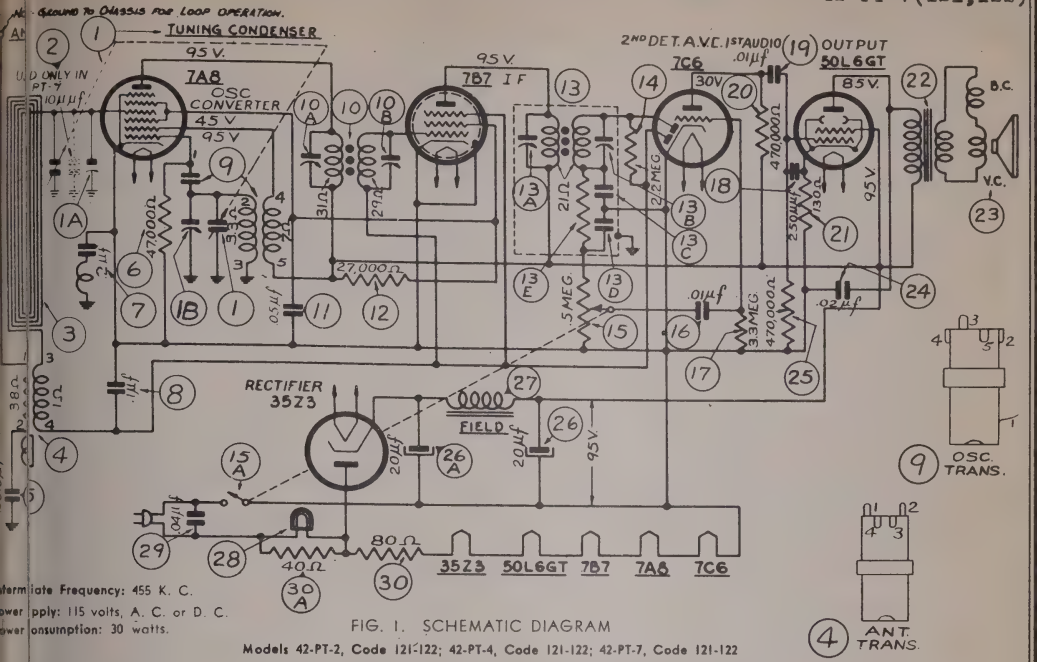

FIG. 1. SCHEMATIC DIAGRAM

Models 42-PT-2, Code 121-122; 42-PT-4, Code 121-122; 42-PT-7, Code 121-122

Intermediate Frequency: 455 K. C.
Power Supply: 115 volts, A. C. or D. C.
Power Consumption: 30 watts.

Voltages indicated at the tube elements in the above diagram were measured with a 1000 ohms per voltmeter, Philco Model 027.

REPLACEMENT PARTS

Schem. No.	Description	Part No.
	Tuning Condenser (PT-2, 4, 7, Code 121)	31-2527
	Tuning Condenser (PT-2, 4, 7, Code 122)	31-2610
	Drive Shaft	31-2531
	Mtg. Nut	W-2137
	Drive Cord	31-2529
	Spring	28-8954
	Mtg. Grommet	27-4610
	Pointer	56-2076
1a.	Trimmer Compensator (Part of Tuning Condenser)	
1b.	Oscillator Compensator (Part of Tuning Condenser)	
2.	Antenna Condenser	
	(10 mmfd., used in PT-7 only)	60-010137
	Loop Aerial (PT-2, Code 121-122)	318-2773
	Loop Aerial (PT-4, Code 121-122)	318-2773
	Loop Aerial (PT-7, Code 121)	76-1196
	Loop Aerial (PT-7, Code 122)	76-1196
	Mtg. Washer	W-152
	Mtg. Screw	W-881
3.	Antenna Transformer	32-3391
	Mtg. Clip	28-5002
5.	Condenser (.0015 mfd., 200 volts)	30-4621
6.	Resistor (47,000 ohms)	33-347339
7.	R.F. Choke and Condenser (.2 mfd.)	76-1161
8.	Condenser (.1 mfd., 200 volts)	30-4586
9.	Oscillator Transformer (PT-2, 4, 7, Code 121)	32-3562
	Oscillator Transformer (PT-2, 4, 7, Code 122)	32-3839
	Mtg. Clip	28-5002
10.	First I.F. Transformer	32-3603
	Mtg. Nut	W-1949FA3
10a.	Primary Compensator	(Part of 10)
10b.	Secondary Compensator	(Part of 10)
11.	Condenser (.05 mfd., 400 volts)	30-4519
12.	Resistor (27,000 ohms)	33-327337
13.	Second I.F. Transformer	32-3604
	Mtg. Nut	W-1949
13a.	Primary Compensator	(Part of 13)
13b.	Secondary Compensator	(Part of 13)
13c.	Condenser	(Part of 13a and 13b)
13d.	Condenser	(Part of 13a and 13b)
13e.	Resistor	(Part of 13)
14.	Resistor (2.2 megohms)	33-522339
15.	Volume Control	33-5434
	Mtg. Nut	W-2157
15a.	Power Switch	(Part of 15)
16.	Condenser (.01 mfd., 400 volts)	30-4572
17.	Resistor (3.3 megohms)	33-533339
18.	Mica Condenser (250 mmfd.)	60-125157
19.	Condenser (.01 mfd., 400 volts)	30-4572
20.	Resistor (470,000 ohms)	33-447339
21.	Resistor (130 ohms)	33-113336
22.	Output Transformer	32-8164
23.	Speaker	36-1533-9
24.	Cone Assembly	36-4190
25.	Condenser (.02 mfd., 400 volts)	30-4516
26.	Resistor (470,000 ohms)	33-447339
26a.	Electrolytic Condenser (20 mfd.)	30-2382
	Electrolytic Condenser (20 mfd.)	(Part of 26)
27.	Mtg. Clamp	56-1346
28.	Field Coil	(Replace Speaker 36-1533)
	Pilot Lamp	34-2068
	Socket Assembly	76-1177

Schem. No.	Description	Part No.
29.	Condenser (.04 mfd., 400 volts)	30-4119
30.	Filament Resistor (80 ohms)	33-3408
30a.	Filament Resistor (40 ohms)	(Part of 30)

MISCELLANEOUS PARTS

Cabinet and Loop (PT-2, code 121-122)	76-1195
Back	27-9817
Mtg. Stud	W-2235FA8
Cabinet and Loop (PT-4, code 121-122)	76-1219
Back	27-9870
Cabinet (PT-7, code 121)	10583A
Cabinet (PT-7, code 122)	10583B
Back	27-9944
Mtg. Screw	W-2023
Cord (Power)	L-3199
Dial Scale (PT-2, code 121)	27-5679
Dial Scale (PT-2, code 122)	27-5810
Mtg. Strap	56-2059
Mtg. Screw	W-2249FA3
Dial Scale (PT-4, code 121)	27-5695
Dial Scale (PT-4, code 122)	27-5811
Mtg. Strap	56-2059
Mtg. Screw	W-2249
Dial Scale (PT-7, code 121)	27-5781
Dial Scale (PT-7, code 122)	27-5812
Mtg. Strap	56-2068
Knob (PT-2, code 121, 122)	54-4052
Knob (PT-4, code 121, 122)	27-4805
Knob (PT-7, code 121, 122)	54-4135
Socket (50L6GT)	27-6174
Socket (LOKTAL TUBES)	27-6177
Screw (Chassis Mtg. PT-2-4)	W-1921FA9
Screw (Chassis Mtg. PT-7)	W-2065
Washer (Chassis Mtg. PT-2-4)	28-2615
Washer (Chassis Mtg. PT-7)	W-410

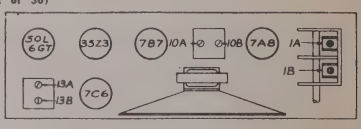

FIG. 2. COMPENSATOR LOCATIONS

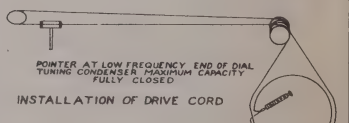
POINTER AT LOW FREQUENCY END OF DIAL
TUNING CONDENSER MAXIMUM CAPACITY
FULLY CLOSED
INSTALLATION OF DRIVE CORD
2-TURNS AROUND DRIVE CORD

FIG. 3. DRIVE CORD ARRANGEMENT

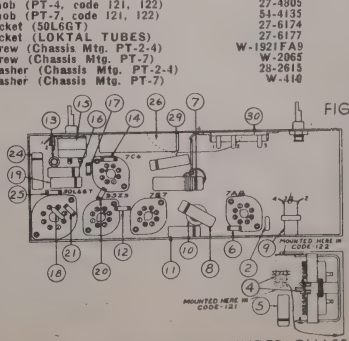

FIG. 4. PART LOCATIONS — UNDER CHASSIS

FOR ALIGNMENT SEE INDEX

December, 1941

MODELS 42-PT-2,42-PT-4,
42-PT-7
MODELS 42-PT-10,42-321
MODEL 42-1004

PHILCO RADIO & TELEVISION CORP.

ALIGNMENT FOR MODELS
42-PT-2, 42-PT-4, 42-PT-7
42-321, 42-PT-10

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled. The aligning points on scale plate should also be used.

After connecting the aligning instruments adjust the compensators as shown in the tabulation below. Compensator locations are shown on the Schematic.

If the indicating meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order 42-321, -PT-10	 42-PT-2, -PT-4, -PT-7	
1	Ant. Section of tuning	455 K. C.	540 K. C. Tuning Cond. Closed	Vol. Max.	18A, 18B, 14A, 14B	13B, 13A, 10A, 10B	Note B
2	Loop see above instructions	1600 K. C.	1600 K. C.	Vol. Max.	(6B, Note C)	(1B, Note C)	Note A
3	Loop see above instructions	1500 K. C.	1500 K. C.	Vol. Max.	(6A, Note D)	(1A, Note D)	

NOTE A: DIAL POINTER CALIBRATION—In order to adjust the receiver correctly, the pointer must be adjusted to track properly with the tuning condenser. To do this, turn the tuning condenser to the maximum capacity (plates fully meshed.) With the condenser in this position, set the tuning pointer on the first small line stamped in the scale plate on the left side.

NOTES FOR MODELS 42-321, -PT-10

NOTE B—Before adjusing compensators, turn down (14B) to tight position. Then adjust the compensators for maximum output in the following order: 18A, 18B, 14A and 14B.

NOTE C—Turn tuning condenser until dial pointer is on the first small line stamped in the scale plate from right side of chassis. Adjust padder (6B) to maximum at this point.

NOTE D—Turn tuning condenser until dial pointer is on the second small line stamped in the scale plate from right side of chasiss. Adjust padder (6A) to maximum at this point.

NOTES FOR MODELS 42-PT-2, -PT-4, -PT-7

NOTE B—Before adjusting compensators, turn down (10B) to tight position. Then adjust the compensators for maximum output in the following order: 12A, 12B, 10A and 10B.

NOTE C—When adjusting padder outside of cabinet, turn tuning condenser until dial pointer is on the first small line stamped in the scale plate from right side of chassis. Adjust padder (1B) to maximum at this point.

NOTE D—When adjusting padder outside of cabinet, turn tuning condenser until dial pointer is on the second small line stamped in the scale plate from right side of chassis. Adjust padder (1A) to maximum at this point.

MODEL 42-1004

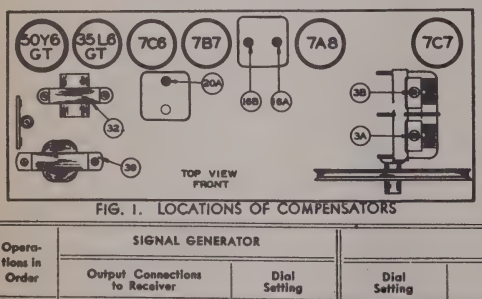

FIG. 1. LOCATIONS OF COMPENSATORS

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled. A paper aligning scale, Part No. 27-9985, is also attached to the metal dial plate for adjusting the radio outside of the cabinet. The scale is marked with three lines indicating from left to right—"Dial Calibration Point," "580 K.C." and "1500 K.C." After connecting the aligning instruments adjust the compensators as shown in the tabulation below. Locations of the compensators are shown in fig. 1.

If the indicating meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of tuning	455 K.C.	540 K.C. Tuning Cond. Closed	Vol. Max.	20A, 16B, 16A	
2	Loop see above instructions	1600 K.C.	1600 K.C.	Vol. Max.	3B, 3A	Note A

Operations in Order	SIGNAL GENERATOR MODEL 42-1006 CODE 122		RECEIVER			Special Instructions
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of tuning	455 K.C.	540 K.C. Tuning Cond. Closed	Vol. Max. Switch-Radio	22A, 21B, 21A	
2	Loop see above instructions	1600 K.C.	1600 K.C.	Vol. Max. Switch-Radio	3B, 3A	Note A

NOTE A:—Dial Calibration: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the small dot below 540 K.C.

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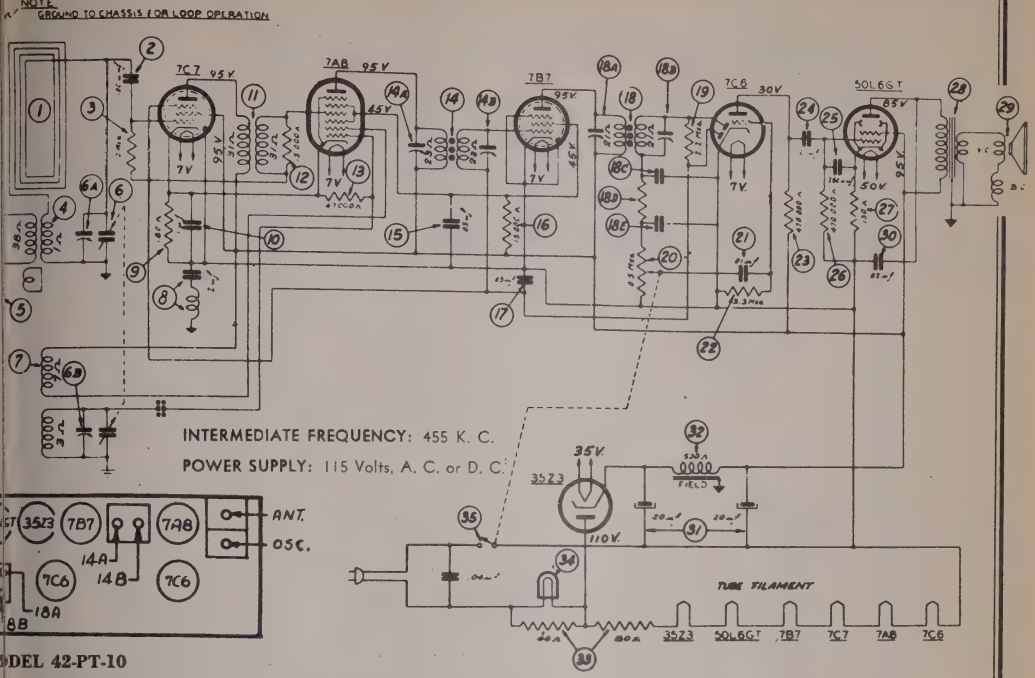
MODELS 42-PT-10, 42-PT-321

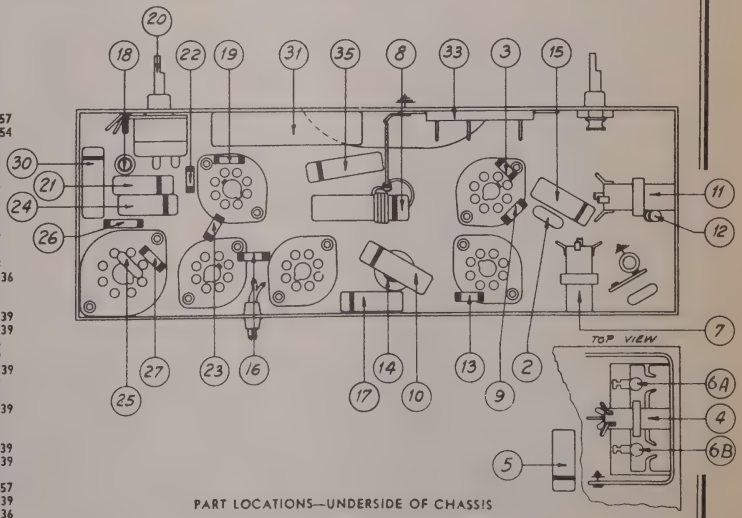


MODEL 42-PT-10

Volume control (20) Part No. 33-5469 list in the Service Bulletin is used on Model 42-321 only. The volume control for Model 42-PT-10 is Part No. 33-5434.

FOR ALIGNMENT SEE INDEX

SCHE No.	DESCRIPTION	PART No.
1	oop Aerial (42-321TI)	76-1196
	Loop Aerial (PT-10) Part of Cabinet.	
2	ica Condenser (100 mmfd.)	60-110157
3	sistor (1.0 megohms)	33-510154
4	rial Transformer	32-3394
5	ndenser (.0015 mfd., 600 volts)	30-4621
6	ning Condenesr	31-2527
	Pointer	56-2076
	Spring (Drive Cord)	28-8954
	Shaft Assembly (42-321)	31-2591
	Shaft Assembly (PT-10)	31-2531
	Drive Cord	31-2529
7	scillator Transformer	32-3613
8	ndenser and Choke Assembly	76-1198
9	sistor (180 ohms)	33-118336
10	ndenser (.11 mfd., 200 volts)	30-4586
11	F. Transformer	32-3595
12	sistor (15,000 ohms)	33-315339
13	sistor (47,000 ohms)	33-347339
14	I. F. Transformer	32-3614
15	ndenser (.05 mfd., 200 volts)	30-4519
16	sistor (15,000 ohms)	33-315339
17	ndenser (.05 mfd., 200 volts)	30-4519
18	d I. F. Transformer	32-3604
19	sistor (2.2 megohms)	33-522339
20	lume Control	33-5469
21	ndenser (.01 mfd., 400 volts)	30-4572
22	sistor (3.3 megohms)	33-533339
23	sistor (470,000 ohms)	33-447339
24	ndenser (.01 mfd., 400 volts)	30-4572
25	ica Condenser (250 mmfd.)	60-125157
26	sistor (470,000 ohms)	33-447339
27	sistor (130 ohms)	33-113336
28	utput Trans. (for Speaker 36-1533-9)	32-8154
29	one Assembly (for Speaker 36-1533-9)	36-4190
30	ndenser (.02 mfd., 400 volts)	30-4516
31	ectrolytic Condenser (20-20 mfd.)	30-2382
32	ield Coil (Replace Speaker 36-1533-9)	
33	sistor (Wirewound, 40-80 ohms)	33-3408
34	ot Lamp	34-2068
35	ndenser (.04 mfd., 400 volts)	30-4119
	MISCELLANEOUS PARTS	
	binet (42-321T)	10568A
	binet (42-321TI)	10568B
	binet (PT-10)	76-1195
	Cardboard Back (PT-10)	27-9817



PART LOCATIONS—UNDERSIDE OF CHASSIS

DESCRIPTION	PART No.	DESCRIPTION	PART No.
Cable (Power)	L-3199	Screw (Chassis Mounting) (42-321)	W-2065
Clip (R. F. Coil Mtg.)	28-5002	Screw (Chassis Mounting) (PT-10)	W-1921
Dial Scale (42-321)	76-1192	Socket (Lokal Tubes)	27-6177
Dial Scale (PT-10)	27-5496	Socket (Output Tube)	27-6174
Knob Assembly (42-321T)	54-4105	Socket Assembly (Pilot Lamp)	76-1177
Knob (42-321TI)	54-4143	Speaker	36-1533-9
Knob (42-PF10)	54-4052	Washer Chassis Mounting	W-410

OCTOBER, 1941

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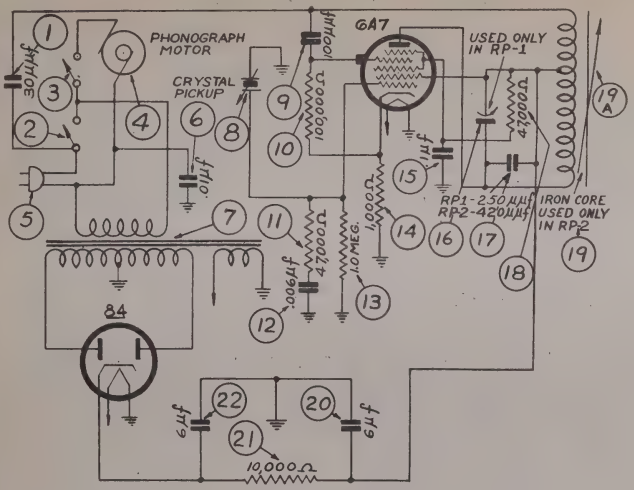


FIG 1. SCHEMATIC DIAGRAM—MODELS 42-RP-1; 42-RP-2, CODE 121

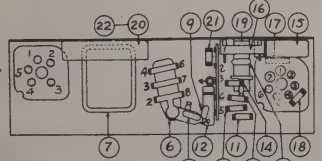


FIG. 2. PART LOCATIONS—CHASSIS

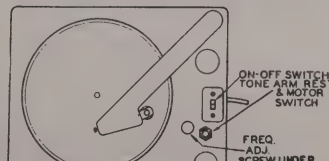


FIG. 3. MODEL 42-RP-2

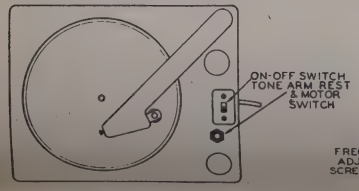


FIG. 4. MODEL 42-RP-1

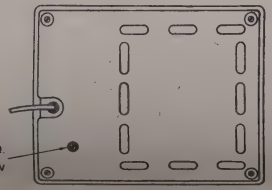


FIG. 5. MODEL 42-RP-1

SPECIFICATIONS

Models 42-RP-1 and 42-RP-2 are remote wireless record players which can be used in conjunction with any standard broadcast receiver to reproduce phonograph records. In general these models are similar in design, with the exception of the cabinet.

POWER SUPPLY: 115 Volts, 60 Cycle A.C.

PICKUP: Crystal

MOTOR: Rim Drive

TUBES: 6A7; 84

OPERATING:

Place record on turntable and slide "Off-On Switch" (Fig. 3-4) to "On" position; this will be indicated by pilot light in tone arm.

After allowing sufficient time for tubes to warm up, place tone arm on record; this automatically starts motor.

Tune the radio to approximately 540 KC (54 on most dials) at which setting the phonograph signal will be picked up. Volume can be regulated by the radio receiver's volume control in the normal way.

At the end of the record, turn the tone arm to rest position which will automatically turn motor off. It is not necessary to slide "Off-On" Switch to the "Off" position between records.

If interference from broadcasting stations is encountered, the frequency of the unit can be changed to any other frequency between 530 KC and 580 KC by adjusting small screw indicated in Fig. 3 for model 42-RP-2 and Fig. 5, model 42-RP-1. Turning screw clockwise lowers the frequency, counter-clockwise raises the frequency. THIS ADJUSTMENT IS BEST MADE WHILE THE UNIT IS IN OPERATION.

If hum is experienced, it may be necessary to reverse the power plug of the record player, the radio, or both. In most cases it is preferable to use different receptacles for record player and radio.

No definite rule can be established for the relative location of the record player to your radio; individual trial will establish the best location. However, in general, satisfactory operation may be obtained up to a distance of fifty (50) feet, provided local noise conditions are not too severe.

REPLACEMENT PARTS

42-RP-1; 42-RP-2, CODE 121

Schem. No.	Description	Part No.
1.	Condenser (30 mmfd.)	60-030127
2.	Power Switch	42-1562
3.	Off-On Switch (Motor)	42-1655
	Switch Plate	56-1383
	Washer	W-467-FA4
	Screw	W-560-FA9
	Nut	W-684-FA4
4.	Motor (115 volts, 60 cycles)	35-1240
	Turntable	35-3047
	Mtg. Screw	W-89-FA4
5.	Power Cord	L-2778
6.	Condenser (.01 mfd., 200 volt)	3903-5G
7.	Power Transformer (115 volts, 60 cycles)	32-8043
8.	Phono Crystal & Tone Arm Complete	35-2479
	Bumper	54-4070
9.	Condenser (100 mmfd.)	60-110157
10.	Resistor (100,000 ohms)	33-410339
11.	Resistor (47,000 ohms)	33-347339
12.	Condenser (.006 mfd., 400 volts)	30-4591
13.	Resistor (1 megohms)	33-510339
14.	Resistor (1,000 ohms)	33-210339
15.	Condenser (.1 mfd., 400 volts)	61-0113
16.	Compensator (Condenser Type—Model 42-RP-1)	Part of 19
17.	Mica Condenser (250 mmfd.—Model RP-1)	30-1038
	Mica Condenser (420 mmfd.—Model RP-2)	30-1116
18.	Resistor (47,000 ohms)	33-347339
*19.	Oscillator Transformer (Model RP-1)	32-3218
	Oscillator Transformer (Model RP-2)	32-3192
19a.	Iron Core Compensator (Model RP-2)	Part of 19
	Mtg. Nut	W-139-FA3
20.	Electrolytic Condenser (6-6 mfd.)	30-2388
	Mtg. Clamp	56-1346-FA5
21.	Resistor (10,000 ohms)	33-310339
22.	Electrolytic Condenser (6 mfd.)	Part of 20

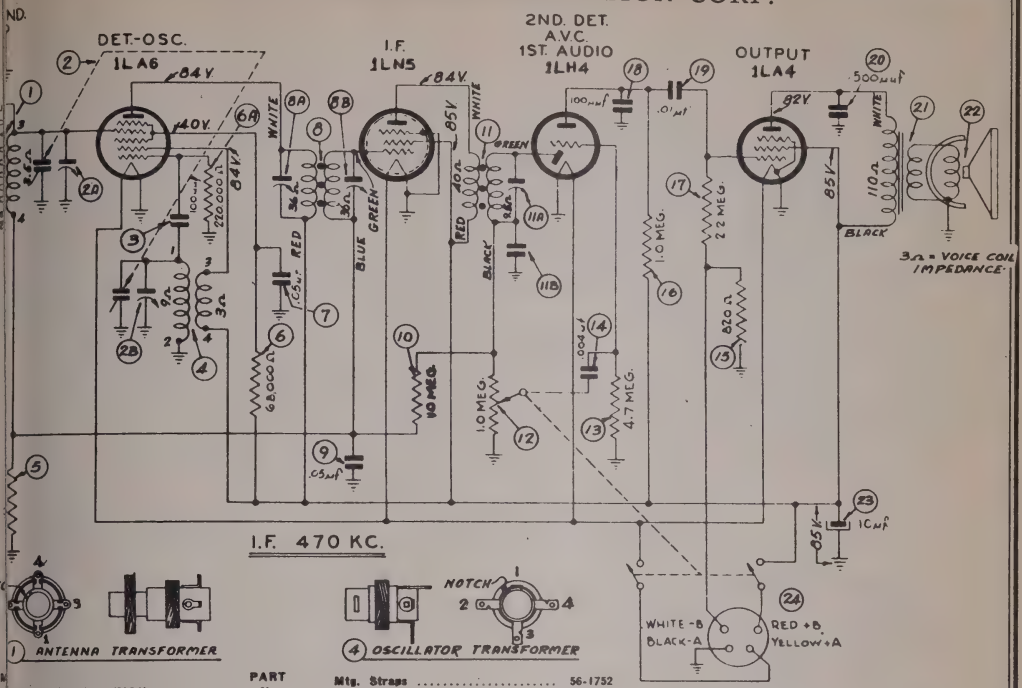
*NOTE: The oscillator transformers (19) of the RP-1 and RP-2 differ in construction. The RP-1 transformer is tuned by a capacity type padder and the RP-2 transformer by an Iron Core mounted in the center of the coil.

MISCELLANEOUS PARTS

CABINET (42-RP-1)	10581-A
Rubber Foot	27-4817
Bottom Cover	27-9846
Screw (Foot mtg.)	W-2177-FA9
CABINET (42-RP-2)	10582-A
Bottom Cover	27-9847
SNAP BUTTON	W-1767-FC37
SOCKET (84 tube)	27-6035
SOCKET (6A7 tube)	27-6037
Mtg. Eyelet	W-1650
SCREW (CHASSIS MTG.)	W-218-FE11
WASHER (CHASSIS MTG.)	W-751FA3
NEEDLE KIT	48-6480

PHILCO RADIO & TELEVISION CORP.

MODEL 42-121



(1) ANTENNA TRANSFORMER

(4) OSCILLATOR TRANSFORMER

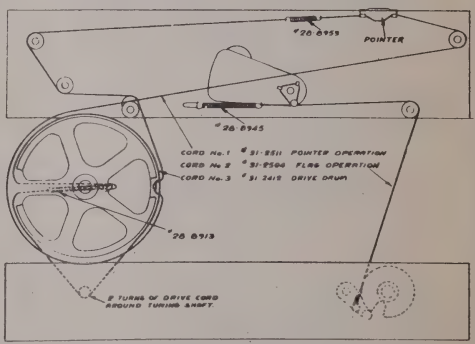
No.	DESCRIPTION	PART No.
1.	Antenna Transformer	32-3490
	Clip	28-5002
2.	Tuning Condenser Assembly	31-2485
	Rubber Grommet	27-4610
	Spacer	56-1669
	Spring (Tuning Cond.)	28-8913
	Spring (Pointer Drive)	28-8953
	Pointer (Dial)	56-2159
	Drive Cord (Pointer)	31-2511
	Drive Cord (Tuning Cond.)	31-2516
	Shaft (Tuning)	31-2545
	Drive Drum	76-1176
	Nut (Cond. Mtg.)	W-1543
3.	Mica Condenser (100 mmfd.)	60-110157
4.	Oscillator Transformer	32-3491
5.	Resistor (4.7 meg., ½ watt)	33-547339
6.	Resistor (68,000 ohms, ½ watt)	33-368339
7.	Tubular Condenser (.05 mfd., 200 v.)	30-4519
8.	1st I. F. Transformer	32-3675
	Painut (mounting)	W-1949
9.	Tubular Condenser (.05 mfd., 200 v.)	30-4519
10.	Resistor (10.0 meg., ½ watt)	33-610339
11.	2nd I. F. Transformer	32-3199
	Painut (mounting)	W-1949
11A.	Compensator	part of 11
11B.	Condenser	part of 11A
12.	Volume Control (1.0 meg.)	33-5441
	Painut	W-2157
13.	Resistor (4.7 meg., ½ watt)	33-547339
14.	Tubular Condenser (.004 mfd., 400 v.)	30-4578
15.	Resistor (820 ohms, ½ watt)	33-182336
16.	Resistor (1.0 meg., ½ watt)	33-510339
17.	Resistor (2.2 meg., ½ watt)	33-522339
18.	Mica Condenser (100 mmfd.)	60-110157
19.	Tubular Condenser (.01 mfd., 400 v.)	30-4572
20.	Mica Condenser (500 mmfd.)	60-150157
21.	Output Transformer	32-8100
22.	Cone & Voice Coil Assembly	
	(Speaker Part No. 36-1507-1)	36-4158
	(Speaker Part No. 36-1507-3)	36-4165
23.	Electrolytic Cond. (10 mfd., 150 v.)	30-2396
24.	Battery Cable Assembly	41-3505

Mtg. Straps		56-1752
Mtg. Washers		W-152
Mtg. Screw		W-2062
Indicator Plug		W-2232
Indicator		76-1122
Drive Cord		31-2504
Cam Assembly		38-9051
Transfer Lever		76-1049

MISCELLANEOUS PARTS

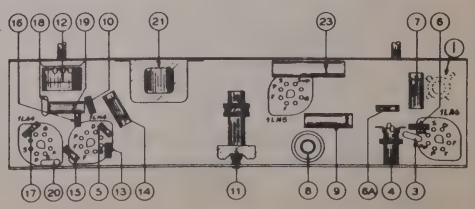
Cloth Assembly		45-5545
Mtg. Fasteners		56-5082
Cabinet		10478-B
Disc Feet		27-4804
Screw (Chassis Mtg.)		W-2068
Dial Scale		27-5714
Dial Backing Cavel		27-9875

FOR ALIGNMENT SEE INDEX


#20 8953
POINTER
#36 8945
CORD No. 1 #31-2511 POINTER OPERATION
CORD No. 2 #31-2506 FLAG OPERATION
CORD No. 3 #31 2415 DRIVE DRUM
#28 8913
2 TURNS OF DRIVE CORD AROUND TUNING SHAFT

INSTALLATION OF DRIVE CORDS. POINTER AT LOW FREQUENCY END OF DIAL. GANG CLOSED VIEW SHOWN FROM REAR OF CHASSIS

INSTALLATION OF DRIVE CORDS, MODEL 42-121.



LOCATIONS OF PARTS — UNDERSIDE OF CHASSIS — MODEL 42-121.

MODELS 42-122, 42-123

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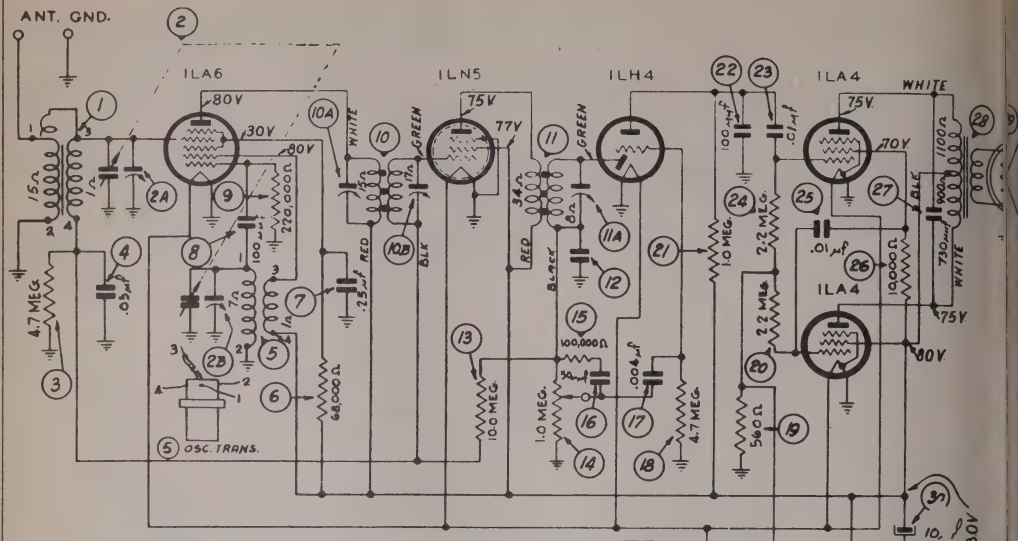
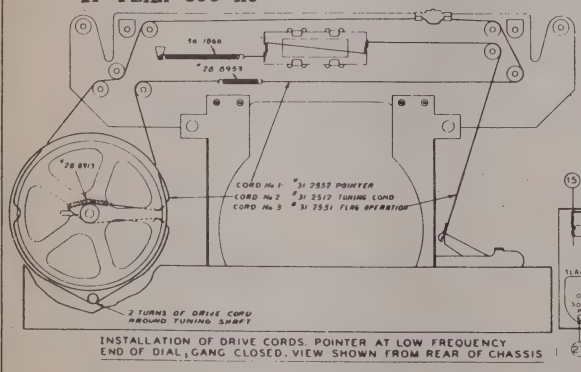
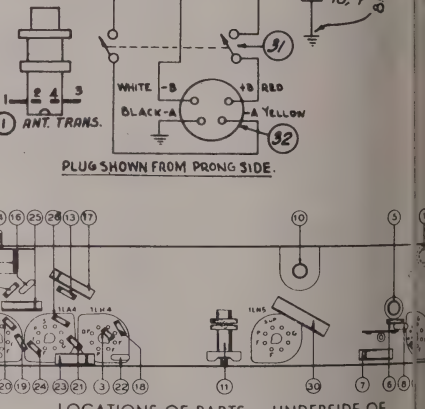


IF PEAK 455 KC

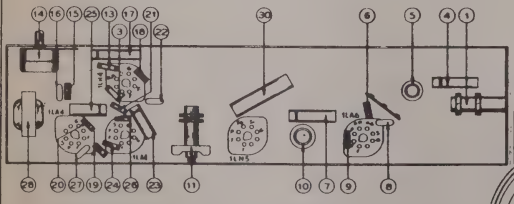

CORD No 1 "31-2552 POINTER
CORD No 2 "31-2512 TUNING COND
CORD No 3 "31-2551 FLAG OPERATION
2 TURNS OF DRIVE CORD AROUND TUNING SHAFT

INSTALLATION OF DRIVE CORDS. POINTER AT LOW FREQUENCY END OF DIAL, GANG CLOSED. VIEW SHOWN FROM REAR OF CHASSIS



LOCATIONS OF PARTS — UNDERSIDE OF CHASSIS — MODEL 42-122.

INSTALLATION OF DRIVE CORDS, MODEL 42-122.



LOCATIONS OF PARTS — UNDERSIDE OF CHASSIS — MODEL 42-123.

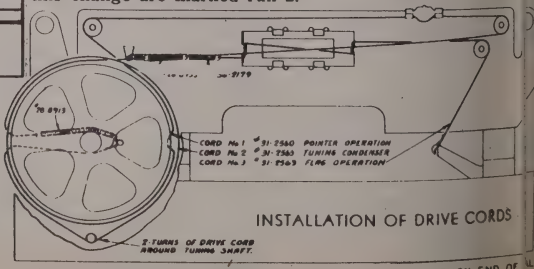
FOR ALIGNMENT AND PARTS LIST SEE INDEX

MODEL 42-123

To prevent audio microphonics resistor (26) 10,000 ohms was changed to 4700 ohms Part No. 33-247339.

To improve tuning the drive cord on the tuning cond was changed from Part No. 31-2512 to 31-2516.

To prevent audio microphonics resistor (26) 10,000 was changed to 4700 ohms Part No. 33-247339. Chassis this change are marked run 2.


CORD No 1 "31-2560 POINTER OPERATION
CORD No 2 "31-2563 TUNING CONDENSER
CORD No 3 "31-2563 FLAG OPERATION
2 TURNS OF DRIVE CORD AROUND TUNING SHAFT.

INSTALLATION OF DRIVE CORDS

INSTALLATION OF DRIVE CORDS. POINTER AT LOW FREQUENCY END OF GANG CLOSED. VIEW SHOWN FROM REAR OF CHASSIS

MODEL 42-123

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PHILCO RADIO & TELEVISION CORP.

MODEL 42-121
MODELS 42-122, 42-123

MODEL 42-121

TY OF CIRCUIT — Four (4) tube battery operated single band superhetrodyne circuit covering 540 to 1720 K.C. In addition, other features included a pentode audio output stage, automatic volume control, high output permanent magnet speaker, Philco low current drain LOKTAL tubes, and an "ON-O" indicator.

INTERMEDIATE FREQUENCY — 455 K.C.

BATTERIES REQUIRED — Philco combination "A-B" battery type No. P-608-6L.

BATTERY VOLTAGE AND CONSUMPTION — "A" 1.5 volts, 200 Ma.
"B" 90 volts, 6.9 Ma.

AUDIO OUTPUT — 100 milliwatts.

MODELS 42-122T, 42-123F

TYPE OF CIRCUIT: Five (5) tube battery operated superheterodyne circuit covering broadcast band and state police frequencies. Other features included are: Push-Pull pentode audio output stage; automatic volume control; OFF-ON indicator; low current drain Philco LOKTAL Tubes and a high output permanent Magnet Speaker especially designed for Farm Radios.

In general these models are similar with the exception of the cabinets and speakers. Model 42-122T is assembled in a Table Type Cabinet, and Model 42-123F in a console (Floor Type) Cabinet.

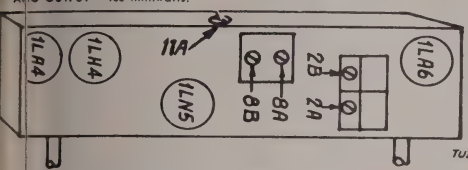
TUNING RANGES: 540 to 1720 K.C.

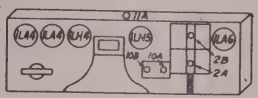
INTERMEDIATE FREQUENCY: 455 K.C.

PHILCO BATTERY REQUIRED: Type P-60D-11L Combination "A-B" unit.

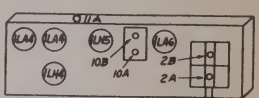
BATTERY VOLTAGE AND CONSUMPTION: Filament, 1.5 volts; 250 Ma.
Plate, 90 volts; 10 Ma.

AUDIO OUTPUT: 170 milliwatts.





TUBE & COMPENSATOR LOCATION - MODEL 42-122



TUBE & COMPENSATOR LOCATION - MODEL 42-123

FIG. 2 — TUBE AND COMPENSATOR LOCATIONS, TOP OF CHASSIS, MODEL 42-121.

MODELS 42-121, 42-122, 42-123
CONNECTING ALIGNING INSTRUMENTS

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator it should be connected to the A. V. C. circuit as follows:

Connect the negative (−) terminal of the vacuum tube voltmeter through a 2 megohm resistor to any point in the circuit where the A. V. C. voltage can be measured.

Connect the positive (+) terminal to the chassis ground terminal.

Audio Output Meter: If this type of meter is used as an aligning indicator, it should be connected to the plate of the output tube and ground.

Signal Generator: When adjusting the I. F. padders the high side of the signal generator is connected through a .1 mfd. condenser to the aerial tuning condenser stator lug which connects to the grid of the converter tube. The ground or low side of the signal generator is connected to the chassis of the receiver.

When aligning the R. F. padders connect the signal generator as given below in the column "Output Connections to Receiver" with a dummy aerial as indicated in "Dummy Aerial" column.

After connecting the aligning meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown in the diagram.

If the output pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Due to the dial being mounted on the cabinet, it will be necessary to align receiver when mounted in the cabinet.

Operations Order	SIGNAL GENERATOR			RECEIVER				Special Instructions
	Output Connections To Receiver	Dummy Aerial	Dial Setting	Dial Setting	Control Settings	Adjust Compensators 42-121	Adjust Compensators 42-122 42-123	
1	Stator Plate lug-aerial tuning cond.	.1 mfd.	455 K.C.	580 K.C.	Vol. Max.	11B, 8B, 8A	11A, 10B, 10A	Note A
2	Aerial Connection Receiver	225 mmfd.	1700 K.C.	1700 K.C.	Vol. Max.	2B	2B	
3	Aerial Connection Receiver	225 mmfd.	1500 K.C.	1500 K.C.	Vol. Max.	2A	2A	

NOTE A — Dial Calibration: Before adjusting the R. F. Compensators, the dial pointer must be adjusted to track properly with the tuning Condenser. To adjust the pointer, turn the tuning Condenser to the closed position (maximum capacity) and set the pointer to the mark at the left hand end of the dial below 550 K.C.

REPLACEMENT PARTS — MODELS 42-122, 42-123

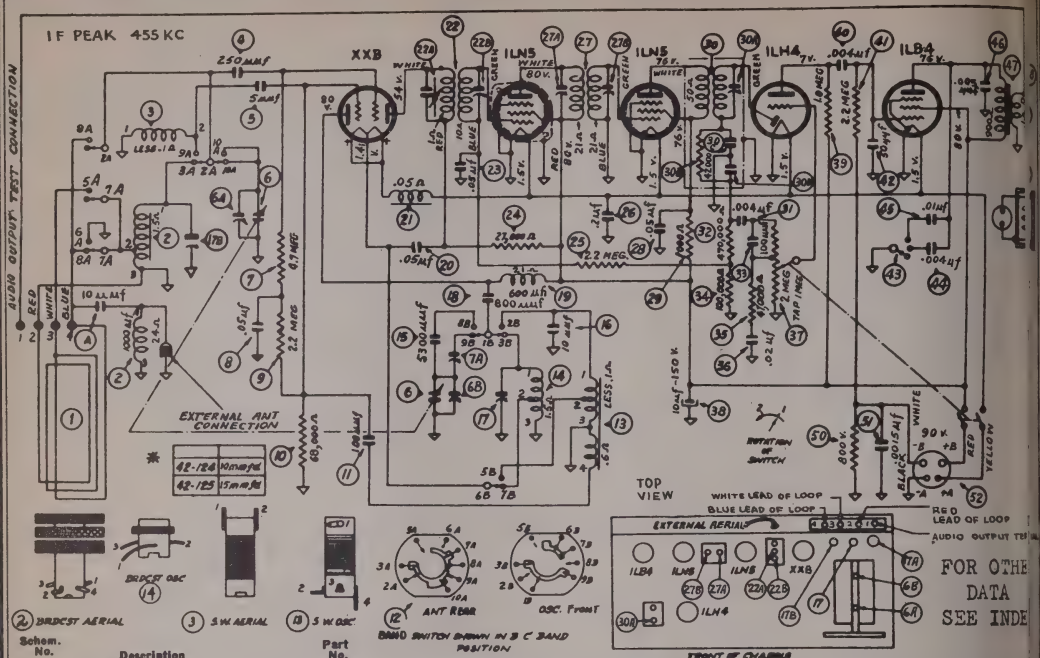
SCHEM. No.	DESCRIPTION	PART No.
1	Aerial Transformer	32-3708
	Mounting Clip	28-5002
2	Tuning Condenser (42-122)	31-2548
	Tuning Shaft Assembly (42-122)	31-2554
	Tuning Condenser (42-123)	31-2564
	Tuning Shaft Assembly (42-123)	31-2566
	Nut (Shaft Mtg.)	W-684
	Drive Drum	76-1176
	Drive Cord (Tuning Cond. 42-122)	31-2512
	Drive Cord (Tuning Cond. 42-123)	31-2565
	Drive Cord (Pointer—42-122)	31-2552
	Drive Cord (Pointer—42-123)	31-2560
	Rubber Grommet (Mtg. Tuning Cond. 42-122)	27-4610
	Rubber Grommet (Mtg. Tuning Cond. 42-123)	54-4020
	Spring (Tuning Cond. Drive Cord)	28-8913
	Spring (Pointer Drive)	28-8953
	Pointer	56-2158
	Nut (Condenser Mtg.)	W-1543
3.	Resistor (4.7 megohms)	33-547339
4.	Condenser (.05 mfd.)	30-4519
5.	Oscillator Transformer	32-3184
6.	Resistor (68,000 ohms)	33-368339
7.	Condenser (.25 mfd., 100 volts)	61-0112
8.	Mica Condenser (100 mmfd.)	60-110157
9.	Resistor (220,000 ohms)	33-422339
10.	1st I. F. Transformer (42-122)	32-3706
	1st I. F. Transformer (42-123)	32-3736
10A.	Compensator part of 10	
10B.	Compensator part of 10	
11.	2nd I. F. Transformer	32-3190
	Nut (Mtg.)	W-1949
11A.	Compensator part of 11	
12.	Condenser part of 11A	
13.	Resistor (10 megohms)	33-610339
14.	Volume Control (10 megohms, 42-122)	33-5447
	Volume Control (10 megohms, 42-123)	33-5453
	Nut (Mtg. control)	W-2157
15.	Resistor (100,000 ohms)	33-410339
16.	Condenser (50 mmfd.)	60-050157
17.	Condenser (.004 mfd., 400 v.) 42-122	60-8128
	Condenser (.004 mfd., 400 v.) 42-123	30-4623
18.	Resistor (4.7 megohms)	33-547339
19.	Resistor (560 ohms)	33-156326
20.	Resistor (2.2 megohms)	33-522339
21.	Resistor (1.0 megohms)	33-510339
22.	Condenser (100 mmfd.)	60-110157
23.	Condenser (.01 mfd., 400 volts)	30-4572
24.	Resistor (2.2 megohms)	33-522339
25.	Condenser (.01 mfd., 400 volts)	30-4572
26.	Resistor (10,000 ohms)	33-310339
27.	Condenser (730 mmfd.)	60-173127
28.	Audio Output Transformer	32-8152
	Rivet	97-0068
29.	Cone Assembly (for Speaker 36-1567-1) Model 42-122	36-4156
	Cone Assembly (for Speaker 36-1567-3) Model 42-122	36-4165
	Cone Assembly (for Speaker 36-1488) Model 42-123	36-4129
30.	Electrolytic Condenser (10 mfd.)	30-2396
31.	Switch part of Volume Control	
32.	Battery Cable and Plug	41-3585

MISCELLANEOUS PARTS

DESCRIPTION	PART No.
Bezel	54-4090
Screw (Bezel Mtg.)	W-2673
Cabinet (42-122T)	10544A
Cabinet (42-123F)	10543A
Cable (Speaker 41-123F)	41-3448
Dial Scale	27-5715
Backing Card	27-5675
Spring Fastener	56-6127
Indicator (OFF-ON)	56-2180
Operating Arm (Indicator)	56-2183
Transfer Lever Arm	56-2184
Stud Mtg.	56-6143
Drive Cord (Indicator, 42-122)	31-2561
Drive Cord (Indicator, 42-123)	31-2563
Spring Washer	56-1065
Spring	56-2179
Stud (Indicator Drive)	28-6004
Knob	54-4089
Screw (Superstructure Mtg.)	W-333
Screw (Chassis Mtg.)	W-2650
Sockets (Tubes)	27-6177
Rivet	W-239
Socket (Aerial)	27-6118
Rivet	W-267
Speaker (42-122)	36-1567
Speaker (42-123)	36-1488
Washer	27-7467
Nut	W-124
Terminal Panel (Chassis)	38-8300

MODELS 42-124T, 42-125K

PHILCO RADIO & TELEVISION CORP.



Schem. No.	Description	Part No.
1.	Loop Aerial (42-124)	76-1292
	Mtg. Screw	W-2071
	Loop Aerial (42-125)	76-1320
	Shaft	76-1319
	Shaft Plate	56-2267
	Shaft Retainer	56-2268
	Washer	97-0128
	Screw (Retainer)	W-692
	Screw (Shaft Assembly)	W-2062
	Loop Drive Cord	31-2588
2.	Aerial Transformer (Broadcast)	32-3731
	Mtg. Clip	28-5002
2A.	Mica Condenser (10 mmfd., Model 42-124)	60-010137
	Mica Condenser (15 mmfd., Model 42-125)	60-015137
3.	Aerial Transformer (Short Wave, Model 42-124)	32-3729
	Aerial Transformer (Short Wave, Model 42-125)	32-3760
4.	Mica Condenser (250 mmfd.)	60-125157
5.	Mica Condenser (5 mmfd.)	60-005157
6.	Tuning Condenser	31-2561
	Grommet (Mtg. Cond.)	27-4596
	Grommet (Mtg. Cond.)	54-4020
	Screw	W-523
	Spacer	28-5665
	Spring (Pointer Drive Cord)	28-8953
	Spring (Cond. Drive Cord)	28-8954
	Washer (Mtg. Cond.)	W-151
	Drive Shaft	31-2562
	Drive Cord (Pointer)	31-2560
	Drive Cord (Tuning Cond.)	31-2559
	Drive Pulley	76-1284
7.	Resistor (4.7 megohms)	33-547339
8.	Condenser (.05 mfd., 200 volts)	30-4519
9.	Resistor (2.2 megohms)	33-522339
10.	Resistor (68,000 ohms)	33-368339
11.	Mica Condenser (100 mmfd.)	60-110157
12.	Band Switch	42-1680
	Mtg. Nut	W-2157
13.	Oscillator Transformer (S.W.)	32-3728
	Mtg. Clip	28-5002
14.	Oscillator Transformer (Broadcast)	32-3730
	Mtg. Clip	28-5002
15.	Mica Condenser (5,300 mmfd.)	60-253124
16.	Mica Condenser (10 mmfd.)	60-010137
17.	Compensator (Osc., 1700 K.C.)	31-6430
17A.	Compensator (Osc. 580 K.C.) part of 17	
17B.	Compensator (Aerial, 1500 K.C.) part of 17	
18.	Mica Condenser (800 mmfd.) 8	60-180157
19.	Oscillator Plate Choke	32-3615
20.	Condenser (.05 mfd., 200 volts)	61-0101
21.	Filament Choke	32-3732
22.	1st I. F. Transformer	32-3737
	Mtg. Nut	W-1949
22A.	Primary Compensator part of 22	
22B.	Secondary Compensator part of 22	
23.	Condenser (.05 mfd., 200 volts)	30-4519
24.	Resistor (27,000 ohms)	33-327339
25.	Resistor (2.2 megohms)	33-522339
26.	Condenser (.2 mfd., 200 volts)	30-4587
27.	2nd I. F. Transformer	32-3621
	Mtg. Nut	W-1949
27A.	Primary Compensator part of 27	
27B.	Secondary Compensator part of 27	
28.	Condenser (.05 mfd., 200 volts)	61-0101
29.	Resistor (1,000 ohms)	33-210336
30.	Third I. F. Transformer	32-3733
	Mtg. Nut	W-1949
30A.	Secondary Compensator part of 30	
30B.	Resistor (42,000 ohms) part of 30	33-342339
30C.	Condenser (100 mmfd.) part of 30-30A	
30D.	Condenser (100 mmfd.) part of 30-30A	
31.	Condenser (.004 mfd., 600 volts)	30-4623
32.	Resistor (470,000 ohms)	33-447339
33.	Condenser (100 mmfd.)	60-110157
34.	Resistor (100,000 ohms)	33-410337
35.	Resistor (47,000 ohms)	33-347339
36.	Condenser (.02 mfd., 100 volts)	61-0154
37.	Volume Control	33-5452
	Nut	W-2157
38.	Electrolytic Condenser (10 mfd.)	30-2396
39.	Resistor (1 megohm)	33-510339
40.	Condenser (.004 mfd., 600 volts)	30-4623
41.	Resistor (2.2 megohms)	33-522339
42.	Mica Condenser (50 mmfd.)	60-050157
43.	Tone Control Switch	42-1676
	Nut	W-2157
44.	Condenser (.004 mfd., 200 volts)	61-0128
45.	Condenser (.01 mfd., 400 volts)	61-0100
46.	Condenser (.0015 mfd.; 600 volts)	30-4621
47.	Output Transformer	32-8175
	Mtg. Rivet	97-0065
48.	Speaker Socket	27-6115
49.	Speaker (Model 42-125)	36-1488-3
	Cone Assembly (for Speaker 36-1488-3)	36-4129
	Mtg. Nut	W-124
	Speaker (Model 42-124)	36-1545
	Mtg. Screw	W-523
	Cone Assembly (for 36-1545-3 Speaker Model 42-124)	36-4208
	Speaker Cable	41-3448
50.	Resistor (800 ohms)	33-180336
51.	Condenser (.0015 mfd., 600 volts)	30-4621
52.	Battery Cable and Plug	41-3505

MISCELLANEOUS PARTS

Bezel (42-125)	54-4
Mtg. Screw	W-2
Bezel (42-124)	54-4
Decalcomania	27-1
Cabinet (42-124)	1054
Cabinet (42-125)	1064
Dial Scale	27-1
Dial Backing Card	27-1
Dial Pointer	56-1
Spring Fastener	54-1
Knobs (42-124)	54-1
Knobs (42-128)	54-1
Indicator (On-Off)	56-1
Grommet (Indicator)	54-1
Drive Cord	31-1
Operating Arm (Indicator)	56-1
Transfer Lever Arm	56-1
Spring Washer	54-1
Stud	56-1
Pulley (Pointer & Indicator)	27-1
Stud (Pointer & Indicator)	28-1
Socket (Tubes)	27-1
Rivet	W-1
Rubber Washer (Mtg. Socket)	27-1
Rubber Grommet (Mtg. Socket)	27-1
Adapter Plate (Mtg. Socket, 1st, 2nd I. F.)	56-1
Rivet (Mtg. Adapter Plate)	W-1
Screw (Chassis Mtg.)	38-1
Terminal Panel (Aerial)	W-1
Rivet	38-1
Terminal Panel	38-1
Terminal Panel	38-1
Washer (Chassis Mtg.)	W-1

To improve the audio power output resistor (50) 800 ohms was changed to 680 ohms Part No. 33-168336.

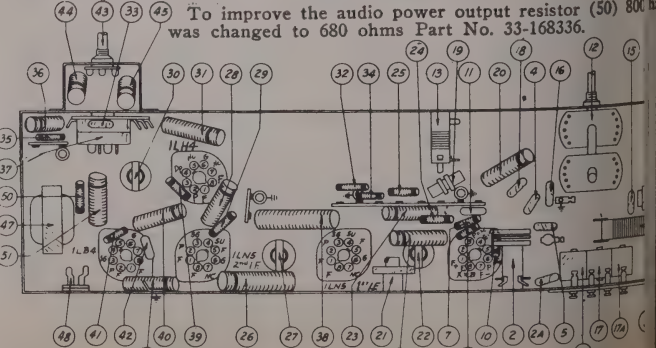


FIG. 2 — LOCATIONS OF PARTS, UNDERSIDE OF CHASSIS, MODELS 42-124, 42-125

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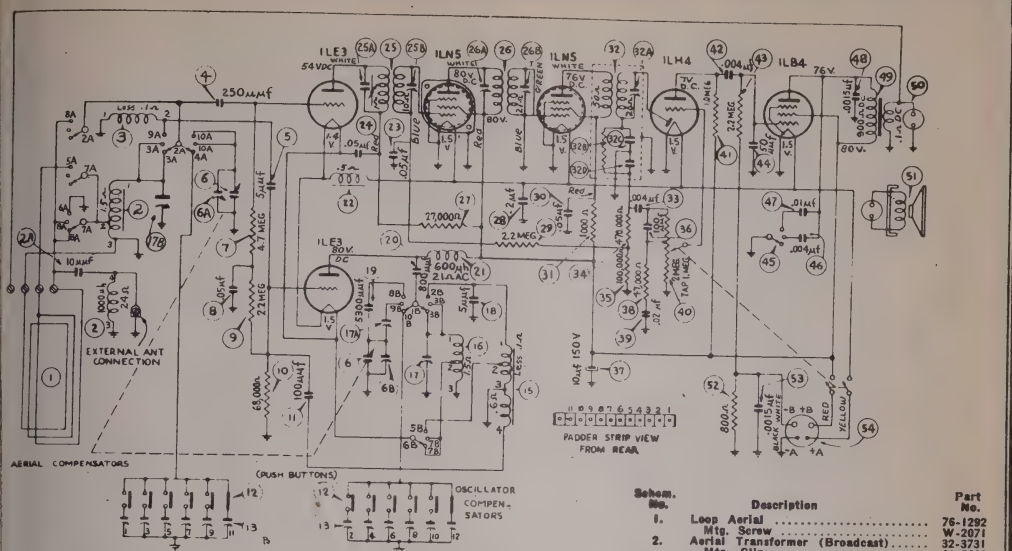
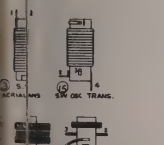
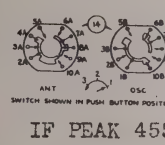
PHILCO RADIO & TELEVISION CORP. MODEL 42-126

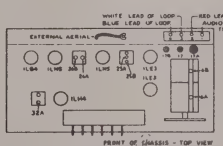




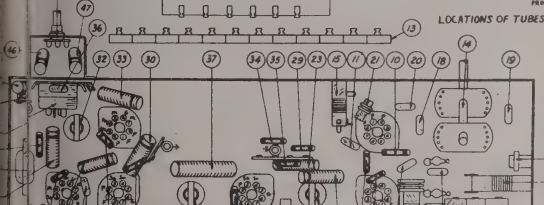


FOR OTHER DATA SEE INDEX

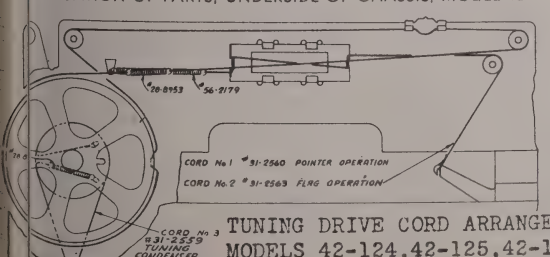
IF PEAK 455 KC



LOCATIONS OF TUBES and COMPENSATORS



LOCATION OF PARTS, UNDERSIDE OF CHASSIS, MODEL 42-126


CORD No 1 #31-2560 POINTER OPERATION
CORD No 2 #31-2563 FLAG OPERATION
CORD No 3 #31-2559 TUNING CONDENSER
3-TURNS OF DRIVE CORD AROUND TUNING SHAFT.

TUNING DRIVE CORD ARRANGEMENT MODELS 42-124, 42-125, 42-126

INSTALLATION OF DRIVE CORDS. POINTER AT LOW FREQUENCY END OF DIAL, GANG CLOSED. VIEW SHOWN FROM REAR OF CHASSIS.

Schem. No.	Description	Part No.
1.	Loop Aerial	76-1292
	Mtg. Screw	W-2071
2.	Aerial Transformer (Broadcast)	32-3731
	Mtg. Clip	28-5002
2A.	Mica Condenser (10 mmfd.)	60-010157
3.	Aerial Transformer (S.W.)	32-3729
	Mtg. Clip	28-5002
4.	Mica Condenser (250 mmfd.)	60-125157
5.	Mica Condenser (5 mmfd.)	60-005157
6.	Tuning Condenser	31-2561
	Drive Shaft	31-2562
	Drive Cord (Cond. Drive)	31-2559
	Drive Cord (Pointer)	31-2560
	Grommet	27-4596
	Grommet	54-4020
	Nut (Mtg. Drive Shaft)	W-2157
	Pulleys (Pointer)	27-4981
	Screw (Mtg. Cond.)	W-523
	Spacer	28-5665
	Spring (Cond. Drive)	28-8954
	Spring (Pointer Drive)	28-8953
	Stud (Pointer Drive)	56-6120
7.	Resistor (4.7 megohms)	33-547339
8.	Condenser (.05 mfd., 200 volts)	30-4519
9.	Resistor (2.2 megohms)	33-522339
10.	Resistor (68,000 ohms)	33-368339
11.	Mica Condenser (100 mmfd.)	60-110157
12.	Push-button Switch	42-1675
	Mtg. Grommet	27-4596
	Mtg. Spacer	28-5665
	Washer	W-151
	Screw	W-523
13.	Push-button Padder Strip	31-6429
	Washer	W-152
	Screw	W-1974
14.	Band Switch	42-1674
15.	Oscillator Transformer (S. W.)	32-3728
16.	Oscillator Transformer (Brdcst.)	32-3730
17.	Compensator (Osc. 1700 K.C.)	31-6430
17A.	Compensator (Osc. 540 K.C.) part of 17	
17B.	Compensator (Osc. 1500 K.C.) part of 17	
	Mtg. Rivets	W-239
18.	Mica Condenser (5 mmfd.)	60-005137
19.	Mica Condenser (5300 mmfd.)	60-253124
20.	Mica Condenser (800 mmfd.)	60-180157
21.	Oscillator Plate Choke	32-3615
22.	Filament Choke	32-3732
23.	Condenser (.05 mfd., 200 volts)	30-4519
24.	Condenser (.05 mfd., 200 volts)	61-0101
25.	1st I. F. Transformer	32-3737
	Mtg. Nut	W-1949
25A.	Primary Compensator part of 25	
25B.	Secondary Compensator part of 25	
26.	2nd I. F. Transformer	32-3621
	Mtg. Nut	W-1949
27.	Resistor (27,000 ohms)	33-327339
28.	Condenser (.2 mfd., 200 volts)	30-4587
29.	Resistor (2.2 megohms)	33-522339
30.	Condenser (.05 mfd., 200 volts)	61-0101
31.	Resistor (1,000 ohms)	33-210336
32.	3rd I. F. Transformer	32-3733
	Mtg. Nut	W-1949
32A.	Secondary Compensator part of 32	
32B.	Resistor, (42,000 ohms) part of 32	
32C.	Condenser part of Compensator 32A	
32D.	Condenser part of Compensator 32A	
33.	Condenser (.004 mfd., 600 volts)	30-4623
34.	Resistor (470,000 ohms)	33-437339
35.	Resistor (100,000 ohms)	33-410339
36.	Mica Condenser (100 mmfd.)	60-110157
37.	Electrolytic Condenser (10 mfd.)	30-2396
38.	Resistor (47,000 ohms)	33-347339
39.	Condenser (.02 mfd., 100 volts)	61-0154
40.	Volume Control	33-5452
	Mtg. Nut	W-2157
41.	Resistor (1 megohm)	33-[illegible]10339
42.	Condenser (.004 mfd., 600 volts)	30-4623
43.	Resistor (2.2 megohms)	33-522339
44.	Mica Condenser (50 mmfd.)	60-050157
45.	Tone Control Switch	42-1676
	Mtg. Nut	W-2157
46.	Condenser (.004 mfd., 200 volts)	61-0128
47.	Condenser (.01 mfd., 400 volts)	61-0100
48.	Condenser (.0015 mfd., 600 volts)	30-4621
49.	Output Transformer	32-8175

To improve the audio power output resistor (52) ohms was changed to 680 ohms 33-168336.

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SPECIFICATIONS

MODELS 42-124T, 42-125K

Models 42-124T and 42-125K are similar in design with the exception of the cabinets, speaker and loop aerial. Model 42-124T is assembled in a table type cabinet and Model 42-125K in a console cabinet (Floor Model). The loop aerial in Model 42-125K is rotatable from the front of the cabinet. **Circuit Description:** Five (5) tube battery operated superheterodyne circuit with two tuning bands covering 540 to 1720 K.C. and 5.7 to 15.5 M.C.; Tone Control; Bass compensation in the volume control circuit; Automatic Volume Control; Pentode Audio Output stage; two I. F. amplifier stages; High output permanent magnet speaker; Loop Aerial; Low current drain Philco LOKTAL Farm Radio Tubes; "ON-OFF" indicator, and a glass dial scale.

INTERMEDIATE FREQUENCY: 455 K.C.

AUDIO OUTPUT: 180 Milliwatts

BATTERY REQUIRED: Philco Type P-4001IL

BATTERY CURRENT DRAIN: "A" Filament 1.5 Volts, 300 ma.
"B" Plate 90 Volts, 12 ma.

PHILCO TUBES USED: XX8, converter; 1LN5, 1st I. F. amplifier; 1LN5, 2nd I. F. amplifier; 1LH4, 2nd detector, 1st audio, and a 1LB4, audio output.

CABINET DIMENSIONS:

	Height	Width	Depth
Model 42-124	13½"	18⅛"	8⅛"
Model 42-125	38"	27"	10⅝"

MODEL 42-126

CIRCUIT DESCRIPTION: Model 42-126 is a six (6) tube battery operated superheterodyne circuit with two tuning bands covering 540 to 1720 K.C. and 5.7 to 15.5 M.C.; Six (6) push buttons for automatically tuning in six stations; tone control; bass compensation in the volume control circuit; automatic volume control; pentode audio output stage; two I. F. amplifier stages; high output permanent magnet speaker; loop aerial and provisions for an outside aerial; low current drain Philco LOKTAL Farm Radio tubes; "ON-OFF" indicator; a glass dial scale and assembled in a table type cabinet.

INTERMEDIATE FREQUENCY: 455 K.C.

AUDIO OUTPUT: 180 Ma.

BATTERY REQUIRED: Philco Type P-6001IL

BATTERY CURRENT DRAIN: "A" (Filament) 1.5 Volts, 300 ma.
"B" (Plate) 90 Volts, 12 ma.

PHILCO TUBES USED: 1LE3, oscillator; 1LE3, converter; 1LN5, 1st I, F. amplifier; 1LN5, 2nd I. F. amplifier; 1LH4, 2nd detector, 1st audio, and a 1LB4, audio output.

CABINET DIMENSIONS:

Height	Width	Depth
13⅜"	20¼"	10"

AERIAL AND GROUND

Under ordinary receiving conditions the loop aerial in these models has ample pick-up for reception of Broadcast Stations. Unusual receiving conditions, however, may necessitate the use of an external aerial for maximum performance. When an outdoor aerial is required, the Philco Farm Radio Aerial, Part No. 40-6383, is recommended. To connect the outdoor aerial remove the wire and lug from underneath the screw adjacent to the terminal panel at the rear of the chassis. Attach the aerial lead-in wire to this wire.

A good ground connection is also necessary when using an outdoor aerial. The ground wire can be connected to the chassis screw adjacent to the loop terminal panel. The ground wire should be attached to a water pipe, radiator pipe or a four-foot metal pipe driven into moist earth.

INSTALLING BATTERY IN MODELS 42-124, 42-126

A space is provided underneath the chassis for a battery. When installing the battery it should be inserted so that the battery socket is in the upper right hand corner, viewing the radio from the rear. Push battery forward gently until it strikes battery retaining blocks.

INSTALLING BATTERY IN MODEL 42-125

Stand battery on end so that it rests on shelf in corner of cabinet opposite loop. Push battery forward until it fits in space between speaker baffle and cabinet side.

SETTING AND OPERATING ELECTRIC PUSH-BUTTONS, MODEL 42-126

Select six of your most dependable broadcast stations and remove their call letters from the station call letter tab sheets supplied. Place the call letters in the windows above the buttons, making sure that each button covers the frequency of the station for which it is to be used. The frequencies of these stations may be found by consulting any station list. The frequency range of the buttons and the corresponding padder is as follows:

PADDER SCREW (right to left view from rear)	Circuit	BUTTONS (left to right view from front)	Freq. Range
1	Ant.	1	540-1030 K.C.
2	Osc.		
3	Ant.	2	650-1100 K.C.
4	Osc.		
5	Ant.	3	650-1100 K.C.
6	Osc.		
7	Ant.	4	740-1240 K.C.
8	Osc.		
9	Ant.	5	1160-1600 K.C.
10	Osc.		
11	Ant.	6	1160-1600 K.C.
12	Osc.		

The left-hand button, looking at the front of the cabinet, corresponds to the two right-hand padder screws, looking at the rear, and covers the lowest frequency range.

With the control in "BDCST" position, tune in the station whose call letters appear above the left-hand button. Then depress the left-hand button, turn the knob to "PB" position and tune in this station by rotating the No. 2 "Osc" screw. (NOTE: Inherent characteristics of these padders may cause some of them to cover a lower range than required to cover the broadcast band. This may cause the radio to howl or flutter when a station button is depressed. To correct this, loosen the "ANT" padder corresponding to the depressed station button). Turn the "OSC" screw slowly and listen carefully or the station may be passed without noticing it. After the "OSC" screw has been adjusted for maximum volume, the corresponding "ANT" screw should be adjusted for maximum. For some stations, it may be necessary to readjust the "OSC" screw after the "ANT" screw has been set. Switching from "BDCST" to "PB" will enable you to make sure you have the correct station tuned in accurately. When the first station has been set, the same procedure should be followed for the remaining buttons, first tuning in the desired station by means of the "Dial Tuning" control.

Failure To Operate On Low Frequency End of Broadcast Band Models 42-124, 125, 126

Some complaints may be received on the above models that the sets will not operate on the low end of the broadcast band when the "A" battery voltage goes below 1.2 volts.

In some cases the condition can be corrected simply by replacing the oscillator tube. In other cases, however, it will be necessary to change the oscillator coil, using a new coil, Part No. 32-3879. In addition, the grid resistor No. 10 in the wiring diagram of Service Bulletin No. 390 should be shunted with a 220,000 ohm resistor, such as Philco Part No. 33-422339.

After the oscillator coil has been replaced, it is necessary to repad the receiver according to service instructions. Should any difficulty be experienced in padding the high frequency end of the broadcast band, the lead from the high frequency broadcast padder to the wave switch should be dressed away from the sub-base.

ALIGNING R. F. AND I. F. COMPENSATORS

MODELS 42-124, 42-125, 42-126

EQUIPMENT REQUIRED

SIGNAL GENERATOR: Covering the frequency bands of the radios, Philco Model 070 (A.C. operated and covering 120 K.C. to 70 M.C.) or Model 177 signal generator (battery operated and covering 115 K.C. to 36000 M.C.) are recommended.

ALIGNING INDICATOR: To accurately adjust the compensators, a vacuum tube volt meter similar to Philco Models 027 is required. Model 027 vacuum tube voltmeter also contains an audio output meter which may be used as an aligning indicator. The method of connecting either of these instruments is listed below.

ALIGNING TOOLS: Fiber handle screwdriver, Philco part No. 45-2610.

CONNECTING ALIGNING INSTRUMENTS

Either the vacuum tube voltmeter or the audio output meter may be used as an aligning indicator when adjusting the compensators.

VACUUM TUBE VOLTMETER: To use the vacuum tube voltmeter as an aligning indicator it should be connected to the A.V.C. circuit as follows:

1. Connect the negative (−) terminal of the vacuum tube voltmeter through a 2 megohm resistor to any point in the circuit where the A.V.C. voltage can be measured.
2. Connect the positive (+) terminal to the chassis ground terminal.

AUDIO OUTPUT METER: If this type of meter is used as an aligning indicator, it should be connected as follows:

Terminal No. 1 on the loop aerial terminal panel at the rear of the chassis is provided for connecting one lead of the output meter to the voice coil of the speaker. The other lead of the meter is connected to the chassis. When using these connections the lowest A.C. scale of the meter must be used. (0 to 10 volts.)

The audio output meter can also be connected to the plate and screen terminals of the output tube.

SIGNAL GENERATOR: When adjusting the I. F. compensator the high side of the signal generator is connected through a .1 mfd. condenser to the stator lug of the aerial tuning condenser. The ground or low side of the signal generator is connected to the chassis of the receiver.

To align the "R. F." padders a test loop aerial is made from a few turns of wire and connected to the signal generator output terminals; the signal generator and loop is then placed about one foot from the loop of the radio.

The radio must be adjusted in the cabinet with the battery and loop in place.

After connecting the aligning instruments, adjust the compensators in the order as shown in the tabulations below. Locations of the compensators are shown on the schematic diagram.

If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

Operations In Order	SIGNAL GENERATOR		RECEIVER				Special Instructions
	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjusting Compensators 42-124 42-125	42-126	
1	Aerial Tuning Condenser Stator Lug	455 K.C.	580 K.C.	Osc. Max. Band Switch Broadcast	30A 27A, 27B 22A, 22B	32A 26A, 26B 25A, 25B	
2	Test Loop Aerial	15 M.C.	15 M.C. Note A & B	Osc. Max. Band Switch S.W.	6B, 6A	6B, 6A	Note A Note B Note C
3	Test Loop Aerial	1700 K.C.	1700 K.C.	Band Switch Broadcast	17	17	
4	Test Loop Aerial	1500 K.C.	1500 K.C.	Band Switch Broadcast	17B	17B	
5	Test Loop Aerial	580 K.C.	580 K.C.	Band Switch Broadcast	17A	17A	Note C
6	Test Loop Aerial	1700 K.C.	1700 K.C.	Band Switch Broadcast	17	17	

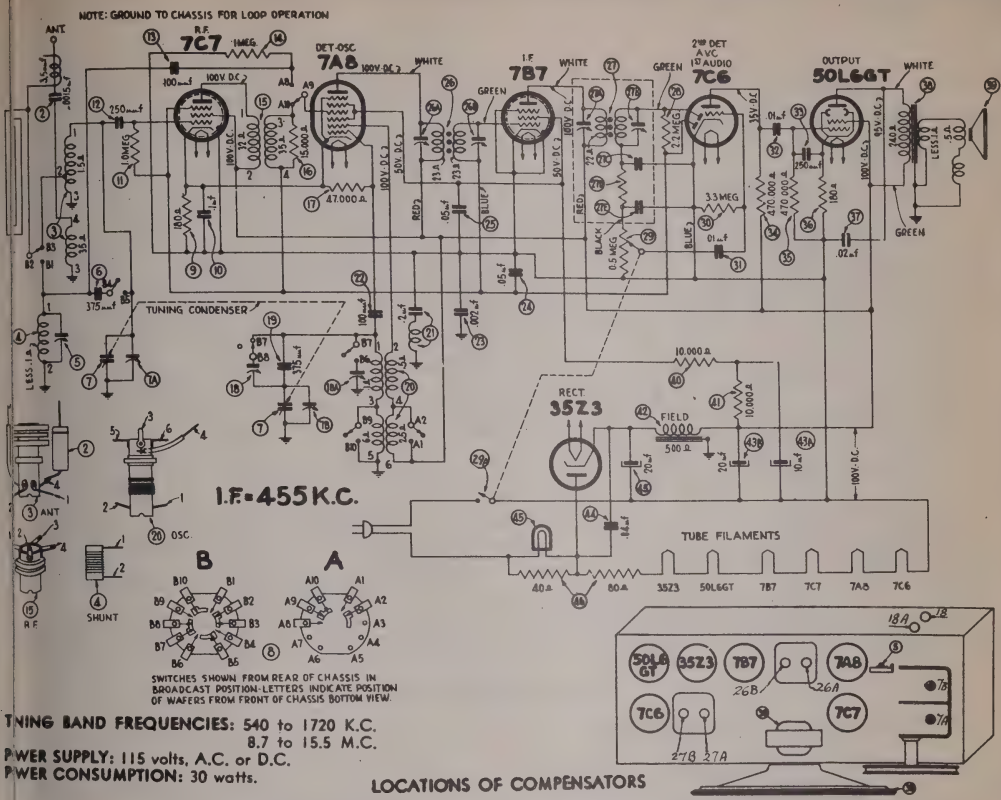
NOTE A.—Dial calibration: Before adjusting the R. F. compensators the dial pointer must be adjusted to track properly with the tuning scale. To adjust the pointer proceed as follows: With the tuning condenser in the closed position (maximum capacity) set the pointer to the center of the low frequency index line below 540 K.C. Arrangement of the tuning drive cords is shown on this page.

NOTE B.—When adjusting compensator (6B) two signal peaks may be observed on the output meter. One of these peaks is the fundamental signal (15 M.C.) and the other the image signal. The compensator should be adjusted to the fundamental signal, 15 M.C. If the compensator is correctly adjusted, the image signal will be observed on the output meter by leaving the radio dial at 15 M.C., and turning the signal generator dial to 19,090 M.C.

NOTE C.—When adjusting the low frequency compensator (17A) or the aerial padder (6A) of the high frequency tuning range; the receiver Tuning Condenser must be adjusted (rolled) as follows: First, tune the compensator for maximum output, then, vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

PHILCO RADIO & TELEVISION CORP.

MODEL 42-322



TUNING BAND FREQUENCIES: 540 to 1720 K.C.
8.7 to 15.5 M.C.

POWER SUPPLY: 115 volts, A.C. or D.C.

POWER CONSUMPTION: 30 watts.

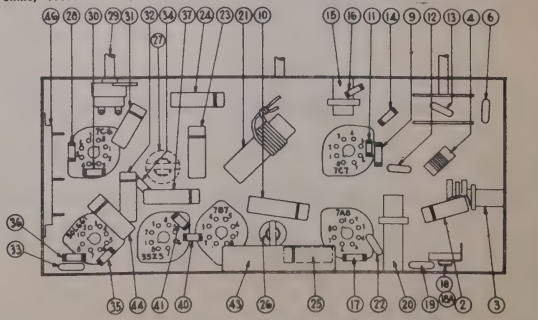
LOCATIONS OF COMPENSATORS

REPLACEMENT PARTS—MODEL 42-322, CODE 121

Schem. No.	Description	Part No.
1.	Loop Aerial	76-1389
	Mtg. Screw	W-2073
2.	Condenser (.0015 mfd.) 600 volts	30-4621
3.	Broadcast Aerial Transformer	32-3857
	Mtg. Clip	28-5002
4.	Short Wave Aerial Transformer	32-3858
5.	Compensator (S.W. Aerial)	31-6426
6.	Mica Condenser (375 mmfd.)	20-037511
7.	Tuning Condenser	31-2605
7a.	Compensator (Broadcast Aerial)	Part of 7
7b.	Compensator (Broadcast Osc.)	Part of 7
	Drive Cord	31-2604
	Spring	28-9000
	Drive Shaft	76-1396
	"C" Washer	28-5990
	Pointer	56-2076
	Rubber Grommet	27-4596
	Mtg. Sleeve	28-5665
	Mtg. Washer	W-410
	Mtg. Screw	W-756
8.	Band Switch	42-1712
	Mtg. Nut	W-2157
9.	Resistor (180 ohms.)	33-118336
10.	Condenser (.1 mfd., 200 volts)	61-0164
11.	Resistor (1 megohm)	33-510339
12.	Mica Condenser (250 mmfd.)	60-125157
13.	Condenser (100 mmfd.)	60-110157
14.	Resistor (1 megohm)	33-510339
15.	I. F. Transformer	32-3595
	Mtg. Clip	28-5002
16.	Resistor (15,000 ohms) Part of 15	33-315339
17.	Resistor (47,000 ohms)	33-347339
18.	Compensator (Broadcast Osc.-500 K.C.)	31-6452
18a.	Compensator (S.W. Osc.)	Part of 18
19.	Mica Condenser (375 mmfd.)	20-037511
20.	Oscillator Transformer	32-3856
	Mtg. Clip	28-5002
21.	Condenser (.2 mfd., 400 volts) and R. F. Choke	76-1198
22.	Mica Condenser (100 mmfd.)	60-110157
23.	Condenser (.002 mfd., 400 volts)	30-4579
24.	Condenser (.05 mfd., 200 volts)	30-4519
25.	Condenser (.05 mfd., 200 volts)	30-4519
26.	First I. F. Transformer	32-3859
	Mtg. Nut	W-624
27.	Second I. F. Transformer	32-3860
	Mtg. Nut	W-624
27a.	Primary Compensator	Part of 27
27b.	Secondary Compensator	Part of 27
27c.	Condenser	Part of 27a
27d.	Resistor (47,000 ohms.)	33-347339
27e.	Condenser	Part of 27a
28.	Resister (2.2 megohms)	33-522339
29.	Volume Control	33-5482
	Mtg. Nut	W-2157
30.	Resister (3.3 megohms)	33-533339
31.	Condenser (.01 mfd., 400 volts)	30-4572
32.	Condenser (.01 mfd., 400 volts)	30-4572
33.	Mica Condenser (250 mmfd.)	60-125157
34.	Resistor (470,000 ohms)	33-447339
35.	Resister (470,000 ohms)	33-447339
36.	Resistor (180 ohms)	33-118336
37.	Condenser (.02 mfd., 400 volts)	30-4516
38.	Output Transformer (For Speaker 36-1533-9)	32-8164
39.	Speaker	36-1533-9
	Cone Assembly (For Speaker 36-1533-9)	36-4190
40.	Resistor (10,000 ohms)	33-310339
41.	Resistor (10,000 ohms)	33-310339
42.	Field Coil (Replace Speaker 36-1533)	30-2530
43.	Electrolytic Condenser (10 mfd.)	Part of 43
43a.	Electrolytic Condenser (20 mfd.)	Part of 43
43b.	Electrolytic Condenser (20 mfd.)	56-1496
	Mtg. Clip	30-4119
44.	Condenser (.04 mfd., 400 volts)	34-2968
45.	Dial Lamp	76-1398
	Socket Assembly	33-3408
46.	Filament Resistor (40-80 ohms.)	

MISCELLANEOUS PARTS

Description	Part No.
Cabinet	10552-A
Cable (Power)	L-3189
Dial Scale	27-3889
Knob Assembly	54-4137
Screw (Chassis Mtg.)	W-2065
Socket (LOKTAL Tubes)	27-6177
Mtg. Rivet	W-239
Socket (Output Tube)	27-6174
Washer (Chassis Mtg.)	W-410



LOCATIONS OF PARTS—UNDER CHASSIS—MODEL 42-322

MODEL 42-322
MODEL 42-350

PHILCO RADIO & TELEVISION CORP.

MODEL 42-322 ALIGNMENT

Signal Generator: When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to the antenna section of the tuning condenser. Connect the ground or low side of the generator to the chassis.
When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removd from the cabinet. When adjusting the R. F. Compensators in the cabinet, the aligning points on the dial scale are used. If the radio is adjusted outside of the cabinet, the small indentations (lines) on the dial metal background plate mounted on the chassis are used as aligning points. These points progressing from the left end of the scale plate represent frequencies as follows: pointer position with tuning condenser closed, 580 K.C., 9.5 M.C., 1500 K.C., 15 M.C., and the last line 1720 K.C. or 15.5 M.C.
When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled.

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Lug on the Ant. Section of Tuning	455 K.C.	540 K.C. Tuning Cond. Closed	Vol. Max. Range Switch Brdcst.	27A, 27B 26A, 26B	
2	Loop See Above Instructions	1500 K.C.	1500 K.C.	Vol. Max. Band Switch Brdcst.	7B, 7A	Note A
3	Loop See Above Instructions	580 K.C.	580 K.C.	Vol. Max. Band Switch Brdcst.	(1B)	Roll Tuning Condenser
4	Loop See Above Instructions	Repeat Operation 2				
5	Loop See Above Instructions	15 M.C.	15 M.C.	Band Switch S.W.	(1BA, 5) Note B	Roll Tuning Condenser When Padding 5

NOTE A—DIAL POINTER CALIBRATION: In order to adjust the receiver correctly, the pointer must be adjusted to track properly with the tuning condenser. To do this, turn the tuning condenser to the maximum capacity (plates fully meshed). With the condenser in this position, set the tuning pointer on the first small line stamped in the scale plate on the left side.

NOTE B—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator (1BA) to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second peak is obtained on the output meter. Adjust the compensator for maximum output at this second peak.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the signal generator dial 910 K.C. above the frequency being used on any high frequency range.

The aerial padder (5) must be adjusted to maximum by rolling the tuning condenser. If two signal peaks occur when turning the padder, adjust to maximum output on the first signal peak from the tight position (screw all the way down) of the padder.

-Model L42-350, Code 121

EXTERNAL AERIAL CONNECTIONS

The built-in aerial system is designed to operate without an outside aerial or ground and to give exceptionally high receiving performance of stations in the standard, shortwave, or FM bands.

To operate the radio in steel reinforced buildings and other shielded locations where signal strength is weak, an external aerial is recommended. Three different types of aerial combinations are available, to improve reception on the the standard, short-wave, or FM bands.

1—For Additional Sensitivity on Frequency Modulation only:

*Philco Dipole Outdoor Aerial, Part No. 45-2926.

The plug at the end of the transmission line is inserted in the socket at the back of the chassis in place of the plug connected to the F. M. loop in the cabinet.

2—For Additional Sensitivity on ALL ranges:

*Philco Dipole Outdoor Aerial, Part No. 45-2926.

Philco Aerial Coupler, Part No. 45-1361.

The coupler plugs into the socket at the back of the chassis in place of the plug connected to the F. M. loop. The aerial transmission line then connects to the terminals on the coupler marked "red" and "black." The local-distance switch on the coupler connects or disconnects the outdoor aerial from the standard broadcast and shortwave tuning ranges. The dipole remains connected to the F. M. band regardless of the position of the switch.

3—For Additional Sensitivity on Standard Broadcast and Shortwave only in Areas where F. M. reception is not available.

Philco Safety Aerial, Part No. 40-6370.

Philco Aerial Coupler, Part No. 45-1361.

Connect the single wire lead in of the aerial to the "black" terminal on the aerial coupler.

*Accessories for this aerial are the Philco Aerial Mast Kit, the Philco Reflector Kit and Philco High Efficiency Transmission Line. See Service Bulletin No. 396 on Dipole Aerials.

NOTE: When installing the F. M. Philco Outdoor Dipole Aerial, it is very important that the aerial compensating condensers of the standard and shortwave band are repadded.

ELECTRIC PUSH-BUTTON TUNING ADJUSTMENTS

The electric push-button tuning mechanism consists of six (6) push-buttons. Five of the push-buttons are used for selecting standard broadcast stations, and one for the power control (ON-OFF).

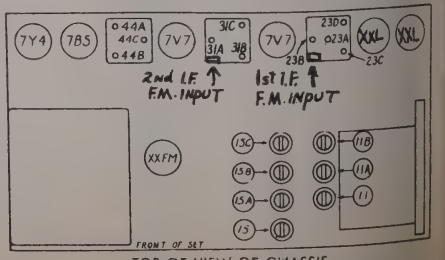
Viewing the front of the cabinet from left to right the first push-button is the power control (ON-OFF), the next five push-buttons for tuning standard broadcast stations.

When setting up stations on the push-buttons the lowest frequency station is set up in the second push-button from the left and and the remaining stations according to increasing frequency in the next four push-buttons. These push-buttons are adjusted by the padders located on the rear of the chassis.

The frequency ranges covered by the station tuning push-buttons and procedure for adjusting are as follows:

Padders (right to left from rear)	Circuit	Buttons (left to right from front)	Frequency Range
1	Ant.	1	ON-OFF
2	Osc.	2	540 to 980 KC
3	Ant.	3	540 to 980 KC
4	Osc.		
5	Ant.	4	710 to 1185 KC
6	Osc.		
7	Ant.	5	850 to 1600 KC
8	Osc.		
9	Ant.	6	1185 to 1720 KC
10	Osc.		

The second push-button from the left can also be adjusted for reception of the sound channel of a television program received by special Philco television radios. This push-button may also be used in conjunction with a Philco Wireless Record Player.



TOP OF VIEW OF CHASSIS
FIG. 1—LOCATIONS OF R. F. AND I. F. COMPENSATORS

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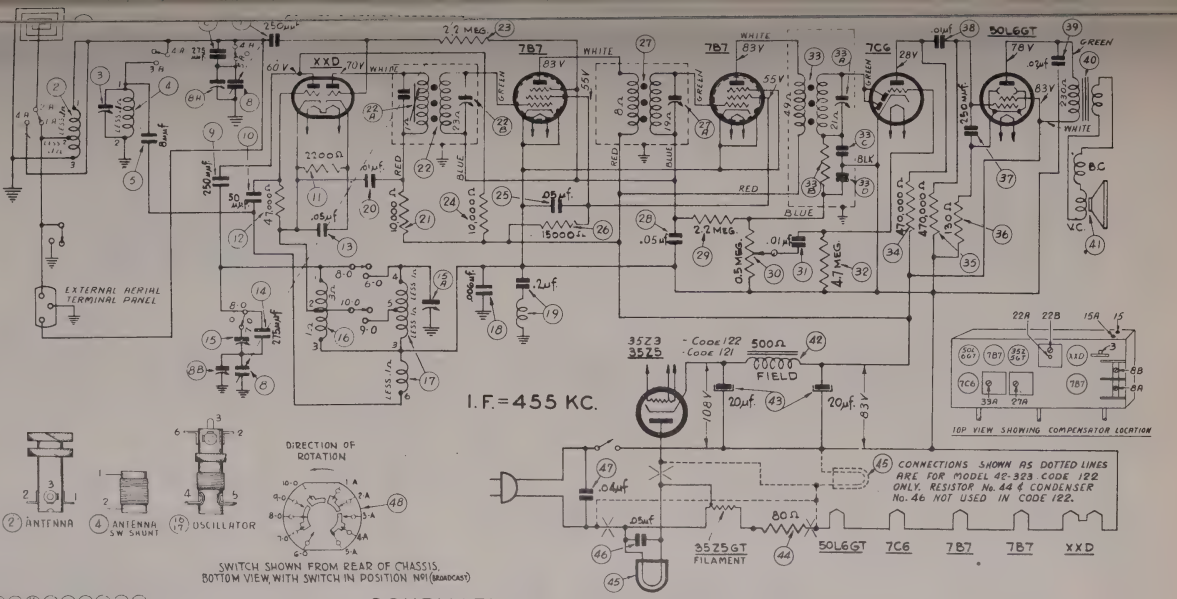

SCHEMATIC DIAGRAM MODEL 42-323

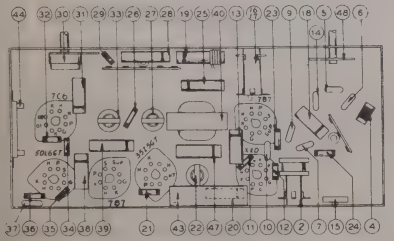

FIG. 1—PART LOCATIONS, UNDERSIDE OF CHASSIS, MODEL 42-323

The D. C. voltages indicated at the tube elements in the above diagram were measured with a 1000 ohms per volt voltmeter. Philco Model 027. Line voltage, 117 volts A. C. No signal being received—range switch broadcast.

Model 42-323 is manually tuned and is assembled in a table type cabinet. Codes 121 and 122 differ only in the pilot lamp, rectifier tube and bias resistor. These differences are indicated on the part list and diagram.

Intermediate Frequency: 455 KC.
Tuning Bands: 540 to 1720 KC; 9 to 15.5 MC.
Audio Output: 1 watt.
Power Supply: 115 volts, A. C. or D. C.

The cabinet Part No. for code 122 is 10565B. The cabinet Part No. 10565A is used with Code 121 models.

Correction: Diagram The rectifier tube is listed as a 35Z3GT. The correct designation is 35Z3.

FOR ALIGNMENT, PARTS LIST, AND OTHER DATA, SEE INDEX

MODEL 42-323
MODEL 42-327

PHILCO RADIO & TELEVISION CORP.

REPLACEMENT PARTS—Model 42-323

Sch. No.	Description	Part No.
1.	Loop Aerial	76-1279
	Mtg. Screw	W-2071
2.	Aerial Transformer (Broadcast)	32-3750
	Mtg. Clip	28-5002
3.	Compensator (Aerial-S. W.)	31-6426
4.	Aerial Transformer (S. W.)	32-3751
5.	Mica Condenser (8 mmfd)	60-080127
6.	Mica Condenser (275 mmfd)	30-1200
7.	Mica Condenser (250 mmfd)	60-125157
8.	Tuning Condenser	31-2555
	Drive Cord	31-2553
	Drive Shaft	76-1323
	"C" Washer	28-5990
	Mtg. Screw (Cond.)	W-758
	Rubber Grommet (2 required)	27-4596
	Rubber Grommet (1 required)	54-4020
	Spring (Drive Cord)	28-8954
	Sleeve	28-5663
	Washer	W-410
8A.	Compensator (Aerial—1500 KC), Part of 8	
8B.	Compensator (Oscillator—1720 KC), Part of 8	
9.	Mica Condenser (250 mmfd)	60-125157
10.	Mica Condenser (50 mmfd)	60-050157
11.	Resistor (2200 ohms)	33-222339
12.	Resistor (47,000 ohms)	33-347339
13.	Condenser (.05 mfd, 200 volts)	30-4519
14.	Mica Condenser (275 mmfd)	30-1200
15.	Compensator (Brdcst.— { Code 121 580 KC) { Code 122	31-6434 31-6453
15A.	Compensator (S. W.—15 MC),	
16.	Oscillator Transformer (Broadcast)	32-3715
17.	Oscillator Transformer (S. W.) Part of 16	
18.	Condenser (.006 mfd, 400 volts)	30-4591
19.	Condenser, .2 mfd, and R. F. Choke Assembly	76-1161
20.	Condenser (.01 mfd, 400 volts)	30-4572
21.	Resistor (10,000 ohms)	33-310339
22.	1st I. F. Transformer	32-3711
22A.	Compensator, Part of 22	
22B.	Compensator, Part of 22	
	Nut	W-1949
23.	Resistor (2.2 megohms)	33-522339
24.	Resistor (10,000 ohms)	33-310339
25.	Condenser (.05 mfd, 200 volts)	30-4519
26.	Resistor (15,000 ohms)	33-315339
27.	2nd I. F. Transformer	32-3712
	Nut	W-1949
27A.	Secondary Compensator, Part of 27	
28.	Condenser (.05 mfd, 200 volts)	30-4519
29.	Resistor (2.2 megohms)	33-522339
30.	Volume Control (.5 megohm)	33-5468
	Mtg. Nut	W-2157
31.	Condenser (.01 mfd, 400 volts)	30-4572
32.	Resistor (4.7 megohms)	33-547339
33.	3rd I. F. Transformer	32-3713
	Nut	W-1949
33A.	Secondary Compensator, Part of 33	
33B.	Resistor (47,000 ohms), Part of 33	
33C.	Condenser (100 mmfd), Part of 33A	
33D.	Condenser (100 mmfd), Part of 33A	
34.	Resistor (470,000 ohms)	33-447339
35.	Resistor (470,000 ohms)	33-447339
36.	Resistor (130 ohms)	33-113336
37.	Mica Condenser (250 mmfd)	60-125157
38.	Condenser (.01 mfd, 400 volts)	30-4572
39.	Condenser (.02 mfd, 400 volts)	30-4516
40.	Output Transformer	32-3173
41.	Speaker	36-1544-9
	Cone Assembly (For Speaker 36-1544-9)	36-4190
42.	Field Coil (Replace Speaker 36-1544)	
43.	Electrolytic Condenser (20, 20 mfd)	30-2503
	Clamp	56-1466
44.	Filament Resistor (Code 121 only)	33-3406
45.	Pilot Lamp (Code 121)	34-2068
	(Code 122)	34-2477
46.	Condenser (.05 mfd, 200 volts) (Code 121 only)	30-4519
47.	Condenser (.04 mfd, 400 volts)	30-4119
48.	Band Switch	42-1671

Sch. No.	Description	Part No.
	Miscellaneous Parts	
	Cabinet	10586-A
	Cable (Power)	L-2199
	Dial Scale	27-5762
	Dial Pointer	56-3076
	Knob (Tuning, Volume, Band)	54-4131
	Socket Assembly (Pilot Lamp) (Code 121)	76-1177
	Socket Assembly (Pilot Lamp) (Code 122)	76-1282
	Socket (Aerial)	27-6145
	Rivet	W-207
	Socket (Loktal Tubes)	27-6177
	Socket (Octal Tubes)	27-6174
	Rivet	W-239
	Screw (Chassis Mtg.)	W-2080
	Washer (Chassis Mtg.)	W-410

REPLACEMENT PARTS—Model 42-327

Sch. No.	Description	Part No.
1.	Loop Aerial	76-1279
	Mtg. Screw	W-2071
1A.	External Aerial Socket	27-6145
	Rivet	W-207
2.	Aerial Transformer (Broadcast)	32-3714
	Mtg. Clip	28-5002
3.	Compensator (Aerial—S. W.)	31-6426
4.	Aerial Transformer (S. W.)	32-3716
	Mtg. Clip	28-5002
5.	Mica Condenser (5 mmfd)	60-005127
6.	Mica Condenser (275 mmfd)	30-1200
7.	Mica Condenser (250 mmfd)	60-125157
8.	Tuning Condenser	31-2555
	Drive Shaft	76-1276
	"C" Washer	28-5990
	Drive Cord	31-2553
	Rubber Grommet	27-4596
	Rubber Grommet	54-4020
	Sleeve	28-5665
	Spring (Drive Cord)	28-8954
	Screw	W-758
	Washer	W-410
9.	Mica Condenser (250 mmfd)	60-125157
10.	Mica Condenser (50 mmfd)	60-050157
11.	Resistor (2200 ohms)	33-222339
12.	Resistor (47,000 ohms)	33-347339
13.	Condenser (.05 mfd, 200 volts)	30-4519
14.	Mica Condenser (275 mmfd)	30-1200
15.	Compensator (Broadcast—580 KC)	31-6434
16.	Push-Button Switch	42-1708
17.	Push-Button Compensator Assembly	31-6434
	Mtg. Screw	W-1974
18.	Oscillator Transformer (Broadcast)	32-3715
	Mtg. Clip	28-5002
19.	Oscillator Transformer (S. W.), (Part of 18)	
20.	Condenser (.006 mfd, 400 volts)	30-4445
21.	Condenser (.2 mfd and R. F. Choke Assembly)	76-1161
22.	Resistor (10,000 ohms)	33-310339
23.	Condenser (.01 mfd, 400 volts)	30-4572
24.	1st I. F. Transformer	32-3711
	Mtg. Nut	W-1949
24A.	Compensator Primary of (24)	
24B.	Compensator (Part of 24)	
24C.	Condenser (Part of 24)	
25.	Resistor (2.2 megohms)	33-522339
26.	Resistor (10,000 ohms)	33-310339
27.	Resistor (15,000 ohms)	33-315339
28.	Condenser (.05 mfd, 200 volts)	30-4519
29.	2nd I. F. Transformer	32-3712
	Mtg. Nut	W-1949
29A.	Compensator (Part of 29)	
30.	Condenser (.05 mfd, 200 volts)	30-4519
31.	Resistor (2.2 megohms)	33-522339
32.	Volume Control	33-5468
	Mtg. Nut	W-2157
33.	Condenser (.01 mfd, 400 volts)	30-4572
34.	Resistor (4.7 megohms)	33-547339
35.	3rd I. F. Transformer	32-3713
35A.	Compensator (Part of 35)	
35B.	Resistor (Part of 35)	
35C.	Condenser (Part of 35A)	
35D.	Condenser (Part of 35A)	
36.	Resistor (470,000 ohms)	33-447339
37.	Resistor (470,000 ohms)	33-447339
38.	Resistor (130 ohms)	33-113336
39.	Mica Condenser (250 mmfd)	60-125157
40.	Condenser (.01 mfd, 400 volts)	30-4572
41.	Condenser (.02 mfd, 400 volts)	30-4516
42.	Output Transformer	32-3173
43.	Speaker	36-1544-9
	Cone Assembly (For Speaker 36-1544-9)	36-4190
44.	Electrolytic Condenser (20-20 mfd)	30-2503
	Mtg. Clamp	56-1466
45.	Field Coil (Replace Speaker 36-1544)	
46.	Filament Resistor (30 ohms) (Used in Code 121 only)	33-3406
47.	Pilot Lamp (6 volts—Code 121)	34-2068
	Socket Assembly (Code 121)	76-1177
	Pilot Lamp (115 volts—Code 122)	34-2477
	Socket Assembly (Code 122)	76-1282
48.	Condenser (.05 mfd, 200 volts) (Used in Code 121 only)	30-4519
49.	Condenser (.04 mfd, 400 volts)	30-4119
50.	Band Switch	42-1668

Sch. No.	Description	Part No.
	Miscellaneous Parts	
	Cable (Power)	L-2199
	Cabinet (Complete)	10661-A
	Dial Scale	27-5754
	Dial Pointer	56-3076
	Escutcheon (Push-Button)	54-2388
	Mtg. Screw	W-2071
	Knob (Tuning, Volume, Tone)	54-4131
	Knob (Push-Button)	54-4135
	Socket (Tubes)	27-6177
	Rivet	W-239
	Screw (Chassis Mtg.)	W-765
	Terminal Panel	76-1307
	Terminal Panel	27-5733
	Tab (ON-OFF)	27-5737
	Tab Cover	27-5737
	Tab Kit	40-6660
	Washer (Chassis Mtg.)	W-410

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The following procedure is used for all models:

EQUIPMENT REQUIRED

1. **SIGNAL GENERATOR:** Covering the frequency range of the receiver, such as Philco Model 070.
2. **ALIGNING INDICATOR:** Either a vacuum tube voltmeter or an audio output meter may be used as an aligning indicator. Philco Models 027 and 028 circuit testers contain both these meters.
3. **TOOLS:** Philco Fiber Screw Driver, Part No. 45-2610.

CONNECTING ALIGNING INSTRUMENTS

Audio Output Meter: If this type of aligning meter is used, connect it to the voice coil terminals of the speaker or from the plate of the 35A5 tube to the chassis. Adjust the meter for the 0 to 10 volt scale.

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator, make the following connections: Attach the negative (—) terminal of the voltmeter to any point in the circuit where the A. V. C. voltage can be obtained. Connect the positive (+) terminal of the vacuum tube voltmeter to the chassis.

Signal Generator: When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to the antenna section of the tuning condenser. Connect the ground or low side of the generator to the chassis.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet.

In order to adjust the radio outside of the cabinet the dial scale should be removed from the cabinet and placed on the dial background plate. The dial scale can be held in position by clips or rubber bands. The loop aerial should also be placed in approximately the same position around or near the chassis as when assembled.

After connecting the aligning instruments adjust the compensators as shown in the tabulation below. Locations of the compensators are shown in the schematic diagram of each model.

If the indicating meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

PROCEDURE—MODELS 42-323; 42-327; 42-340; 42-360

Operations in Order	SIGNAL GENERATOR		RECEIVER					Special Instructions
	Output Connections to Radio	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order — Models 42-323	42-327	42-340	42-360	
1	Aerial Section Tuning Condenser	455 KC	540 KC	Vol. Max. Band Switch Brdcst.	22A 22B 27A 33A	24A 24B 29A 35A	15A 15B 18A 32A	25A 25B 29A 37A	
2	Loop (See above Instructions)	1720 KC	1720 KC	"	8B	8B	7	14A	Note A
3	"	1500 KC	1500 KC	"	8A	8A	23	4	
4	"	580 KC	580 KC	"	15	15	23B	4A	Roll Tuning Condenser Note B
5	Repeat Operation 2								
6	"	15.5 MC	15.5 MC	Band Switch S. W.	15A 3	15A 3	7A 23A	14 12	Note C

PROCEDURE—MODELS 42-345; 42-365

Operations in Order	SIGNAL GENERATOR		RECEIVER				Special Instructions
	Output Connections to Radio	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order — Models 42-345	42-365	
1	Aerial Section Tuning Condenser	455 KC	540 KC	Vol. Max. Band Switch "Brdcst."	29A 29B 32A 34A	29A 29B 32A 41A	
2	Loop (See above Instructions)	1720 KC	1720 KC	"	15	6B	Note A
3	"	1500 KC	1500 KC	"	9	13	
4	"	580 KC	580 KC	"	9B	13A	Roll Tuning Condenser Note B
5	Repeat Operation 2						
6	"	6.7 MC	6.7 MC	Band Switch "Police"	15A	6A	
7	"	15.5 MC	15.5 MC	Band Switch S. W.	15B Osc. 9A Aer.	6 Osc. 4	Note C

NOTE A.—Adjusting Dial Pointer: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceeed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the first mark below 540 KC.

NOTE B.—When adjusting the low frequency compensator (Broadcast) or the aerial padders of the high frequency tuning range; the receiver tuning condenser must be adjusted (rolled) as follows: First, tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C.—Turn tuning condenser until pointer is on 15.5 MC mark, then adjust oscillator compensator to maximum on the second signal peak from the tight position (compensator closed). The Short Wave Aerial padder should then be "rolled" to maximum on the 15 MC signal. See Note B.

John F. Rider

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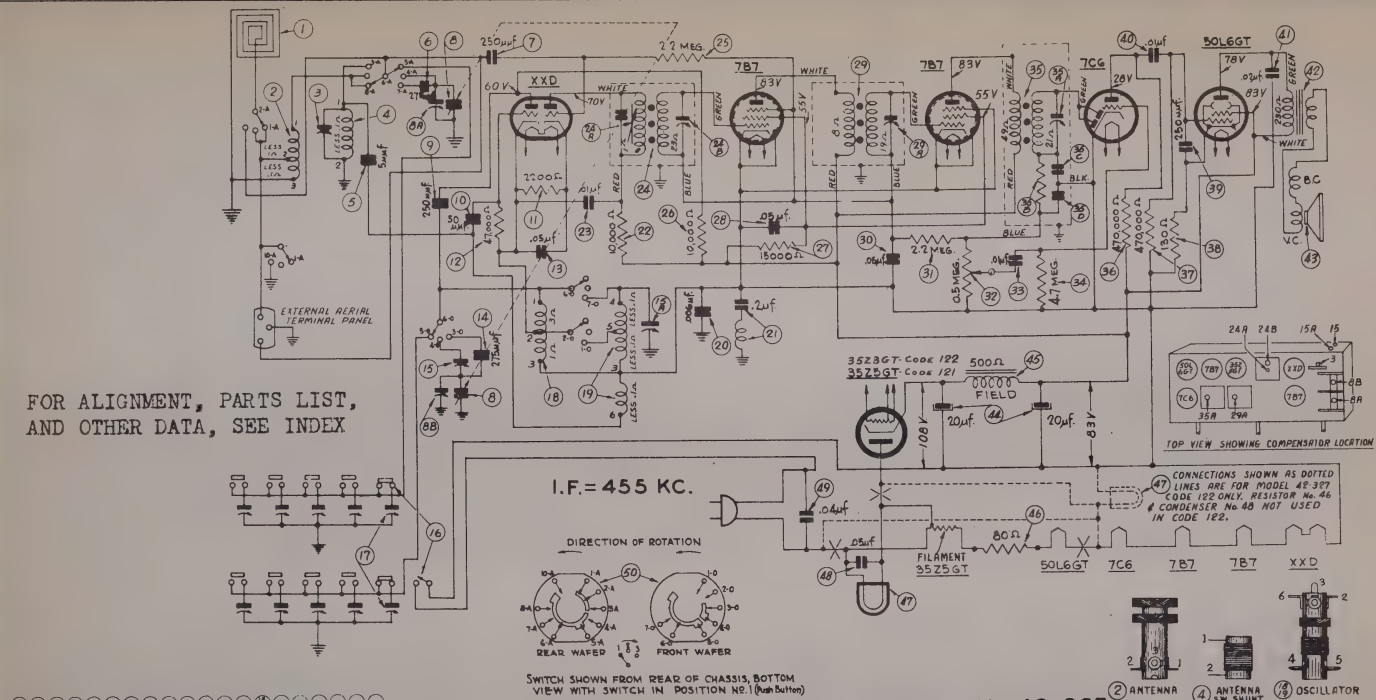
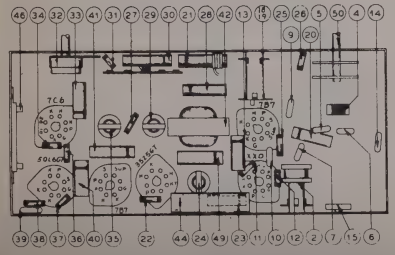


SCHEMATIC DIAGRAM MODEL 42-327



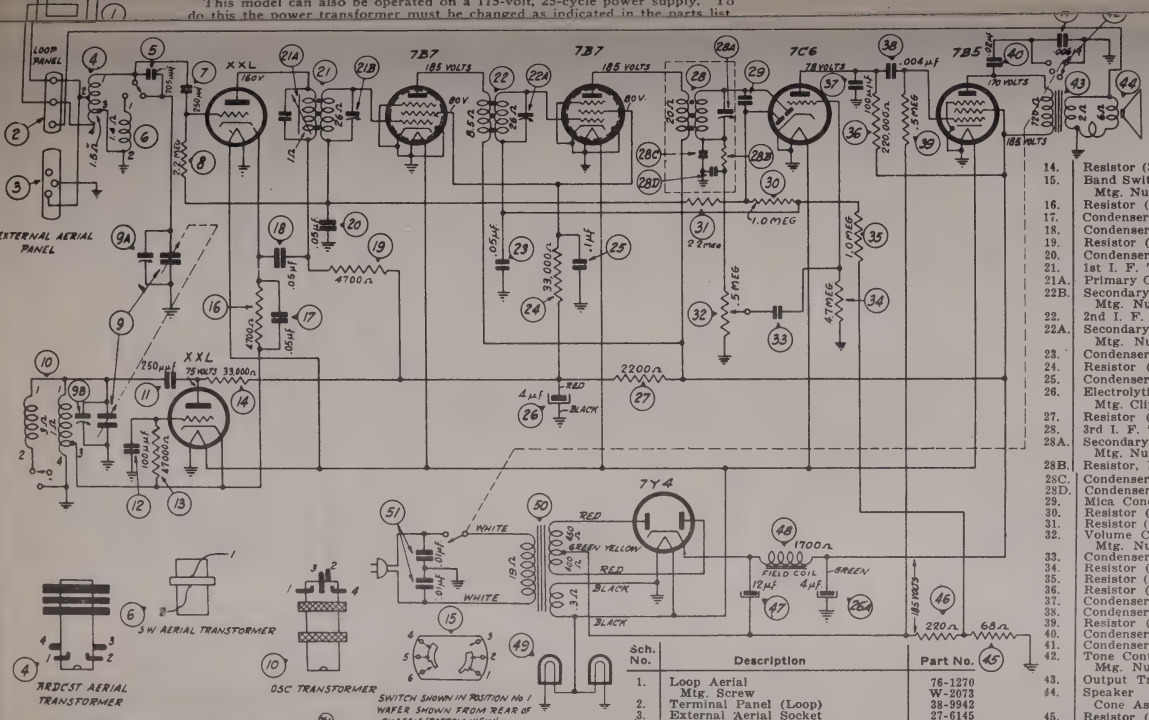
-PART LOCATIONS, UNDERSIDE OF CHASSIS, MODEL 42-327

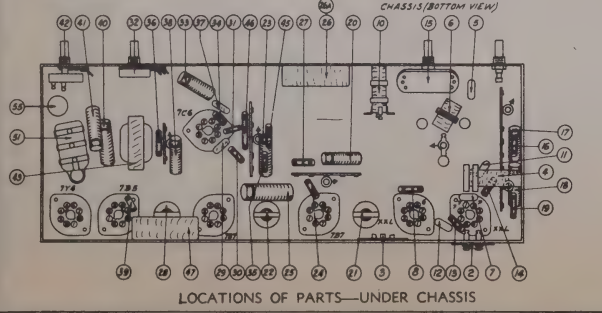
The D. C. voltages indicated at the tube elements in the above diagram were measured with a 1000 ohms per volt voltmeter. Philco Model 027. Line voltage, 117 volts A. C. No signal being received—range switch broadcast.

Model 42-327 incorporates electric push-button tuning in addition to manual tuning and is assembled in a table type cabinet. Codes 121 and 122 differ only in the type of pilot lamp, rectifier tube and bias resistor. These differences are indicated on the part list and diagram. The electric push-button tuning mechanism consists of six (6) push-buttons. One push-button is used to control (ON-OFF) the power to the radios. The remaining five (5) push-buttons automatically tune in stations. The procedure for adjusting and operating the push-buttons will be found in the instructions supplied with the radio.

IF PEAK 455 KC
TUNING BANDS: 540-1720 KC; 9-15.5 MC
AUDIO OUTPUT: 1 WATT
POWER SUPPLY: 115 V, AC-DC

This model can also be operated on a 115-volt, 25-cycle power supply. To do this the power transformer must be changed as indicated in the parts list.





LOCATIONS OF PARTS—UNDER CHASSIS

Sch. No.	Description	Part No.
1.	Loop Aerial	76-1270
	Mtg. Screw	W-2073
2.	Terminal Panel (Loop)	38-9942
3.	External Aerial Socket	27-6145
4.	Aerial Transformer	32-3697
	Mtg. Clip	28-5002
5.	Mica Condenser (705 mmfd)	60-171187
6.	Aerial Transformer (Police)	32-3698
7.	Condenser (250 mmfd)	60-125257
8.	Resistor (2.2 megohms)	33-522339
9.	Tuning Condenser	31-2544
9A.	Aerial Compensator, Part of 9	
9B.	Oscillator Compensator, Part of 9	
	Drive Drum (Tuning Cond.)	38-9883
	Drive Shaft Assembly	56-6152
	"C" Washer	28-2043
	Drive Cord (Tuning Cond.)	31-2546
	Drive Cord (Pointer)	31-2547
	Mounting Rubber (Tuning Cond.)	27-4596
	Mounting Sleeve (Tuning Cond.)	28-3806
	Mounting Washer	W-151
	Mounting Screw	W-2002
	Pulleys (Drive Cord)	54-4045
	Mtg. Stud	28-6946
	Spring (Cond. Drive)	28-8751
	Spring (Pointer Drive)	28-8953
10.	Oscillator Transformer	32-3568
	Mtg. Clip	28-5002
11.	Mica Condenser (250 mmfd)	60-125257
12.	Mica Condenser (100 mmfd)	60-110257
13.	Resistor (47,000 ohms)	33-347339
14.	Resistor (33,000 ohms)	33-333339
15.	Band Switch	42-1664
	Mtg. Nut	W-2157
16.	Resistor (4700 ohms)	33-247339
17.	Condenser (.05 mfd, 200 volts)	30-4519
18.	Condenser (.05 mfd, 400 volts)	30-4518
19.	Resistor (4700 ohms)	33-247339
20.	Condenser (.05 mfd, 200 volts)	30-4519
21.	1st I. F. Transformer	32-3734
21A.	Primary Compensator, Part of 21	
22B.	Secondary Compensator, Part of 21	
	Mtg. Nut	W-1949
22.	2nd I. F. Transformer	32-3705
22A.	Secondary Compensator, Part of 22	
	Mtg. Nut	W-1949
23.	Condenser (.05 mfd, 400 volts)	30-4519
24.	Resistor (33,000 ohms)	33-333339
25.	Condenser (.1 mfd, 400 volts)	30-4527
26.	Electrolytic Condenser (4 mfd)	
	Mtg. Clip	56-1466
27.	Resistor (2200 ohms)	33-222339
28.	3rd I. F. Transformer	32-3640
28A.	Secondary Compensator, Part of 28	
	Mtg. Nut	W-1949
28B.	Resistor, Part of 28	
28C.	Condenser, Part of 28	
28D.	Condenser, Part of 28	
29.	Mica Condenser (100 mmfd)	60-110257
30.	Resistor (1 megohm)	33-510339
31.	Resistor (2.2 megohms)	33-522339
32.	Volume Control	33-5443
	Mtg. Nut	W-2157
33.	Condenser (.01 mfd, 400 volts)	30-4572
34.	Resistor (4.7 megohms)	33-547339
35.	Resistor (1 megohm)	33-510339
36.	Resistor (220,000 ohms)	33-422339
37.	Condenser (100 mmfd)	60-110257
38.	Condenser (.004 mfd)	30-4623
39.	Resistor (.5 megohms)	33-447339
40.	Condenser (.02 mfd, 400 volts)	30-4516
41.	Condenser (.006 mfd)	30-4591
42.	Tone Control, On-Off Switch	42-1665
	Mtg. Nut	W-2157
43.	Output Transformer	32-8172
44.	Speaker	36-1543-9
	Cone Assembly	36-4206
45.	Resistor (68 ohms, ½ watt)	33-068336
46.	Resistor (220 ohms, 1 watt)	33-122436
47.	Electrolytic Condenser	
	Mtg. Clip	56-1466
48.	Field Coil (Replace Speaker)	36-1543
49.	Pilot Lamps	34-2064
50.	Power Transformer (115 volts, 60 cycle)	32-8064
	Power Transformer (115 volts, 25 cycle)	32-8075
	Screw	W-453
	Shield (60 cycle)	56-1525
	Shield Base (60 cycle)	56-1526
	Shield (25 cycle)	56-1547
	Shield Base (25 cycle)	56-1548
51.	Power Line Condensers (Dual .01 mfd)	3903-ODG

Tuning Bands: 540 to 1600 KC; 1.6 to 3.3 MC.
Intermediate Frequency: 455 KC.
Audio Output: 1.5 watts.
Power Consumption: 45 watts.

FOR OTHER DATA SEE INDEX

MODEL 42-335
MODEL 42-358

PHILCO RADIO & TELEVISION CORP.

REPLACEMENT PARTS—Model 42-358, Codes 121-122

Sch. No.	Description	Part No.
1.	Loop Aerial	76-1190
	Mtg. Sleeve	28-3806
	Mtg. Sleeve	56-1907
	Mtg. Sleeve	56-1545
	Mtg. Screw	W-288
	Mtg. Washer	W-151
	Spring Washer	28-4186
1A.	Condenser (.0015 mfd)	30-4621
2.	Aerial Transformer	32-3772
	Mtg. Clip	28-5002
3.	Tuning Condenser	31-2099
3A.	Aerial Compensator (1500 KC), Part of 3	
3B.	Oscillator Compensator (1700 KC), Part of 3	
	Drive Pulley	38-9856
	Drive Cord	31-2586
	Spring	28-8954
	Mtg. Screw	W-523
	Mtg. Spacer	28-5665
	Mtg. Grommet (2 required)	27-4596
	Mtg. Grommet (1 required)	54-4020
	Tuning Shaft	31-2566
	Mtg. Nut	W-684
4.	Compensator (580 KC)	31-6410
5.	Mica Condenser (250 mmfd)	60-125157
6.	Mica Condenser (250 mmfd)	60-125157
7.	Oscillator Transformer	32-3771
	Mtg. Clip	28-5002
8.	Mica Condenser (100 mmfd)	60-110157
9.	Resistor (47,000 ohms)	33-347339
10.	Resistor (2200 ohms)	33-222339
11.	Condenser (.05 mfd, 200 volts)	30-4519
12.	Condenser (.01 mfd, 400 volts)	30-4572
13.	Resistor (10,000 ohms)	33-310339
14.	1st I. F. Transformer	32-3773
14A.	Primary Compensator, Part of 14	
14B.	Secondary Compensator, Part of 14	
14C.	Condenser, Part of 14	
	Mtg. Nut	W-1949
15.	Resistor (2.2 megohms)	38-522339
16.	Resistor (10,000 ohms)	33-310339
17.	Condenser and R. F. Choke	76-1161
18.	Resistor (15,000 ohms)	33-315339
19.	Condenser (.05 mfd, 200 volts)	30-4519
20.	2nd I. F. Transformer	32-3774
20A.	Secondary Compensator, Part of 20	
21.	Condenser (.05 mfd, 200 volts)	30-4519
22.	Resistor (2.2 megohms)	33-522339
23.	Volume Control	33-5464
	Mtg. Nut	W-2157
24.	Condenser (.01 mfd, 400 volts)	30-4572
25.	Resistor (4.7 megohms)	33-547339
26.	3rd I. F. Transformer	32-3775
26A.	Secondary Compensator, Part of 26	
26B.	Resistor, Part of 26	
26C.	Condenser, Part of 26	
26D.	Condenser, Part of 26	
27.	Resistor (470,000 ohms)	33-447339
28.	Resistor (470,000 ohms)	33-447339
29.	Resistor (130 ohms), Code 121	33-113336
	Resistor (180 ohms), Code 122	33-118336
30.	Mica Condenser (250 mmfd)	60-125157
31.	Condenser (.01 mfd, 400 volts)	30-4572
32.	Condenser (.02 mfd, 400 volts)	30-4516
33.	Output Transformer	32-8180
34.	Speaker (Code 121)	36-1488-3
	Speaker (Code 122)	36-1566
	Cone Assembly (For Speaker 36-1566)	36-4215
	Speaker Cable (Code 122)	41-3663
	Cone Assembly (For Speaker 36-1488-3)	36-4129
	Speaker Cable (Code 121)	41-3448
	Speaker Socket (Code 121)	27-6115
35.	Electrolytic Condenser (20-20 mfd) (Code 121)	30-2515
	Mtg. Clamp	56-1466
36.	Filter Choke	32-8182
37.	Filament Resistor (50 ohms)	33-3412
38.	Pilot Lamp	34-2477
	Socket Assembly	76-1282
39.	Condenser (.04 mfd, 400 volts)	30-4119
40.	Power Switch, Part of 23	
41.	Power Cord	L-3199
	Parts Used in Code 122 Only	
42.	Electrolytic Condenser (10-20-20 mfd) (Code 122)	30-2529
43.	Field Coil (Replace Speaker 36-1566)	
	Miscellaneous Parts	
	Bezel	54-4090
	Mtg. Screw	W-2071
	Cabinet	10543-B
	Dial	27-5745
	Dial Pointer	56-2159
	Spring Fastener (Dial)	56-6161
	Knob	54-4089
	Socket	27-6174
	Socket	27-6175
	Mtg. Rivet	W-239
	Socket (Speaker)	27-6115
	Screw (Chassis Mtg.)	W-2030
	Washer (Chassis Mtg.)	W-416

Aerial Connections: The built-in loop aerial system is designed to operate without an outside aerial or ground, and to give exceptionally sensitive receiving performance.

In steel reinforced buildings, however, and other shielded locations, where station signal strength is weak, the Philco Safety Aerial, Part No. 40-6370, is recommended. A lug and wire grounded to the rear of the chassis by a screw is provided for attaching the safety aerial. Remove the lug from under the screw and connect the aerial lead.

If an external aerial is not used this lug should be grounded to the chassis by the screw to obtain best performance with the built-in loop. A ground is not required with either type of aerial.

Signal Generator: When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd condenser to the stator plate lug of the antenna section of the tuning condenser. Connect the ground or low side of the generator to the chassis.

ALIGNING R. F. AND I. F. COMPENSATORS

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator and loop is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled.

After connecting the aligning instruments adjust the compensators as shown in the tabulation below. Locations of the compensators are shown on the schematic diagrams.

If the indicating meter pointer goes off scale when adjusting the compensator, reduce the strength of the signal from the generator.

PROCEDURE—MODEL 42-335

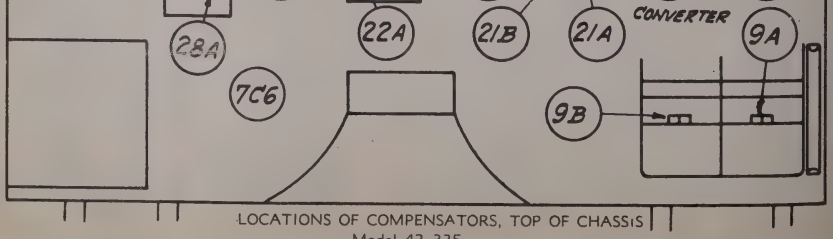
Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of Tuning Cond.	455 KC	Tuning Cond. Closed	Vol. Max. Range Switch "Brdcst"	28A, 22A, 21A, 21B	Note A
2	Loop	1500 KC	1500 KC	Vol. Max. Range Switch "Brdcst"	9B	Note B
3	Loop	1500 KC	1500 KC	Vol. Max. Range Switch "Brdcst"	9A	

PROCEDURE—MODEL 42-358

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Ant. Section of Tuning Cond.	455 KC	540 KC Tuning Cond. Closed	Vol. Max.	14A, 14B, 20A, 26A	
2	Loop See above instructions	1500 KC	1500 KC	Vol. Max.	3B Tuning Condenser	Note B
3	Loop See above instructions	1500 KC	1500 KC	Vol. Max.	3A Tuning Condenser	
4	Loop See above instructions	580 KC	580 KC	Vol. Max.	4	Roll Tuning Condenser
5	Loop See above instructions		Repeat Operation 2			

NOTE A—Compensator (21A) Model 42-335, must be adjusted before (21B) Model 42-335, and should be done in the following manner: Turn 21B all the way down, then adjust I. F. padders in the order as tabulated once only.

NOTE B—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the index line below 540 KC.



LOCATIONS OF COMPENSATORS, TOP OF CHASSIS
Model 42-335

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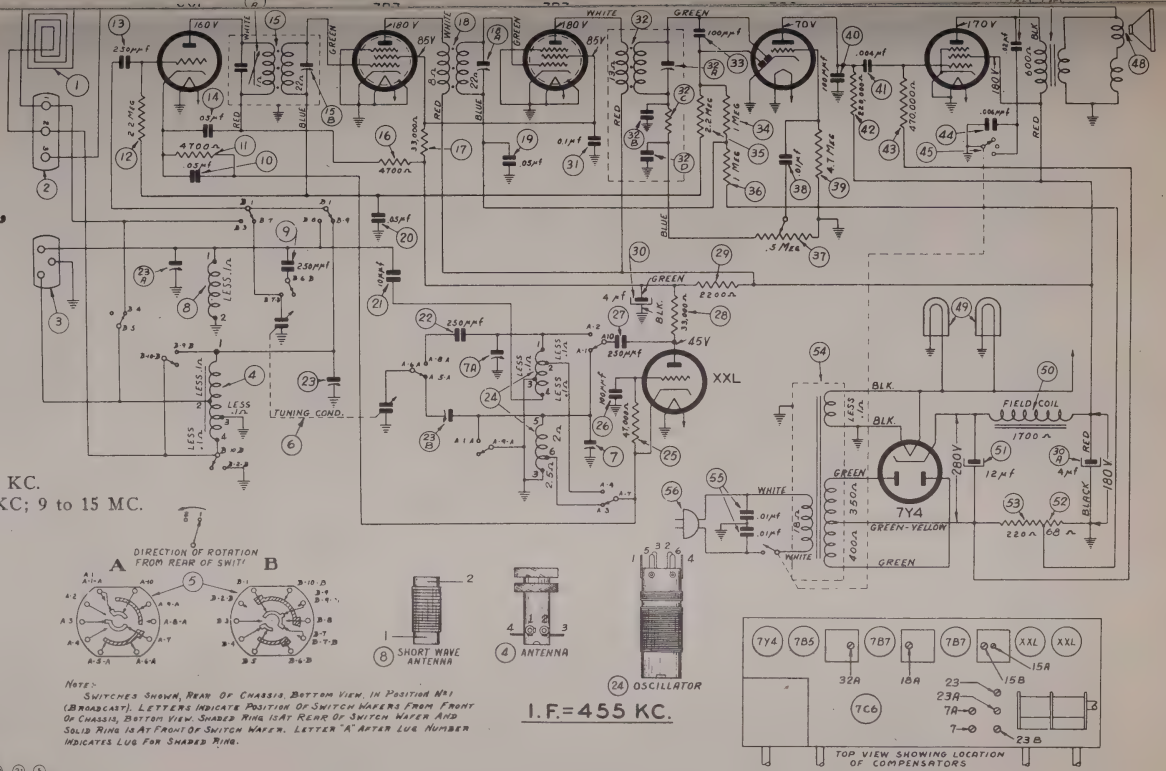
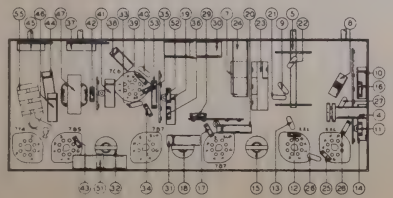
FOR ALIGNMENT, PARTS LIST, AND OTHER DATA, SEE INDEX

Intermediate Frequency: 455 KC.
Tuning Bands: 540 to 1720 KC; 9 to 15 MC.
Audio Output: 1.5 watts



NOTE: SWITCHES SHOWN, REAR OF CHASSIS, BOTTOM VIEW, IN POSITION NO 1 (BROADCAST). LETTERS INDICATE POSITION OF SWITCH WAFERS FROM FRONT OF CHASSIS, BOTTOM VIEW. SHADED RING IS AT REAR OF SWITCH WAFER AND SOLID RING IS AT FRONT OF SWITCH WAFER. LETTER 'A' AFTER LUG NUMBER INDICATES LUG FOR SHADED RING.



PART LOCATIONS, UNDERSIDE OF CHASSIS, MODEL 42-340

SCHEMATIC DIAGRAM MODEL 42-340

The D. C. voltages indicated at the tube elements in the above diagram were measured with a 1000 ohms per volt voltmeter. Philco Model 027. Line voltage, 117 volts A. C. No signal being received—range switch broadcast.

Circuit Description: Model 42-340, Code 121, is a seven (7) tube superheterodyne radio with two tuning bands covering Standard, Police and Shortwave broadcast stations and operates on alternating current (A. C.). This model is designed to operate from the Philco low impedance loop aerial which is built in the cabinet. In addition, connections are also provided for an external aerial.

POWER SUPPLY: 115 V 60 CYCLES
This model can also be operated on 115 volts, 25 cycles by changing the power transformer as indicated in the parts list.

MODEL 42-340
MODEL 42-345

PHILCO RADIO & TELEVISION CORP.

EXTERNAL AERIAL CONNECTIONS

MODELS 42-323, 42-327, 42-340, 42-345, 42-360, 42-365

The built-in low-impedance loop aerial system of these models is designed to operate without an outside aerial or ground, and to give exceptional receiving performance under average conditions.

To operate the radio, however, in steel reinforced buildings and other shielded locations, where signal strength is weak, the Philco outdoor aerial part No. 45-2817 is recommended for maximum receiving performance. The outdoor aerial can be easily connected to the radio by inserting the plug attached to the transformer (supplied with the aerial) into the socket provided at the rear of the radio. This aerial can be obtained from your local Philco distributor.

REPLACEMENT PARTS—Model 42-340

Sch. No.	Description	Part No.
1.	Loop Aerial	76-1270
	Mtg. Screw	W-2071
2.	Loop Terminal Panel	38-9942
3.	External Aerial Socket	27-6145
4.	Aerial Transformer (Broadcast)	32-3724
	Mtg. Clip	28-5002
5.	Band Switch	42-1672
	Mtg. Nut	W-2157
6.	Tuning Condenser	31-2558
	Drive Cord (Pointer)	31-2547
	Drive Cord (Tuning Cond.)	31-2546
	Drive Shaft	56-6152
	Mtg. Nut	W-2157
	Drive Drum (Tuning Cond.)	38-9883
	Mtg. Rubber	27-4596
	Mtg. Sleeve	28-3806
	Spring (Tuning Condenser Cord Drive)	28-8751
	Spring (Pointer Drive Cord)	28-8963
7.	Compensator (Broadcast, Aerial)	31-6438
7A.	Compensator (Short Wave—Aerial) (Part of 7)	
8.	Aerial Transformer (Short Wave)	32-3725
9.	Mica Condenser (250 mmfd)	20-025011
10.	Condenser (.05 mfd, 200 volts)	30-4519
11.	Resistor (4700 ohms)	33-247339
12.	Resistor (2.2 megohms)	33-522339
13.	Mica Condenser (250 mmfd)	60-125257
14.	Condenser (.05 mfd, 400 v.)	30-4518
15.	1st I. F. Transformer	32-3734
	Mtg. Nut	W-1949
15A.	Primary Compensator (Part of 15)	
15B.	Secondary Compensator (Part of 15)	
15C.	Condenser (Part of 15)	
16.	Resistor (4700 ohms)	33-247339
17.	Resistor (33,000 ohms)	33-333339
18.	2nd I. F. Transformer	32-3705
	Mtg. Nut	W-1949
18A.	Secondary Compensator (Part of 18)	
19.	Condenser (.05 mfd, 200 volts)	30-4519
20.	Condenser (.05 mfd, 200 volts)	30-4519
21.	Mica Condenser (10 mmfd)	60-010337
22.	Mica Condenser (250 mmfd)	20-025011
23.	Compensator (Oscillator Broadcast)	31-6428
23A.	Compensator (Oscillator—S. W.) (Part of 23)	
23B.	Compensator (Oscillator—580 KC) (Part of 23)	
24.	Oscillator Transformer	32-3723
	Mtg. Clip	28-5003
25.	Resistor (47,000 ohms)	33-347339
26.	Mica Condenser (100 mmfd)	60-110257
27.	Mica Condenser (250 mmfd)	20-025011
28.	Resistor (33,000 ohms)	33-333339
30.	Electrolytic Condenser (4-4 mfd, 400 volts)	30-2477
30A.	Electrolytic Condenser (4 mfd) (Part of 30)	
31.	Condenser (.1 mfd, 400 volts)	30-4527
32.	3rd I. F. Transformer	32-3640
	Mtg. Nut	W-1949
32A.	Secondary Compensator (Part of 32)	
32B.	Condenser (Part of 32A)	
32C.	Resistor (Part of 32)	
32D.	Condenser (Part of 32A)	
33.	Mica Condenser (100 mmfd)	60-110257
34.	Resistor (1 megohm)	33-510339
35.	Resistor (2.2 megohms)	33-522339
36.	Resistor (1 megohm)	33-510339
37	Volume Control	33-5443
	Mtg. Nut	W-2157
38.	Condenser (.01 mfd, 400 volts)	30-4572
39.	Resistor (4.7 megohms)	33-547339
40.	Mica Condenser (100 mmfd)	60-110257
41.	Condenser (.004 mfd, 600 volts)	30-4623
42.	Resistor (220,000 ohms)	33-422339
43.	Resistor (470,000 ohms)	33-447339
44.	Condenser (.006 mfd, 400 volts)	30-4591
45.	Tone Control and Power Switch	42-1665
	Mtg. Nut	W-2157
46.	Condenser (.02 mfd, 400 volts)	30-4516
47.	Output Transformer	32-3172
48.	Speaker	36-1543-9
	Cone Assembly (For Speaker 36-1543)	36-4206
49.	Pilot Lamps	34-2064
	Socket Assembly	76-1287
50.	Field Coil (Replace Speaker 36-1543)	
51.	Electrolytic Condenser (12 mfd, 400 volts)	30-2409
	Mtg. Clamp	56-1466
52.	Resistor (68 ohms)	33-068336
53.	Resistor (220 ohms)	33-122436
54.	Power Transformer (115 volts, 60 cycle)	32-3064
	Shield	56-1525
	Shield Base	56-1526
	Mtg. Screw	W-453
	Power Transformer (115 volts, 25 cycle)	
55.	Condenser (.01-01 mfd)	3903-ODG
56.	Power Cord	L-3199

Miscellaneous Parts

Cabinet	10569-A
Dial Scale	27-5755
Dial Pointer	56-3239
Knob Assembly	54-4102
Sockets	27-6177
Mtg. Rivets	W-239
Screw (Mtg. Chassis)	W-2030
Washer (Mtg. Chassis)	W-410

REPLACEMENT PARTS—Model 42-345

Sch. No.	Description	Part No.
1.	Loop Aerial	76-1303
	Mtg. Screw	W-2071
2.	Loop Terminal Pane,	38-9942
3.	External Aerial Socket	27-6145
4.	Silver Mica Condenser (250 mmfd)	20-025011
5.	Aerial Transformer (S. W.) (Part of 9)	32-3764
	Mtg. Clip	28-5002
6.	Aerial Transformer (Police)	32-3766
7.	Tuning Condenser	31-2558
	Drive Shaft	56-6152
	Mtg. Screw	W-2157
	Drive Drum	38-9883
	Drive Cord (Pointer)	31-2594
	Spring	28-8953
	Drive Cord (Cond. Drive)	31-2546
	Spring	28-8751
	Pointer	56-1856
	Mtg. Screw	W-2002
	Mtg. Sleeve	28-3806
	Mtg. Rubber	27-4596
8.	Aerial Transformer (Broadcast)	32-3763
9.	Compensator (Aerial—Broadcast)	
9A.	Compensator (Aerial—S. W.) (Part of 9)	
9B.	Oscillator Compensator (580 KC) (Part of 9)	
10.	Push-Buttons and Power Switch	42-1686
	Mtg. Sleeve (Switch to Cabinet)	28-2253
	Mtg. Sleeve (P. B. Switch, 3 required)	28-5665
	Drive Screw	W-523
	Mtg. Screw	W-2002
11.	Push-Button Compensating Condenser Strip	31-6372
12.	Band Switch	42-1684
	Mtg. Nut	W-2157
13.	Mica Condenser (10 mmfd)	60-010337
14.	Oscillator Transformer (Broadcast—S. W.)	32-3762
	Mtg. Clip	28-5003
15.	Compensator (Oscillator—Broadcast)	31-6425
15A.	Compensator (Oscillator—Police) (Part of 15)	
15B.	Compensator (Oscillator—S. W.) (Part of 15)	
16.	Resistor (47,000 ohms)	33-347339
17.	Mica Condenser (100 mmfd)	60-110257
18.	Mica Condenser (250 mmfd)	60-125257
19.	Oscillator Transformer (Police)	32-3765
	Mtg. Clip	28-5002
20.	Mica Condenser (2500 mmfd)	60-225324
21.	Silver Mica Condenser (250 mmfd)	20-025011
22.	Mica Condenser (10 mmfd)	60-010337
23.	Condenser (.05 mfd, 200 volts)	30-4519
24.	Condenser (.05 mfd, 200 volts)	30-4519
25.	Resistor (4700 ohms)	33-247339
26.	Condenser (.05 mfd, 400 volts)	30-4518
27.	Resistor (2.2 megohms)	33-522339
28.	Mica Condenser (250 mmfd)	60-125257
29.	1st I. F. Transformer	32-3734
	Mtg. Nut	W-1949
29A.	Primary Compensator (Part of 29)	
29B.	Condenser (Part of 29)	
29C.	Secondary Compensator (Part of 29)	
30.	Resistor (4700 ohms)	33-247339
31.	Resistor (33,000 ohms)	33-333339
32.	2nd I. F. Transformer	32-3705
	Mtg. Nut	W-1949
32A.	Secondary Compensator (Part of 32)	
33.	Condenser (.05 mfd, 200 volts)	30-4519
34.	3rd I. F. Transformer	32-3640
	Mtg. Nut	W-1949
34A.	Secondary Compensator (Part of 34)	
34B.	Resistor (Part of 34)	
34C.	Condenser (Part of 34A)	
34D.	Condenser (Part of 34A)	
35.	Mica Condenser (100 mmfd)	60-110257
36.	Resistor (2.2 megohms)	33-522339
37.	Resistor (1 megohm)	33-510339
38.	Resistor (1 megohm)	33-510339
39.	Condenser (.1 mfd, 400 volts)	30-4527
40.	Electrolytic Condenser (4-4 mfd, 400 volts)	30-2477
40A.	Electrolytic Condenser (4 mfd) (Part of 40)	
	Mtg. Clip	56-1466
41.	Resistor (33,000 ohms)	33-333339
42.	Resistor (2200 ohms)	33-222339
43.	Volume Control	33-5443
	Mtg. Nut	W-2157
44.	Condenser (.01 mfd, 400 volts)	30-4572
45.	Resistor (4.7 megohms)	33-547339
46.	Mica Condenser (100 mmfd)	60-110257
47.	Resistor (220,000 ohms)	33-422339
48.	Condenser (.004 mfd, 600 volts)	30-4623
49.	Condenser (.003 mfd, 100 volts)	30-4469
50.	Tone Control	33-5450
	Mtg. Nut	W-2157
51.	Resistor (470,000 ohms)	33-447339
52.	Condenser (.006 mfd, 400 volts)	30-4591
53.	Output Transformer	32-3172
54.	Speaker	36-1543-9
	Cone Assembly (For Speaker 36-1543-9)	36-4206
55.	Pilot Lamps	34-2064
	Socket Assembly	76-1287
56.	Field Coil (Replace Speaker)	36-1543
57.	Electrolytic Condenser (12 mfd, 400 volts)	30-2409
58.	Resistor (68 ohms)	33-068336
59.	Resistor (220 ohms)	33-122436
60.	Power Transformer (115 volts, 60 cycle)	32-3064
	Power Transformer (115 volts, 25 cycle)	
	Shield	56-1525
	Shield Base	56-1526
	Mtg. Screw	W-453
61.	Line Filter Condenser (.01-.01 mfd)	3903-ODG
62.	Power Cord	L-3199

Miscellaneous Parts

Cabinet	10570A
Dial	27-5759
Pointer	56-1856
Escutcheon (Push-Buttons)	56-2233
Knob (Tuning, Volume, Tone)	54-4115
Knob (Push-Buttons)	54-4106
Socket (Tubes)	27-6177
Screw (Chassis Mtg.)	W-2030
Tab Kit (Push-Buttons)	40-6660
Tab Cover	27-5737
Tab (ON-OFF)	27-5738
Washer (Chassis Mtg.)	W-410

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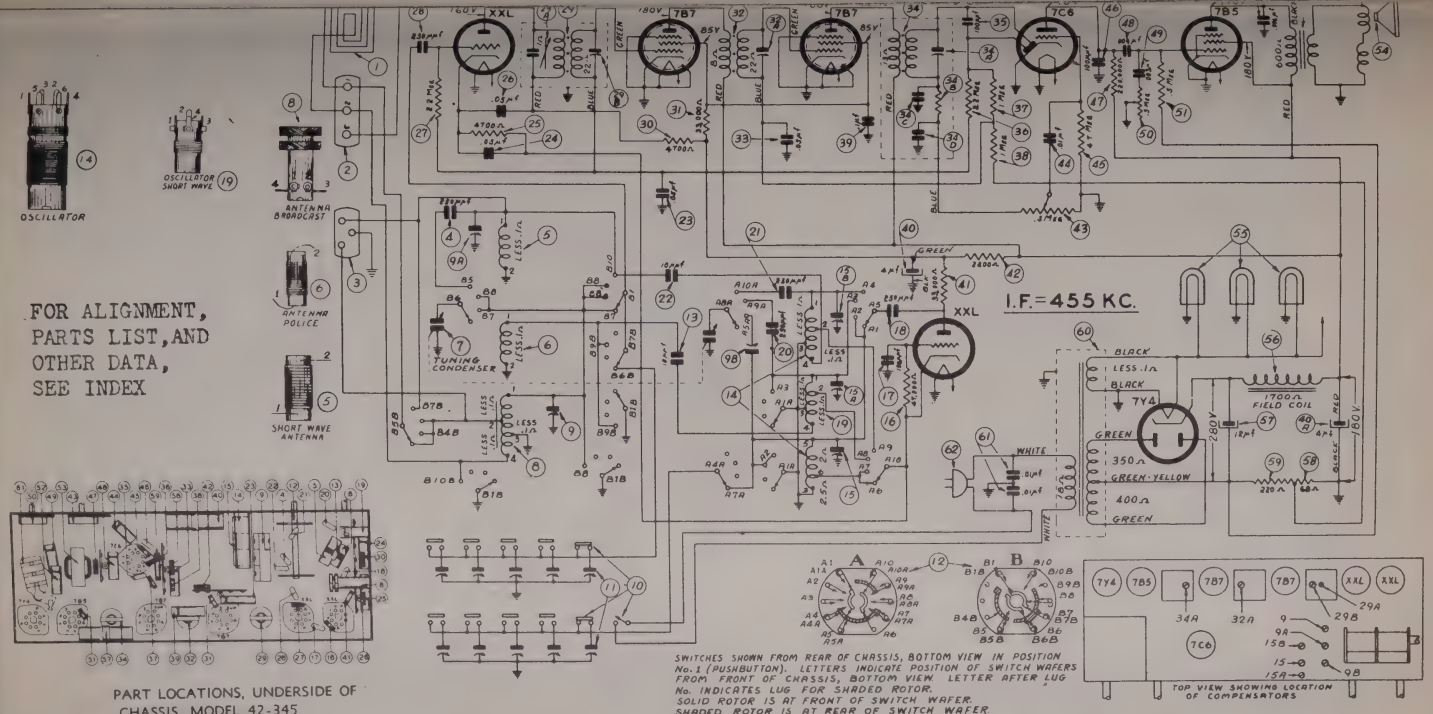
OSCILLATOR
OSCILLATOR SHORT WAVE
ANTENNA BROADCAST
ANTENNA POLICE
SHORT WAVE ANTENNA
TUNING CONDENSER
FOR ALIGNMENT, PARTS LIST, AND OTHER DATA, SEE INDEX
I.F.=455 KC.
XXL
7B7
7C6
7B5
7Y4
BLACK
GREEN
WHITE
GREEN-YELLOW
1700Ω FIELD COIL
350Ω
400Ω
220Ω
SWITCHES SHOWN FROM REAR OF CHASSIS, BOTTOM VIEW IN POSITION No. 1 (PUSHBUTTON). LETTERS INDICATE POSITION OF SWITCH WAFERS FROM FRONT OF CHASSIS; BOTTOM VIEW. LETTER AFTER LUG No. INDICATES LUG FOR SHADED ROTOR. SOLID ROTOR IS AT FRONT OF SWITCH WAFER. SHADED ROTOR IS AT REAR OF SWITCH WAFER.
TOP VIEW SHOWING LOCATION OF COMPENSATORS

PART LOCATIONS, UNDERSIDE OF CHASSIS, MODEL 42-345

SCHEMATIC DIAGRAM MODEL 42-345

The D. C. voltages indicated at the tube elements in the above diagram were measured with a 1000 ohms per volt voltmeter. Philco Model 027. Line voltage, 117 volts A. C. No signal being received—range switch broadcast.

Intermediate Frequency: 455 KC.

Tuning Bands: 540 to 1720 KC; 2.3 to 7 MC; 9 to 15.5 MC.

Audio Output: 2 watts.

Power Supply: 115 volts A. C., 60 cycles. The radio can also be operated on 115 volts, 25 cycle current, by changing the power transformers as indicated in the parts list.

Electric Push-Button Tuning: Six (6) electric tuning push-buttons are provided for automatically selecting stations. Five (5) of the push-buttons are used from broadcast stations and one push-button for controlling (ON-OFF) the power supply. The procedure for adjusting the push-buttons will be found in the instructions supplied with the radio.

MODEL 42-345, CODE 121

Circuit Description: Model 42-345, Code 121, is a seven (7) tube superheterodyne radio employing electric push-button tuning for automatically selecting standard broadcast stations and three (3) tuning bands covering Standard, Police, and Short-wave stations. In addition, this model employs the built-in Philco low impedance loop aerial, for reception of stations without an external aerial. Connections are also provided for an external aerial to be used in sections where signal strength is weak, such as steel reinforced buildings and other shielded areas.

MODEL 42-350

PHILCO RADIO & TELEVISION CORP.

REPLACEMENT PARTS—Model L42-350, Code 121

Schem. No.	Description	Part No.
1.	Loop Aerial	76-1383
	Mtg. Screw	W-2071
1a.	F.M. Loop Aerial	76-1303
	Socket	27-6181
2.	Mica Condenser (250 mmfd.)	60-125257
3.	Resistor (2.2 megohms)	33-522339
4.	Resistor (100,000 ohms)	33-410339
5.	Resistor (2700 ohms)	33-227339
6.	Condenser (.05 mfd., 200 volts)	30-4519
7.	F.M. Oscillator Transformer	32-3797
	Mtg. Clip	28-5002
8.	Resistor (10 ohms)	33-010336
9.	Short Wave Aerial Transformer	32-3764
10.	Broadcast Aerial Transformer	32-3763
	Mtg. Clip	28-5002
11.	Compensator (Brdcst. Band, 580 K.C.)	31-642H
11a.	Compensator (S.W. Aerial, 15 M.C.) Part of 11	
11b.	Compensator (Brdcst. Band, 1500 K.C.) Part of 11	
12.	Push-button Switch & A.C. Switch	42-1695
12a.	A.C. Switch (Part of 12)	
	Mtg. Sleeve	28-5665
	Mtg. Screw	W-523
13.	Push-button Padder Strip	31-6372
	Mtg. Screw	W-1974
14.	Tuning Condenser	31-2595
	Drive Cord (Tuning Cond.)	31-2546
	Spring	28-8751
	Drive Cord (Pointer)	31-2594
	Spring	28-H953
	Mtg. Rubber	27-4596
	Mtg. Sleeve	28-3806
	Mtg. Washer	W-151
	Mtg. Screw	W-2002
	Tuning Shaft	56-6156
	Tuning Drive Drum	38-9883
15.	Compensator (F.M. Osc., 48.5 M.C.)	31-6444
15a.	Compensator (Brdcst. Osc., 1500 K.C.) Part of 15	
15b.	Compensator (S.W. Osc., 15 M.C.) Part of 15	
15c.	Compensator (F.M. Aerial, 48.5 M.C.) Part of 15	
16.	Silver Mica Condenser (250 mmfd.)	20-025011
17.	Mica Condenser (10 mmfd.)	60-010337
18.	Mica Condenser (250 mmfd.)	20-025011
19.	Oscillator Transformer (Brdcst., S.W.)	32-3796
	Mtg. Clip	28-5003
20.	Resistor (47,000 ohms)	33-347339
21.	Resistor (4700 ohms)	33-247339
22.	Condenser (.05 mfd., 400 volts)	30-45IH
23.	1st I.F. Transformer	32-3794
	Mtg. Nut	W-1949
23a.	Primary Compensator (455 K.C.) Part of 23	
23b.	Secondary Compensator (455 K.C.) Part of 23	
23c.	Secondary Compensator (4.3 M.C.) Part of 23	
23d.	Primary Compensator (4.3 M.C.) Part of 23	
23e.	Mica Condenser (4000 mmfd.) (Part of 23)	60-240214
24.	Condenser (.05 mfd., 200 volts)	30-4519
25.	Condenser (.05 mfd., 200 volts)	30-4519
26.	Resistor (120 ohms)	33-112336
27.	Resistor (68 ohms)	33-068336
28.	Condenser (.05 mfd., 400 volts)	30-45IH
29.	Resistor (10,000 ohms)	33-310339
30.	Condenser (.01 mfd., 400 volts)	30-4572
31.	2nd I.F. Transformer	32-378H
	Mtg. Nut	W-1949
31a.	Primary Compensator (4.3 M.C.) Part of 31	
31b.	Secondary Compensator (4.3 M.C.) Part of 31	
31c.	Secondary Compensator (455 K.C.) Part of 31	
31d.	Resistor (47,000 ohms)...(Part of 31)	33-347339
32.	Resistor (150 ohms)	33-115336
33.	Condenser (.05 mfd., 200 volts)	30-4519
34.	Resistor (4700 ohms)	33-247339
35.	Resistor (1000 ohms)	33-210339
36.	Condenser (.01 mfd., 400 volts)	30-4572
37.	Mica Condenser (250 mmfd.)	60-125257
38.	Mica Condenser (100 mmfd.)	60-110257
39.	Resistor (47,000 ohms)	33-347339
40.	Eletrolytic Condenser (4-4 mfd., 400 volts)	30-2477
40a.	Electrolytic Condenser (4 mfd., 400 volts) (Part of 40)	
	Mtg. Clip	56-1466
41.	Resistor (33,000 ohms)	33-333339
42.	Resistor (2200 ohms)	33-222339
43.	Condenser (.0 mfd., 200 volts)	30-4519
44.	3rd I.F. Transformer	32-3795
	Mtg. Nut	W-1949
44a.	Primary Compensator (4.3 M.C.) Part of 44	
44b.	Primary Compensator (455 K.C.) Part of 44	
44c.	Secondary Compensator (4.3 M.C.) Part of 44	
44d.	Mica Condenser (125 mmfd.) Part of 44	
45.	Condenser (.1 mfd.)	30-4586
45x.	Mica Condenser (500 mfd.)	60-150227
46.	Resistor (470,000 ohms)	33-447339
47.	Resistor (2.2 megohms)	33-522339
48.	Resistor (100,000 ohms)	33-410339
49.	Resistor (2.2 megohms)	33-522339
50.	Resistor (2.2 megohms)	33-522339
51.	Condenser (.01 mfd., 400 volts)	30-4572
52.	Mica Condenser (100 mmfd.)	60-110257
53.	Resistor (220,000 ohms)	33-422339
54.	Condenser (.01 mfd., 400 volts)	30-4572
55.	Mica Condenser (100 mmfd.)	60-110257
56.	Condenser (.01 mfd., 400 volts)	30-4572
57.	Tone Control	33-5471
	Mtg. Nut	W-2157
58.	Resistor (33,000 ohms)	33-333339
59.	Volume Control	33-5478
	Mtg. Nut	W-2157
60.	Condenser (.01 mfd., 400 volts)	30-4572
61.	Mica Condenser (150 mmfd.)	60-115327
62.	Mica Condenser (150 mmfd.)	60-115327
63.	Resistor (1 megohm)	33-510339
64.	Resistor (470,000 ohms)	33-447339
65.	Mica Condenser (100 mmfd.)	60-110257
66.	Condenser (.003 mfd., 1000 volts)	30-4469
67.	Condenser (.004 mfd.,)	30-4623
68.	Resistor (220,000 ohms)	33-422339
69.	Resistor (470,000 ohms)	33-447339
70.	Resistor (10 megohms)	33-610339
71.	Condenser (.002 mfd., 600 volts)	30-4622
72.	Output Transformer	32-H172
73.	Speaker	36-154R
	Cone Assembly (for Speaker 36-154R)	36-4206
	Cable	41-3613
74.	Mtg. Washer	27-
	Mtg. Nut	W-
75.	Dial and Indicator Lamps	34-
76.	Field Coil (Replace Speaker 36-154R)	
	Electrolytic Condenser (12mfd., 400 volts)	30-
	Mtg. Clip	56-
77.	Resistor (27 ohms)	33-
78.	Resistor (270 ohms)	33-
79.	Power Transformer (115 volts, 60 cycle)	32-
	Mtg. Screw	W-
	Shield	56-
	Shield Base	56-
	Power Transformer (115 volts, 25 cycles)	32-
	Shield	56-
	Shield Base	56-
	Power Transformer 115/230 volts, 60 cycle)	32-
80.	Condenser (.01-.01 mfd.)	3903-
81.	Band Switch	42-
	Mtg. Nut	W-
	MISCELLANEOUS PARTS	
	Arm and Link (Band Indicator)	76-
	Cable (Power)	L-
	Cabinet	10
	Dial Scale	27-
	Dial Pointer	56-
	Escutcheon (Push Buttons)	56-
	Mtg. Screw	W-
	Knob Assembly (Vol. Tone, Band)	54-
	Knob Assembly (Push Buttons)	54-
	Mtg. Screw (Chassis)	W-
	Mtg. Washer (Chassis)	W-
	Socket Assembly (Indicator Lamps)	76-
	Socket Assembly (Dial Lamps)	76-
	Socket (Single Prong)	27-
	Socket (Tubes)	27-
	Socket (4 Prong F.M. Aerial)	27-
	Mtg. Rivets	W-
	Tab Kit	40-
	Tab (Television)	27-
	Terminal Panel (Loop)	38-
	Wiring Panel (8 lugs)	38-
	Wiring Panel (5 lugs)	38-
	Mtg. Rivets	W-

POWER SUPPLY: 115 volts, 60 cycles A.C. This model can also be operated on 25-cycle current. To do this it is necessary to replace the power transformer as indicated in the parts list for 25-cycle operation.

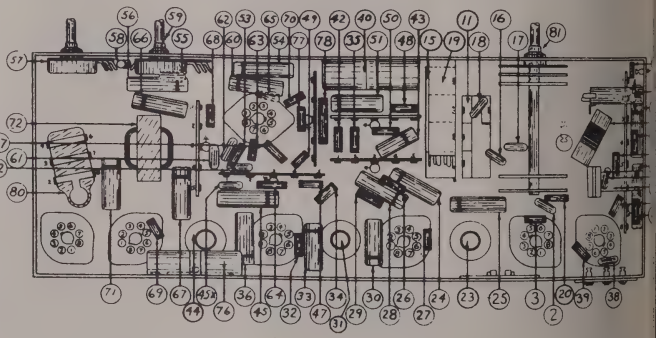

FIG. 4—LOCATIONS OF PARTS—UNDER CHASSIS

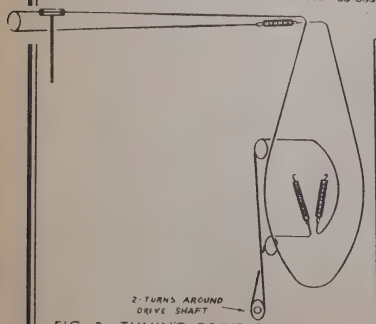

FIG. 3—TUNING DRIVE CORD ARRANGEMENT

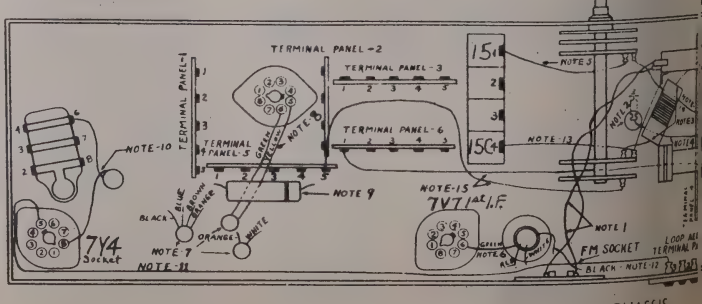

FIG. 5—CRITICAL WIRING AND PART LOCATIONS—UNDER CHASSIS (See Notes 1 to 15.)

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PHILCO RADIO & TELEVISION CORP.

MODEL 42-350

FOR ANTENNA AND PUSH BUTTON DATA, SEE INDEX
REAR VIEW FM AERIAL SOCKET
WHITE
RED
LOOP AERIAL TERMINAL PANEL
275V.
185V.
75V. DC.
100V.
150V.
NOTE: SWITCHES SHOWN FROM REAR OF CHASSIS, BOTTOM VIEW IN POSITION NO.1 (PUSHBUTTON). LETTERS INDICATE POSITION OF SWITCH WAFERS FROM FRONT OF CHASSIS; BOTTOM VIEW. SHADED WING IS AT FRONT OF SWITCH WAFER AND SOLID WING IS AT BACK OF SWITCH WAFER. LETTER AFTER LUG NUMBER INDICATES LUG FOR SOLID WING.
POWER CONSUMPTION: 50 watts.
INTERMEDIATE FREQUENCY: Standard Tuning, 455 KC; F. M. channel, 4.3 MC.
FREQUENCY TUNING RANGES: 540 to 1720 KC; 9 to 15 MC and 42 to 50 MC (F. M.).
AUDIO OUTPUT: 1.5 watts.

MODEL 42-350

PHILCO RADIO & TELEVISION CORP.

CONNECTING ALIGNING INSTRUMENTS

AUDIO OUTPUT METER: Terminal No. 3 is provided on the loop aerial panel for connecting one lead of the audio output meter to the voice coil of the speaker. The other lead of the meter is connected to the chassis. When using these connections, the lowest A. C. scale of the meter must be used. (0 to 10 volts.)
The audio output meter can also be connected between the plate of the output tube and the chassis.

SIGNAL GENERATOR: When adjusting the "I. F." padders, the high side of the signal generator is connected through a .1 mfd. condenser to the points indicated in signal generator column "output connections" to receiver in the tabulations below.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet and dipole aerial lead. Do not remove the receiving loops from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

After connecting the aligning instruments adjust the compensators in the order shown in the tabulation below. Location of the compensators are shown in Fig. 1. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

STANDARD AND S. W. BANDS ALIGNING PROCEDURE

	SIGNAL GENERATOR		RECEIVER			
Operations In Order	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators In Order	Special Instructions
1	High side to No. 1 terminal loop panel	455 KC	580 KC	Vol. max. Band Switch "Brdcst."	44B, 31C, 23A, 23B	
2	Use loop on generator	1500 KC	1500 KC	"	15A, 11B	Note A
3	Use loop on generator	580 KC	580 KC	"	11	Roll Tuning Condensers Note B
4	Use loop on generator	Readjust as given in Operation 2				
5	Use loop on generator	15 MC	15 MC	Band Switch "S.W."	15B, 11A	Note C

FREQUENCY MODULATION ALIGNING PROCEDURE

Note: The Frequency Modulation Circuits Must Be Adjusted With the Dipole Aerial Connected

CRITICAL WIRING LOCATIONS

The following items on this set are critical for location and position. See Figs. 4 and 5, for locations of wires and parts.

Note 1. Dipole aerial leads from socket to be twisted and dressed over wave switch directly to F. M. aerial-oscillator transformer No. 7.

2. Ground braid from gang to chassis to be wired and soldered on top side of subbase in such a manner so that there is a floating bond between ground and the condenser.

3. Short wave aerial transformer (No. 9) to be wired directly between terminal panel 4 and band switch contact C-11-C so that there is a minimum of slack in the wires.

4. Wire from broadcast aerial transformer (No. 10) to ground to be dressed under short wave aerial transformer (No. 9).

5. Wire from band switch contact B-11 to compensator 15 to be direct and away from switch and other wires.

6. Red and white wires from 1st I. F. transformer to be dressed on base and not twisted with other wires from some coil. Green wire to be free of other wires and direct to contact 6 of the 7V7, 1st I. F. tube.

7. Wires from 3rd I. F. transformer (44) to be brought out proper holes and not twisted together inside of can.

8. Green and yellow wires of 3rd I. F. transformer 44 to run from hole in subbase between terminal panel 5, contacts 2 and 3 and direct to contacts of the XXFM tube 5 and 6. Orange, blue, black and brown leads to be free of other wires and dressed off base.

9. Condenser (45) to be dressed off base.

10. A.C. switch leads to be twisted.

11. Wire from prong 5 of the 7Y4 tube to lug 3 of the loop aerial terminal panel to be dressed between Electrolytic Condenser 76 and Mounting Strap and to rear of chassis across bottom contacts of F. M. socket.

12. White, red and black wires of 1st I. F. transformer to be dressed with excess out of coil shield, and towards rear of chassis, and close to base. Black lead to be dressed around and under all leads going to XXL converter tube socket. Orange, yellow, green and blue leads to be dressed with excess out of coil shield and away from the white, red and black leads.

13. Wire from band switch contact C-12-C to compensator 15-C to be dressed free of other wires.

14. Dress wire from band switch contact B-12 to wiring panel 4, lug 4 with excess toward front of set, under shortwave aerial transformer (9), keeping wire between the terminal panel 4 and wires coming through subbase which connect to F. M. aerial-oscillator transformer (7) and band switch.

15. Keep wires from terminal panel No. 5 contact No. 5 to band switch contact D8 and terminal panel No. 6 to terminal panel No. 4 between padder strip and mounting stud of 1st I. F. transformer so that they are kept clear of leads from the 1st I. F. transformer.

F. M. BAND ALIGNING PROCEDURE

	SIGNAL GENERATOR		RECEIVER			
Operations In Order	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators In Order	Special Instructions
1	2nd I. F., F. M. input connection	4.3 MC	580 KC	Vol. max. Band Switch "F.M."	44C (Note D) 44A (Note E)	
2	1st I. F., F. M. input connection	4.3 MC	580 KC	Band Switch "F.M."	31A, 31B (Note F)	
3	High side to No. 1 contact, F. M. socket. Ground to No. 2 contact	4.3 MC	580 KC	Band Switch "F.M."	23D, 23C (Note F)	
4	Use test loop on generator; place near dipole aerial	48.5 MC	85 (Note G)	Band Switch "F.M."	15 (Note G) 15C (Note H)	Roll tuning condenser when adjusting 15C. See Note B.
5	"	48.5 MC	85	Band Switch "F.M."	15 oscillator	

NOTE A.—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial pointer must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity) set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale.

NOTE B.—When adjusting the low frequency compensator of the broadcast or the aerial padders of the high frequency tuning range; the receiver tuning condenser must be adjusted (rolled) as follows: First, tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C.—Adjust compensator (15B) to the second signal peak from the closed position (maximum capacity). The aerial compensator (11A) must also be adjusted to maximum on the first signal peak by rolling the tuning condenser. (See Note B.)

NOTE D.—With the signal generator set to 4.3 MC, padder (44C) is adjusted to the point where minimum signal indication is observed on the output meter.

NOTE E.—Turn the signal generator first to approximately 125 KC below 4.3 MC (4.17 MC) and then 125 KC above 4.3 MC (4.42 MC). A signal peak should be observed on the output meter at approximately each of these points (4.17 and 4.42). The two peak signals should be of equal reading on the output meter and equally spaced in frequency each side of 4.3 MC. If the peaks are unequal in amplitude, padder (44A) must be adjusted in the direction necessary to make both peaks equal. This is done by slightly turning padder and then turning signal generator above and below 4.3 to observe peaks. After equal peaks readings are obtained, set the signal generator to 4.3 MC. The output meter should show zero reading at 4.3 MC. If a signal indication is observed readjust padder (44C) until zero reading is obtained on the meter. After this adjustment is made padder No. 44A should be reset for equal peaks as given above.

NOTE F.—Adjust padders 31A, 31B, 23C, and 23D for equal signal peaks and equal frequency spacing each side of 4.3 M.C.

NOTE G.—The dial scale numbers are listed in tenths of megacycles less the first digit: i.e., 49 MC is 90, 48.5 is 85. Set the tuning dial pointer to 90 on the F. M. scale. Adjust padder (15) to the point where minimum signal indication is observed on the output meter.

NOTE H.—In order to adjust padder (15C) the signal generator should be set to either the signal peak approximately 125 KC below 49 MC (48.875 MC), or 125 KC above 49 MC (49.125 MC). Adjust padder (15C) to maximum output reading on either of these peak signals. As padder 15C is being adjusted roll the tuning condenser as given in Note B.

SEE INDEX FOR CHANGES

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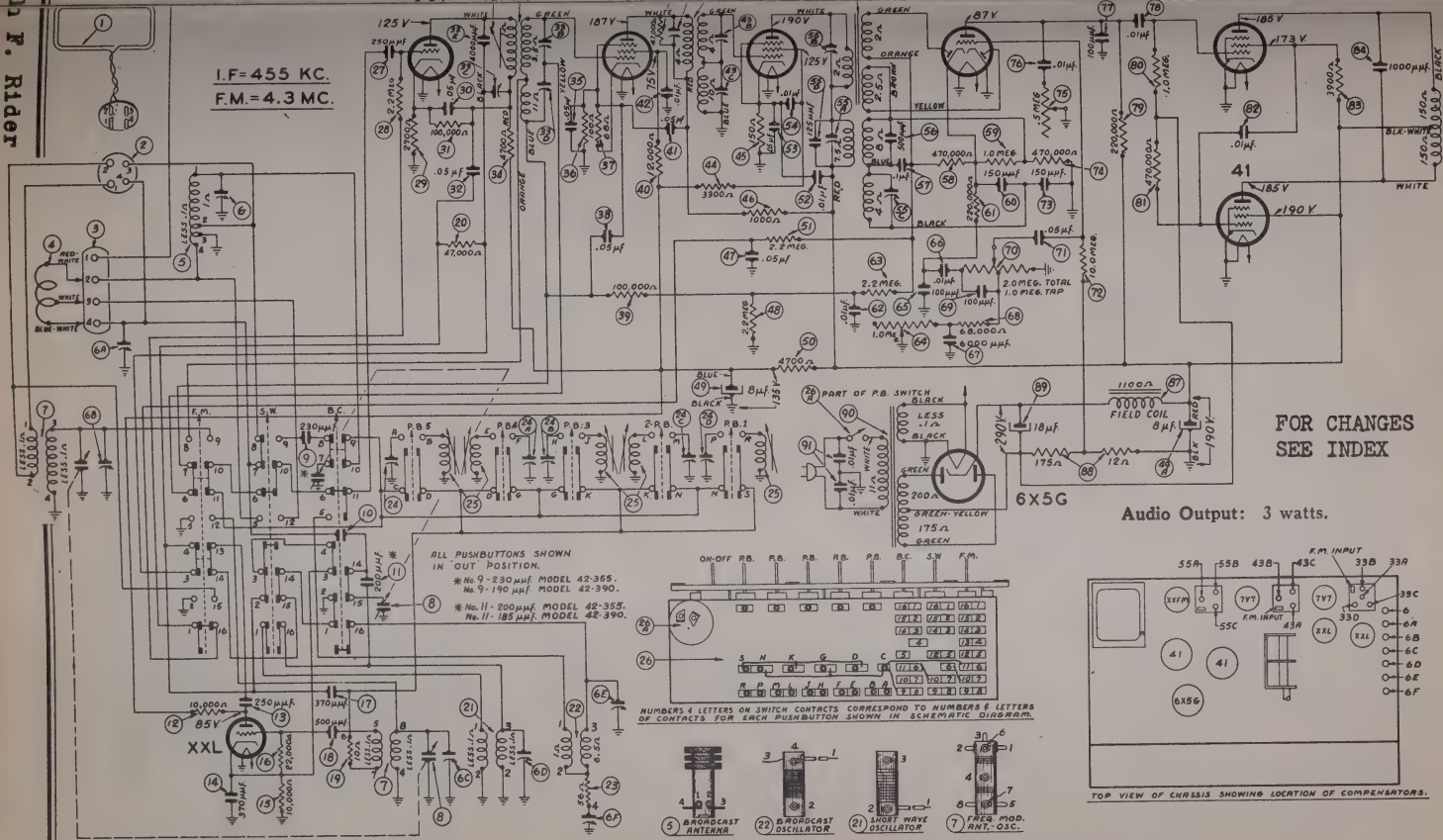
Frequency Tuning Ranges: 540 to 1720 KC; 9 to 15 MC. and 42 to 50 MC (F. M.).


I.F.=455 KC.
F.M.=4.3 MC.
XXL
6X5G
41
7V7
XXFM
ALL PUSHBUTTONS SHOWN IN OUT POSITION.
* No. 9 - 230 μμf. MODEL 42-355. No. 9 - 190 μμf. MODEL 42-390.
* No. 11 - 200 μμf. MODEL 42-355. No. 11 - 185 μμf. MODEL 42-390.
NUMBERS & LETTERS ON SWITCH CONTACTS CORRESPOND TO NUMBERS & LETTERS OF CONTACTS FOR EACH PUSHBUTTON SHOWN IN SCHEMATIC DIAGRAM.
5 BROADCAST ANTENNA
22 BROADCAST OSCILLATOR
21 SHORT WAVE OSCILLATOR
7 FREQ. MOD. ANT.-OSC.
TOP VIEW OF CHASSIS SHOWING LOCATION OF COMPENSATORS.

FOR CHANGES SEE INDEX

Audio Output: 3 watts.

Power Supply: 115 volts, 60 cycles A. C.

This model can also be operated on 25-cycle current. To do this it is necessary to replace the power transformer as indicated in the parts list for 25-cycle operation.

Power Consumption: 70 watts.

Intermediate Frequency: Standard Tuning, 455 KC; F. M. Channel, 4.3 MC.

FIG. 1—SCHEMATIC DIAGRAM—Models 42-355, 42-390

The D. C. voltages indicated at the tube elements in the above diagram were measured with a 1000 ohms per voltmeter. Philco Model 027. Line voltage 117 volts A. C. No signal being received—range switch broadcast.

MODELS 42-355, 42-390

PHILCO RADIO & TELEVISION CORP.

REPLACEMENT PARTS—Models 42-355, 42-390

Sch. No.	Description	Part No.
1.	F. M. Loop Aerial (Model 42-355)	76-1384
	F. M. Loop Aerial (Model 42-390)	76-1346
2.	Socket (on Chassis-F. M. Loop Aerial)	27-6181
	Mtg. Rivet	W-207
3.	Terminal Panel (on Chassis, Loop Aerial)	38-9870
	Mtg. Rivet	W-207
4.	Loop Aerial (Brdcst—S. W.) (Model 42-355)	76-1306
	Mtg. Screw	W-2071
	Loop Aerial (Brdcst.—S. W.) (Model 42-390)	76-1307
	Mtg. Sleeve	28-3806
	Mtg. Sleeve	56-1545
	Spring Washer	28-4186
	Screw	W-288
	Washer	W-425
	Washer	W-648
5.	Aerial Transformer (Broadcast Band) (Model 42-385)	32-3811
	Aerial Transformer (Broadcast Band) (Model 42-390)	32-3790
	Mtg. Clip	28-5002
6.	Compensator (Broadcast Aerial)	31-6443
6A.	Compensator (S. W. Aerial) (Part of 6)	
6B.	Compensator (F. M. Aerial) (Part of 6)	
6C.	Compensator (F. M. Osscillator) (Part of 6)	
6D.	Compensator (S. W. Oscillator) (Part of 6)	
6E.	Compensator (Broadcast—Series) (Part of 6)	
6F.	Compensator (Broadcast—Oscillator) (Part of 6)	
7.	Aerial and Oscillator Transformer (F. M.)	32-3792
	Mtg. Clip	28-5002
8.	Tuning Condenser (two sections—Standard & F. M.)	31-2592
	Drive Cord (Pointer)	31-2576
	Spring (Pointer Drive)	28-8953
	Drive Cord (Tuning Cond.)	31-2577
	Spring (Drive Cord)	28-8751
	Drive Drum (Tuning Cond.)	76-1293
	Mtg. Grommet	27-4596
	Mtg. Sleeve	56-1505
	Mtg. Screw	W-2002
	Tuning Shaft	56-6152
	"C" Washer (Mtg. Shaft)	28-2043
9.	Silver Mica Condenser (230 mmfd) (Model 42-355)	30-1214
	Silver Mica Condenser (190 mmfd) (Model 42-390)	20-019017
10.	Condenser (Wire and Lug)	
11.	Silver Mica Condenser (200 mmfd) (Model 42-355)	
	Silver Mica Condenser (185 mmfd) (Model 42-390)	30-1213
12.	Resistor (10,000 ohms)	20-018511
13.	Mica Condenser (250 mmfd)	33-310339
14.	Silver Mica Condenser (870 mmfd)	60-125257
15.	Resistor (10,000 ohms)	30-1110
16.	Resistor (22,000 ohms)	33-310339
17.	Silver Mica Condenser (370 mmfd)	33-322339
18.	Mica Condenser (500 mmfd)	30-1110
19.	Registor (10 ohms)	60-150157
20.	Resistor (47,000 ohms)	33-010339
	Mtg. Clip	33-347339
21.	S. W. Oscillator Transformer (Model 42-355)	28-5002
	S. W. Oscillator Transformer (Model 42-390)	32-3812
	Mtg. Clip	32-3792
22.	Broadcast Oscillator Transformer	28-5002
	Mtg. Clip	32-3791
23.	Resistor (56 ohms)	28-5002
24.	Push-button Compensator (No. 1 Button)	33-056339
24A.	Push-button Compensator (No. 2 Button) (Part of 24)	31-6439
24B.	Push-button Compensator (No. 3 Button) (Part of 24)	

Sch. No.	Description	Part No.
24C.	Push-button Compensator (No. 4 Button) (Part of 24)	
24D.	Push-button Compensator (No. 5 Button) (Part of 24)	
25.	Push-button Oscillator oil (No. 1 P. B.)	32-3780
25A.	Push-button Oscillator Coil (No. 2 P. B.)	32-3780
25B.	Push-button Oscillator Coil (No. 3 P. B.)	32-3780
25C.	Push-button Oscillator oil (No. 4 P. B.)	32-3779
25D.	Push-button Oscillator Coil (No. 5 P. B.)	32-3779
	Coil Clip	56-2250
	Iron Core	56-6100
	Iron Core Screw Clamp	56-2249
26.	Push-button Switch	42-1692
26A.	Push-button Power Switch (Part of 26)	42-1717
	Mtg. Grommet	27-4596
	Mtg. Sleeve	56-1505
	Mtg. Screw	W-523
27.	Mica Condenser (250 mmfd)	60-125257
28.	Resistor (2.2 megohms)	33-522339
29.	Resistor (2700 ohms)	33-227339
30.	Condenser (.05 mfd, 400 volts)	30-4518
31.	Resistor (100,000 ohms)	33-410339
32.	Condenser (.05 mfd, 400 volts)	30-4518
33.	1st I. F. Transformer	32-3787
33A.	Primary Compensator (455 KC) (Part of 33)	
33B.	Secondary Compensator (455 KC) (Part of 33)	
33C.	Primary Compensator (F. M. 4.3 MC) (Part of 33)	
33D.	Secondary Compensator (F. M. 4.3 MC) (Part of 33)	
33E.	Condenser (4000 mmfd) (Part of 33)	
33F.	Resistor (47,000 ohms) (Part of 33)	
	Mtg. Nut (1. F. Trans.)	W-1949
34.	Resistor (4700 ohms)	33-247339
35.	Resistor (.05 mfd, 200 volts)	30-4519
36.	Resistor (100 ohms)	33-110336
37.	Resistor (68 ohms)	33-068339
38.	Condenser (.05 mfd, 200 volts)	30-4519
39.	Resistor (100,000 ohms)	33-410339
40.	Resistor (12,000 ohms)	33-312339
41.	Condenser (.05 mfd, 400 volts)	30-4518
42.	Condenser (.01 mfd, 400 volts)	30-4572
43.	2nd I. F. Transformer	32-3788
43A.	Primary Compensator (F. M. 4.3 MC)	
43B.	Secondary Compensator (F. M. 4.3 MC)	
43C.	Secondary Compensator (455 KC)	
43D.	Resistor (47,000 ohms) (Part of 43)	33-347339
	Mtg. Nut (1. F. Trans.)	W-1949
44.	Resistor (3300 ohms)	33-233339
45.	Resistor (150 ohms)	33-115336
46.	Resistor (1000 ohms)	33-210339
47.	Condenser (.05 mfd, 200 volts)	30-4519
48.	Resistor (2.2 megohms)	33-522339
49.	Electrolytic Condenser (8-8 mfd)	30-2513
50.	Resistor (4700 ohms)	33-247339
51.	Resistor (2.2 megohms)	33-522339
52.	Condenser (.01 mfd, 400 volts)	30-4572
53.	Condenser (.05 mfd, 200 volts)	30-4519
54.	Condenser (.01 mfd, 400 volts)	30-4572
55.	3rd I. F. Transformer	32-3789
55A.	Primary Compensator (455 KC) (Part of 55)	
55B.	Primary Compensator (F. M. 4.3 MC) (Part of 55)	
55C.	Secondary Compensator (F. M. 4.3 MC) (Part of 55)	
55D.	Condenser (125 mmfd) (Part of 55)	
	Mtg. Nut (I. F. Mtg.)	W-1949
56.	Mica Condenser (500 mmfd)	60-150227
57.	Condenser (.1 mfd, 200 volts)	30-4586
58.	Resistor (470,000 ohms)	33-447339
59.	Resistor (1 megohm)	33-510339
60.	Mica Condenser (150 mmfd)	60-115137
61.	Resistor (220,000 ohms)	33-422339
62.	Condenser (.01 mfd, 400 volts)	30-4572

Sch. No.	Description	Part N
63.	Resistor (2.2 megohms)	33-5223
64.	Tone Control (Bass)	33-546
	Mtg. Nut	W-211
65.	Mica Condenser (100 mmfd)	60-1101
66.	Condenser (.01 mfd, 400 volts)	30-45
67.	Condenser (.006 mmfd)	30-45
68.	Resistor (68,000 ohms)	33-3682
69.	Mica Condenser (100 mmfd)	60-1101
70.	Volume Control	33-54
	Mtg. Nut	W-21
71.	Condenser (.05 mfd, 200 volts)	30-45
72.	Resistor (10 megohms)	33-6103
73.	Condenser (150 mmfd)	60-1151
74.	Resistor (470,000 ohms)	33-4473
75.	Tone Control (Treble)	33-556
	Mtg. Nut	W-21
76.	Condenser (.01 mfd, 400 volts)	30-45
77.	Condenser (100 mmfd)	60-1101
78.	Condenser (.01 mfd, 400 volts)	30-45
79.	Resistor (220,000 ohms)	33-4223
80.	Resistor (1 megohm)	33-5103
81.	Resistor (470,000 ohms)	33-4473
82.	Condenser (.01 mfd, 400 volts)	30-45
83.	Resistor (3900 ohms)	33-2393
84.	Condenser (.001 mfd)	30-46
85.	Output Transformer	32-81
86.	Speaker (Model 42-355)	36-15
	Speaker (Model 42-390)	36-1552
	Cable (Model 42-355)	41-35
	Mtg. Washer	27-74
	Mtg. Nut	W-1
	Cone Assembly (For Speaker 36-1519-2)	36-42
	Cone Assembly (For Speaker 36-1519-3)	36-41
	Cone Assembly (For Speaker 36-1519-4)	36-41
	Cone Assembly (For Speaker 36-1552-4)	36-42
87.	Field Coil (Replace Speaker 36-1519)	33-34
88.	Bias Resistor (12-175 ohms)	30-25
89.	Electrolytic Condenser (18 mfd) Clamp	54-18
90.	Power Transformer (115 volts, 60 cycle) (Model 42-355)	32-81
	Power Transformer (115 volts, 60 cycle) (Model 42-390)	32-81
	Shield	56-15
	Mtg. Screw	W-19
91.	Power Line Filter Condenser (.01-01 mfd)	3903-OD
92.	Pilot Lamps	34-20
	Mtg. Clip	57-14
	Socket Assembly (Dial Lights)	76-12
	Miscellaneous Parts	
	Bezel (Cabinet)	54-40
	Mtg. Screw	W-20
	Cabinet (Model 42-355)	1064B
	Cabinet (42-390)	1067B
	Cord (Power)	L-31
	Dial	27-57
	Background Plate	27-59
	Rubber Corner (Dial Mtg.)	54-64
	Spring (Background Plate)	28-89
	Mtg. Clamp (Dial)	56-15
	Mtg. Screw	W-19
	Pointer	56-25
	Knob (Push-Buttons)	54-41
	Spring (P. B. Knobs)	76-12
	Knob (Tuning, Volume, Tone)	54-41
	Rubber Grommet (Chassis Mtg.)	27-45
	Screw (Chassis Mtg.)	W-19
	Socket (41 tube)	27-61
	Socket (6 x 5 G)	27-61
	Socket (Loktal Tubes)	27-62
	Socket (Single Prong-F. M. Test)	27-63
	Rivets (Mtg. Sockets)	W-2
	Tab Kit	40-66
	Cover Tabs	27-57
	Tab (Broadcast)	27-57
	Tab (S. W.)	27-57
	Tab (F. M.)	27-57
	Tab (ON-OFF)	27-57
	Tab (Television)	27-57

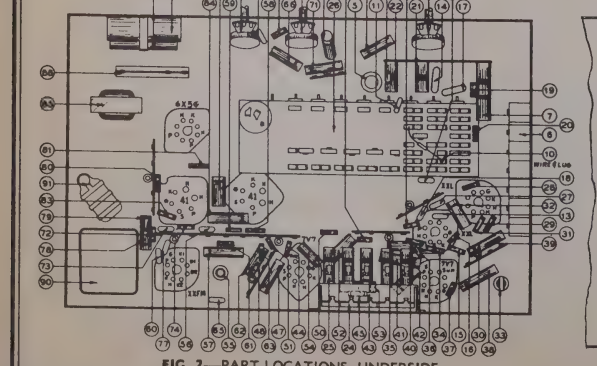


FIG. 2—PART LOCATIONS, UNDERSIDE OF CHASSIS

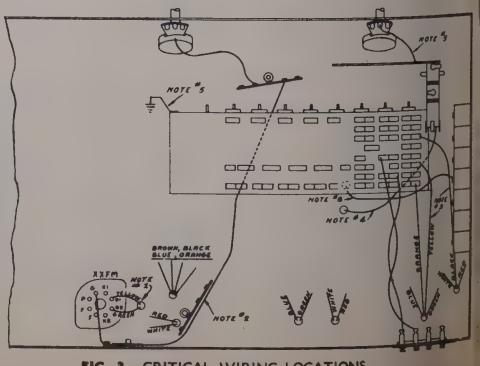


FIG. 3—CRITICAL WIRING LOCATIONS, F. M. ALIGNING

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PHILCO RADIO & TELEVISION CORP.

MODELS 42-355, 42-390

ELECTRIC PUSH-BUTTON TUNING ADJUSTMENTS

The automatic tuning mechanism consists of nine (9) push-buttons. Five of the push-buttons are used for selecting standard broadcast stations, one for the power control (ON-OFF); and three for selecting standard tuning, shortwave and F. M. (Frequency Modulation).

Viewing the front of the cabinet from left to right the first push-button is the power control (ON-OFF), the next five push-buttons for tuning standard broadcast stations, and the seventh, eighth and ninth for selecting the tuning ranges—standard, shortwave and F. M., respectively.

When setting up stations on the push-buttons the lowest frequency station is set up in the second push-button from the left and the remaining stations according to increasing frequency in the next four push-buttons. These push-buttons are adjusted by the padders located on the rear of the chassis. The second push-button from the left can also be adjusted for reception of the sound channel of a television program received by special Philco television radios. This push-button may also be used in conjunction with a Philco Wireless Record Player.

The frequency ranges covered by the station tuning push-buttons and procedure for adjusting is as follows:

Padders right to left from rear	Circuit	Buttons left to right from front	Frequency Range
		1	ON-OFF
1	Ant. Osc.	2	540 to 1000 KC
2	Ant. Osc.	3	600 to 1200 KC
3	Ant. Osc.	4	650 to 1300 KC
4	Ant. Osc.	5	850 to 1500 KC
5	Ant. Osc.	6	900 to 1600 KC
		7	Standard Band
		8	Shortwave Band
		9	Frequency Modulation

STANDARD AND S. W. BANDS ALIGNING PROCEDURE

Operations In Order	SIGNAL GENERATOR Output Connections	SIGNAL GENERATOR Dial Setting	RECEIVER Dial Setting	RECEIVER Control Settings	Adjust Compensators In Order	Special Instructions
1	High side to No. 4 terminal loop panel	455 KC	580 KC	Vol. max. push-button Bdcst. "IN"	55A, 43C, 33B, 33A	
2	Use loop on generator	1500 KC	1500 KC	"	6E, 6	Note A
3	Use loop on generator	580 KC	580 KC	"	6F	Roll Tuning Condensers Note B
4	Use loop on generator	Readjust as given in Operation 2				
5	Use loop on generator	15 MC	15 MC	Push-button S. W. "IN"	6D, 6A	Note C

FREQUENCY MODULATION ALIGNING PROCEDURE

Note: The Frequency Modulation Circuits Must Be Adjusted With the Dipole Aerial Connected.

CRITICAL WIRING LOCATIONS

The following items on these sets are critical for location and position. See Fig. 3 for locations of wires and parts.

1. Green lead and yellow lead from third I. F. coil must be short, direct, and symmetrically spaced from sub-base. Adding capacity to the green lead will narrow the discriminator curve, while adding capacity to the yellow lead will widen the discriminator curve.
2. The XXFM grid lead must be dressed away from the discriminator coil wiring in 42-355 and 42-390 with the lug provided for that purpose. Failure to do this will result in distortion at low volume control settings.
3. The black lead of the 1st I. F. coil must be dressed along the sub-base and away from the yellow and orange leads of the same coil. Proximity of these leads may result in decreased sensitivity at certain points of the broadcast band because of oscillator harmonics feeding through the 4.3 MC I. F. channel to build up A. V. C. voltage.
4. The blue and white and the white leads from the loop terminal panel must have one complete twist. This is necessary to maintain the proper inductance for shortwave operation, and to prevent loose S. W. antenna padding.
5. Grounding must be maintained at all original points. Any change in grounding of the R. F. wiring will cause serious mistracking of the F. M. band.
6. The brass indicator tabs must not be allowed to touch the sub-base. Any accidental connection from the push-button shafts to ground will cause misalignment of the F. M. band.
7. All I. F. coil wires must be brought out of the designated sub-base holes and kept free from wires coming out other holes. This is necessary to maintain the proper 4.3 MC I. F. curves.
8. The leads from the small gang sections are part of the F. M. tuned circuits and must be maintained to specified lengths for proper F. M. tracking.

F. M. BAND ALIGNING PROCEDURE

Operations In Order	SIGNAL GENERATOR Output Connections	SIGNAL GENERATOR Dial Setting	RECEIVER Dial Setting	RECEIVER Control Settings	Adjust Compensators In Order	Special Instructions
1	2nd I. F., F. M. input connection	4.3 MC	580 KC	Vol. max. F. M. push-button "IN"	55C (Note D) 55B (Note E)	
2	1st I. F., F. M. input connection	4.3 MC	580 KC	F. M. push-button "IN"	43A, 43B (Note F)	
3	High side to No. 1 contact, F. M. socket. Ground to No. 2 contact	4.3 MC	580 KC	F. M. push-button "IN"	33C, 33D (Note F)	
4	Use test loop on generator; place near dipole aerial	49 MC	90 (Note G)	F. M. push-button "IN"	6C (Note G) 6B (Note H)	Roll tuning condenser when adjusting 6B. See Note B
5	"	49 MC	90	F. M. push-button "IN"	6C oscillator	

NOTE A.—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial pointer must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer to the extreme left index line at the low frequency end of the broadcast scale.

NOTE B.—When adjusting the low frequency compensator of the broadcast or the aerial padders of the high frequency tuning range; the receiver tuning control must be adjusted (rolled) as follows: First, adjust the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C.—Adjust compensator (6D) to the second signal peak from the closed position (maximum capacity). The aerial compensator (6A) must also be adjusted to maximum on the first signal peak by rolling the tuning condenser. (See Note B.)

NOTE D.—With the signal generator set to 4.3 MC, padder (55C) is adjusted to the point where minimum signal indication is observed on the output meter.

NOTE E.—Turn the signal generator first to approximately 125 KC below 4.3 MC (4.17 MC) and then 125 KC above 4.3 MC (4.42 MC). A signal peak should be observed on the output meter at approximately each of these points (4.17 and 4.42). The two peak signals should be of equal reading on the output meter and equally spaced in frequency each side of 4.3 MC. If the peaks are unequal in amplitude, padder (55B) must be adjusted in the direction necessary to make both peaks equal. This is done by slightly turning padder and then turning signal generator above and below 4.3 to observe peaks. After equal peaks readings are obtained, set the signal generator to 4.3 MC. The output meter should show zero reading at 4.3 MC. If a signal indication is observed readjust padder (55C) until zero reading is obtained on the meter. After this adjustment is made padder No. 55B should be reset for equal peaks as given above.

NOTE F.—Adjust padders 43A, 43B, 33C, and 33D for equal signal peaks and equal frequency spacing each side of 4.3 MC.

NOTE G.—The dial scale numbers are listed in tenths of megacycles less the first digit; i. e., 49 MC is 90, 48.5 is 85. Set the tuning dial pointer to 90 on the F. M. scale. Adjust padder (6C) to the point where minimum signal indication is observed on the output meter.

NOTE H.—In order to adjust padder (6B) the signal generator should be set to either the signal peak approximately 125 KC below 49 MC (48.875 MC), or 125 KC above 49 MC (49.125 MC). Adjust padder (6B) to maximum output reading on either of these peak signals. As padder 6B is being adjusted roll the tuning condenser as given in Note B.

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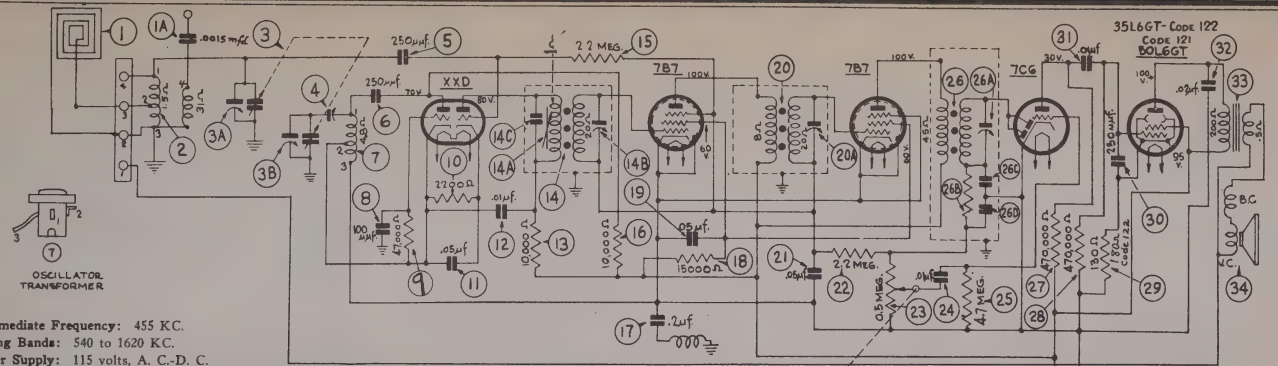
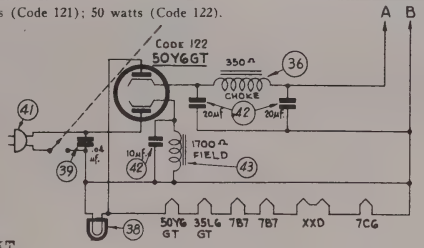
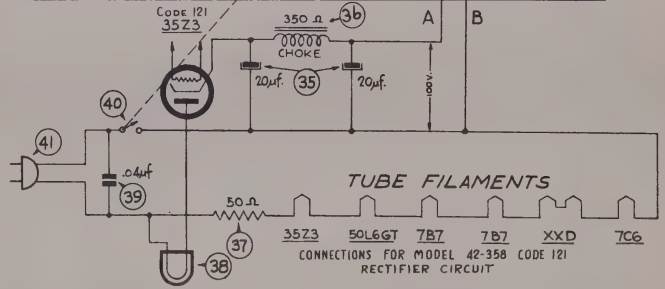


Intermediate Frequency: 455 KC.
Tuning Bands: 540 to 1620 KC.
Power Supply: 115 volts, A. C.-D. C.
Power Consumption: 35 watts (Code 121); 50 watts (Code 122).
Audio Output: 1 watt.

FOR ALIGNMENT SEE INDEX

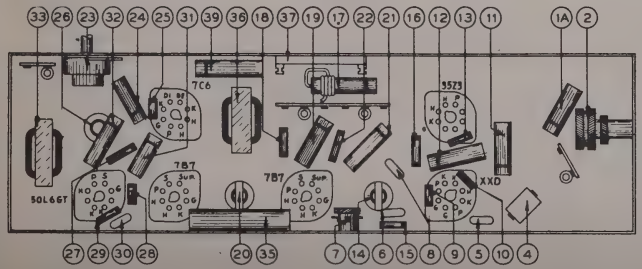


CONNECTIONS FOR MODEL 42-358 CODE 122 RECTIFIER CIRCUIT

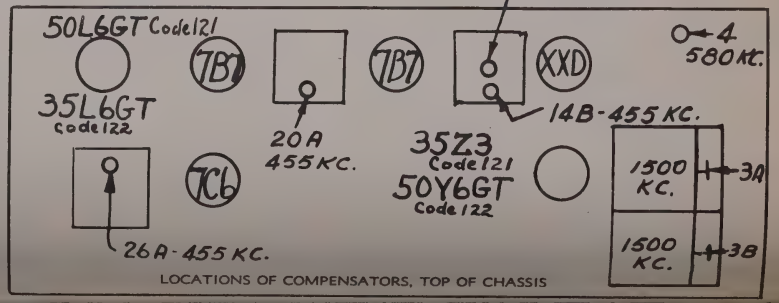


CONNECTIONS FOR MODEL 42-358 CODE 121 RECTIFIER CIRCUIT

The voltages indicated at the tube elements in the above diagram were measured with a 1000 ohms per volt voltmeter. Philco Model 027, line voltage 117 volts, A. C. band switch (broadcast), no station being received.



LOCATIONS OF PARTS—UNDER CHASSIS
Model 42-358



LOCATIONS OF COMPENSATORS, TOP OF CHASSIS

In general, the features of Code 121 and Code 122 chassis are similar with the exception of the output tubes, rectifier tubes, rectifier circuit and speaker. Code 121 chassis incorporates a 50L6GT, output tube; 35Z3, rectifier tube and permanent magnet dynamic speaker. Code 122 chassis consists of a 35L6GT, output tube; 50Y6GT, rectifier tube and dynamic speaker with a field coil. The circuit differences are indicated on the schematic diagram and parts list.

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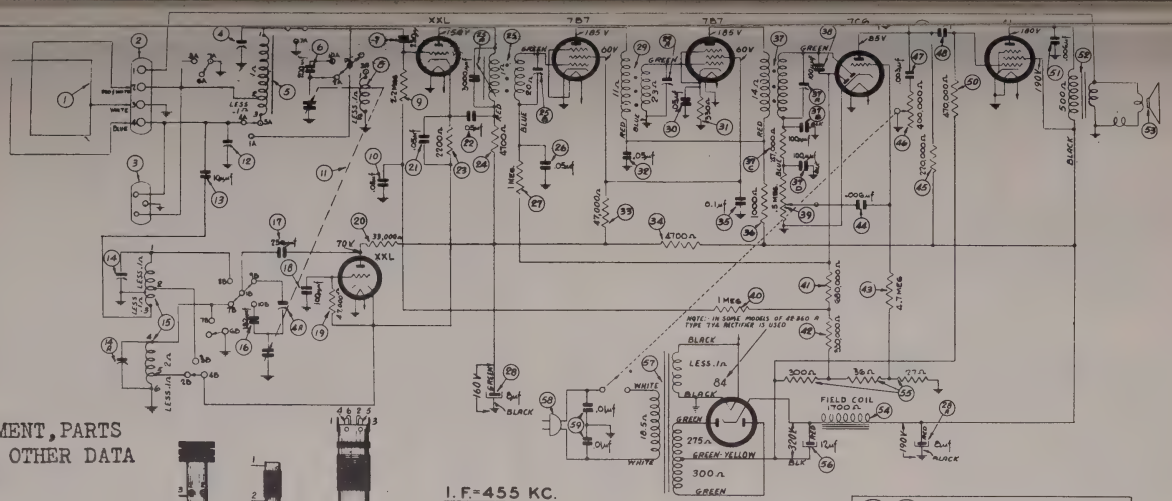
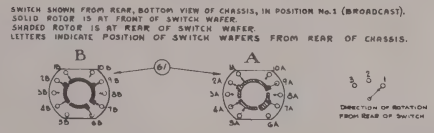


FOR ALIGNMENT, PARTS LIST, AND OTHER DATA SEE INDEX


SWITCH SHOWN FROM REAR, BOTTOM VIEW OF CHASSIS, IN POSITION No.1 (BROADCAST).
SOLID ROTOR IS AT FRONT OF SWITCH WAFER.
SHADED ROTOR IS AT REAR OF SWITCH WAFER.
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM REAR OF CHASSIS.
B
A
DIRECTION OF ROTATION FROM REAR OF SWITCH

SCHEMATIC DIAGRAM MODEL 42-360

The D. C. voltages indicated at the tube elements in the above diagram were measured with a 1000 ohms per volt voltmeter. Philco Model 027. Line voltage, 117 volts A. C. No signal being received—range switch broadcast.

MODEL 42-360, CODE 121

Circuit Description: Model 42-360, Code 121, is a seven (7) tube superheterodyne radio with two tuning bands covering Standard, Police and Shortwave broadcast stations and operates on alternating current (A. C.). In addition, this model incorporates a Philco low impedance loop aerial which is built into the cabinet; provisions for an external aerial; Philco LOKTAL tubes, including the XXL noise reducing converter tube; two intermediate frequency stages; continuously variable tone control; automatic volume control; pentode audio output stage and a 10-inch dynamic speaker.

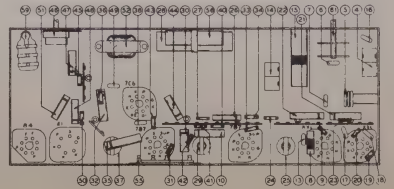
Intermediate Frequency: 455 KC.

Tuning Band Frequencies: 540 to 1720 KC; 9 to 15.5 MC.

Audio Output: 2 watts.

Power Supply: 115 volts, 60 cycles A. C.

This model can also be operated on 115 volts, 25 cycle A. C. by changing the power transformer as indicated in the parts list.



PART LOCATIONS, UNDERSIDE OF CHASSIS, MODEL 42-360

MODEL 42-360
MODEL 42-365

PHILCO RADIO & TELEV. CORP.

REPLACEMENT PARTS—Model 42-360

Sch. No.	Description	Part No.
1.	Loop Aerial	76-1271
	Spring Washer	28-4186
	Sleeve	28-3806
	Sleeve	56-1545
	Screw (Loop Mtg.)	W-288
	Washer (3 required)	W-648
	Washer (1 required)	W-425
2.	Terminal Panel	38-9870
3.	External Aerial Socket	27-6145
	Mtg. Rivet	W-207
4.	Compensator (Broadcast Aerial)	31-6365
4A.	Compensator (Oscillator—Brdcst.—580KC) (Part of 4)	
	Mtg. Rivet	W-239
5.	Aerial Transformer (Brdcst. Band)	32-3726
	Mtg. Clip	28-5002
6.	Mica Condenser (200 mmfd)	30-1205
7.	Mica Condenser (250 mmfd)	60-125157
8.	Aerial Transformer (S. W. Band)	32-3768
	Mtg. Clip	28-5002
9.	Resistor (2.2 megohms)	33-522339
10.	Condenser (.05 mfd, 200 volts)	30-4519
11.	Tuning Condenser	31-2481
	Tuning Shaft	56-6141
	"C" Washer	28-2043
	Drive Drum	38-9883
	Drive Cord (Pointer)	31-2597
	Drive Cord (Tuning Cond.)	31-2400
	Insulating Bushing	27-9437
	Rubber Connector	27-9432
	Mtg. Grommet	27-4596
	Mtg. Sleeve	28-3806
	Spring (Cond. Drive Cord)	28-8751
	Spring (Pointer Drive Cord)	28-8953
	Screw (Mtg. Cond.)	W-2002
12.	Compensator (S. W. Aerial)	31-6384
13.	Mica Condenser (10 mmfd)	60-010337
14.	Compensator (Oscillator—S. W.)	31-6364
14A.	Compensator (Oscillator—Broadcast) (Part of 14)	
	Mtg. Rivet	W-239
15.	Oscillator Transformer	32-3727
	Mtg. Clip	28-5003
16.	Mica Condenser (182 mmfd)	30-1208
17.	Mica Condenser (250 mmfd)	60-125157
18.	Mica Condenser (100 mmfd)	60-110157
19.	Resistor (47,000 ohms)	33-347339
20.	Resistor (33,000 ohms)	33-333339
21.	Condenser (.05 mfd, 200 volts)	30-4519
22.	Condenser (.05 mfd, 400 volts)	30-4518
23.	Resistor (2200 ohms)	33-222339
24.	Resistor (4700 ohms)	33-247339
25.	1st I. F. Transformer	32-3465
25A.	Primary Compensator (Part of 25)	
25B.	Secondary Compensator (Part of 25)	
	Mtg. Nut	W-1949
26.	Condenser (.05 mfd, 200 volts)	30-4519
27.	Resistor (1 megohm)	33-510339
28.	Electrolytic Condenser (8-8 mfd, 400 volts)	30-2476
29.	2nd I. F. Transformer	32-3639
29A.	Secondary Compensator (Part of 29)	
	Mtg. Nut	W-1949
30.	Condenser (.05 mfd, 200 volts)	30-4519
31.	Resistor (330 ohms)	33-133336
32.	Condenser (.05 mfd, 400 volts)	30-4518
33.	Resistor (47,000 ohms)	33-347339
34.	Resistor (4700 ohms)	33-247339
35.	Condenser (.1 mfd, 400 volts)	30-4527
36.	Resistor (1000 ohms)	33-210339
37.	3rd I. F. Transformer	32-3640
37A.	Secondary Compensator (Part of 37)	
37B.	Condenser (100 mmfd) (Part of 37)	
37C.	Resistor (47,000 ohms) (Part of 37)	
37D.	Condenser (100 mmfd) (Part of 37)	
	Mtg. Nut	W-1949
38.	Condenser (100 mmfd)	60-110157
39.	Volume Control	33-5451
	Mtg. Nut	W-2157
40.	Resistor (1 megohm)	33-510339
41.	Resistor (680,000 ohms)	33-468339
42.	Resistor (330,000 ohms)	33-433339
43.	Resistor (4.7 megohms)	33-547339
44.	Condenser (.006 mfd, 400 volts)	30-4591
45.	Resistor (220,000 ohms)	33-422339
46.	Tone Control	33-5463
	Mtg. Nut	W-2157
47.	Condenser (.003 mfd, 600 volts)	30-4552
48.	Condenser (.01 mfd, 400 volts)	30-4572
49.	Mica Condenser (100 mmfd)	60-110157
50.	Resistor (470,000 ohms)	33-447339
51.	Condenser (.006 mfd, 400 volts)	30-4591
52.	Output Transformer	32-3116
53.	Speaker	36-1513-3 or 36-1513-4
	Cone Assembly (For Speaker 36-1513-3)	36-4164
	Cone Assembly (For Speaker 36-1513-4)	36-4169
	Cable (Speaker)	41-3541
	Mtg. Nut (Speaker)	W-124
54.	Field Coil (Replace Speaker)	
55.	Bias Resistor (27-36-300 ohms)	33-3392
56.	Electrolytic Condenser (12 mfd, 400 volts)	30-2471
57.	Power Transformer (115 volts, 60 cycle)	32-3117
	Power Transformer (115 volts, 25 cycle)	
58.	Power Cord	L-3199
59.	Filter Condenser (Power Line)	3903-DG
60.	Pilot Lamps (Dial)	34-2064
	Pilot Lamps (Indicator)	34-3068
	Socket Assembly (Pilot Lamp Dial)	76-1316
	Socket Assembly (Indicator Pilot Lamp)	76-1078
61.	Band Switch	42-1673
	Mtg. Nut	W-2157

Miscellaneous Parts

Bezel (Cabinet)	54-4104
Mtg. Screw	W-2071
Cabinet	10543-C
Dial	27-5744
Pointer	56-1556
Spring Fastener	56-6127
Knob	54-4106
Indicator Arm and Link Assembly	76-1272
Rubber Corners (Chassis)	54-4015
Rubber Grommet (Chassis Mtg.)	27-4571
Screw (Chassis Mtg.)	W-1345
Socket (5 prong)	27-6168
Socket (LOKTAL TUBES)	27-6177
Mtg. Rivet	W-239
Washer (Chassis Mtg.)	38-5114

REPLACEMENT PARTS—Model 42-365

Sch. No.	Description	Part No.
1.	Loop Aerial	76-1305
	Sleeve (Mtg. Loop)	28-3806
	Sleeve (Mtg. Loop)	56-1545
	Spring Washer	28-4186
	Screw (Loop Mtg.)	W-288
	Washer (Loop Mtg.)	W-425
2.	Terminal Panel (Loop Aerial)	38-9870
3.	External Aerial Socket	27-6145
	Mtg. Rivet	W-207
4.	Compensator (S. W. Aerial)	31-6384
5.	Mica Condenser (10 mmfd)	60-010337
6.	Compensator (Oscillator—S. W.)	31-6374
6A.	Compensator (Oscillator—Police) (Part of 6)	
6B.	Compensator (Oscillator—Broadcast) (Part of 6)	
7.	Oscillator Transformer (Broadcast—S. W.)	32-3756
	Mtg. Clip	28-5003
8.	Oscillator Transformer (Police)	32-3757
	Mtg. Clip	28-5002
9.	Aerial Transformer	32-3755
	Mtg. Clip	28-5002
10.	Mica Condenser (10 mmfd)	60-010337
11.	Silver Mica Condenser (210 mmfd)	30-1210
12.	Mica Condenser (250 mmfd)	60-125157
13.	Compensator (Aerial—Broadcast)	31-6401
13A.	Compensator (Oscillator—580 KC) (Part of 14)	
14.	Resistor (2.2 megohms)	33-522339
15.	Condenser (.05 mfd, 200 volts)	30-4519
16.	Condenser (.05 mfd, 200 volts)	30-4519
17.	Mica Condenser (250 mmfd)	60-125157
18.	Mica Condenser (2000 mmfd)	60-220324
19.	Mica Condenser (182 mmfd)	30-1208
20.	Tuning Condenser	31-2581
	Drive Drum	38-9883
	Drive Cord (Pointer)	31-2597
	Drive Cord (Tuning Cond.)	31-2400
	Drive Shaft	56-6141
	"C" Washer	28-2043
	Insulating Bushing	27-9437
	Grounding Spring	28-8955
	Grommet (Mtg. Cond.)	27-4596
	Rubber Connector (Tuning Cond.)	27-9432
	Spring (Cond. Drive Cord)	28-8751
	Spring (Pointer Drive Cord)	28-8953
	Sleeve (Mtg. Tuning Cond.)	28-3806
21.	Push-Button and Power Switch Assembly	42-1687
	Mtg. Sleeve	28-5665
	Mtg. Screw	W-523
	Mtg. Grommet	27-4596
22.	Push-Button Compensator Assembly	31-6377
23.	Mica Condenser (100 mmfd)	60-110157
24.	Resistor (47,000 ohms)	33-347339
25.	Resistor (33,000 ohms)	33-333339
26.	Resistor (2200 ohms)	33-222339
27.	Resistor (4700 ohms)	33-247339
28.	Condenser (.05 mfd, 400 volts)	30-4518
29.	1st I. F. Transformer	32-3465
	Mtg. Nut	W-1949
29A.	Primary Compensator (Part of 29)	
29B.	Secondary Compensator (Part of 29)	
30.	Condenser (.05 mfd, 200 volts)	30-4519
31.	Resistor (1 megohm)	33-510339
32.	2nd I. F. Transformer	32-3639
	Mtg. Nut	W-1949
32A.	Secondary Compensator (Part of 32)	
33.	Condenser (.05 mfd, 200 volts)	30-4519
34.	Resistor (330 ohms)	33-133336
35.	Condenser (.05 mfd, 400 volts)	30-4518
36.	Resistor (47,000 ohms)	33-347339
37.	Electrolytic Condenser (8-8 mfd)	30-2476
37A.	Electrolytic Condenser (8 mfd) (Part of 37)	
	Mtg. Clamp	56-1452
38.	Resistor (4700 ohms)	33-247339
39.	Condenser (.01 mfd, 400 volts)	30-4572
40.	Resistor (1000 ohms)	33-210339
41.	3rd I. F. Transformer	32-3640
	Mtg. Nut	W-1949
41A.	Secondary Compensator (Part of 41)	
41B.	Condenser (100 mmfd) (Part of 41)	
41C.	Resistor (47,000 ohms) (Part of 41)	33-347339
41D.	Condenser (100 mmfd) (Part of 41)	
42.	Mica Condenser (100 mmfd)	60-110157
43.	Volume Control	33-5451
	Mtg. Nut	W-2157
44.	Resistor (1 megohm)	33-510339
45.	Resistor (680,000 ohms)	33-468339
46.	Resistor (330,000 ohms)	33-433339
47.	Resistor (4.7 megohms)	33-547339
48.	Condenser (.006 mfd, 400 volts)	30-4591
49.	Resistor (220,000 ohms)	33-422339
50.	Tone Control	33-5459
	Mtg. Nut	W-2157
51.	Resistor (470,000 ohms)	33-447339
52.	Condenser (.003 mfd, 600 volts)	30-4552
53.	Condenser (100 mmfd)	60-110157
54.	Condenser (.01 mfd, 400 volts)	30-4572
55.	Condenser (.006 mfd, 400 volts)	30-4591
56.	Output Transformer	32-3116
57.	Speaker	36-1513-3 or 36-1513-4
	Cone Assembly (For Speaker 36-1513-3)	36-4164
	Cone Assembly (For Speaker 36-1513-4)	36-4169
	Mtg. Nut	W-124
	Cable (Speaker)	41-3541
58.	Bias Resistor (27-36-300 ohms)	33-3392
	Mtg. Rivet	W-239
59.	Field Coil (Replace Speaker 36-1513)	
60.	Electrolytic Condenser (12 mfd 400 volts)	30-2471
	Mtg. Clamp	56-1452
61.	Power Transformer (115 volts, 60 cycles)	32-3117
	Power Transformer (115 volts, 25 cycles)	
62.	Power Line Filter Condenser	3903-DG
63.	Pilot Lamp (Dial)	34-2064
	Pilot Lamp (Indicator)	34-3068
	Socket Assembly (Dial Light)	76-1316
	Socket Assembly (Indicator)	76-1078
	Light Shield	56-2194
64.	Band Switch	42-1653
	Mtg. Nut	W-2157

Miscellaneous Parts

Cord (Power)	L-3199
Cabinet	10563A
Dial	27-5751
Pointer	56-1556
Escutcheon (Push-Button)	56-2233
Mtg. Screw	W-2071
Knob (Tuning, Volume, Tone)	54-4105
Knob (Push-Button)	54-4106
Indicator Arm and Link Assembly	76-1272
Rubber Corner (Chassis)	54-4015
Rubber Grommet (Chassis Mtg.)	27-4571
Screw (Chassis Mtg.)	W-1345
Socket (5 prong)	27-6168
Socket (6 prong)	27-6168
Socket (Loktal)	27-6177
Mtg. Rivets	W-239
Tab Kit 8	40-9680
Tab (Off-On)	27-5738
Tab Cover	27-5737
Washer	38-5114

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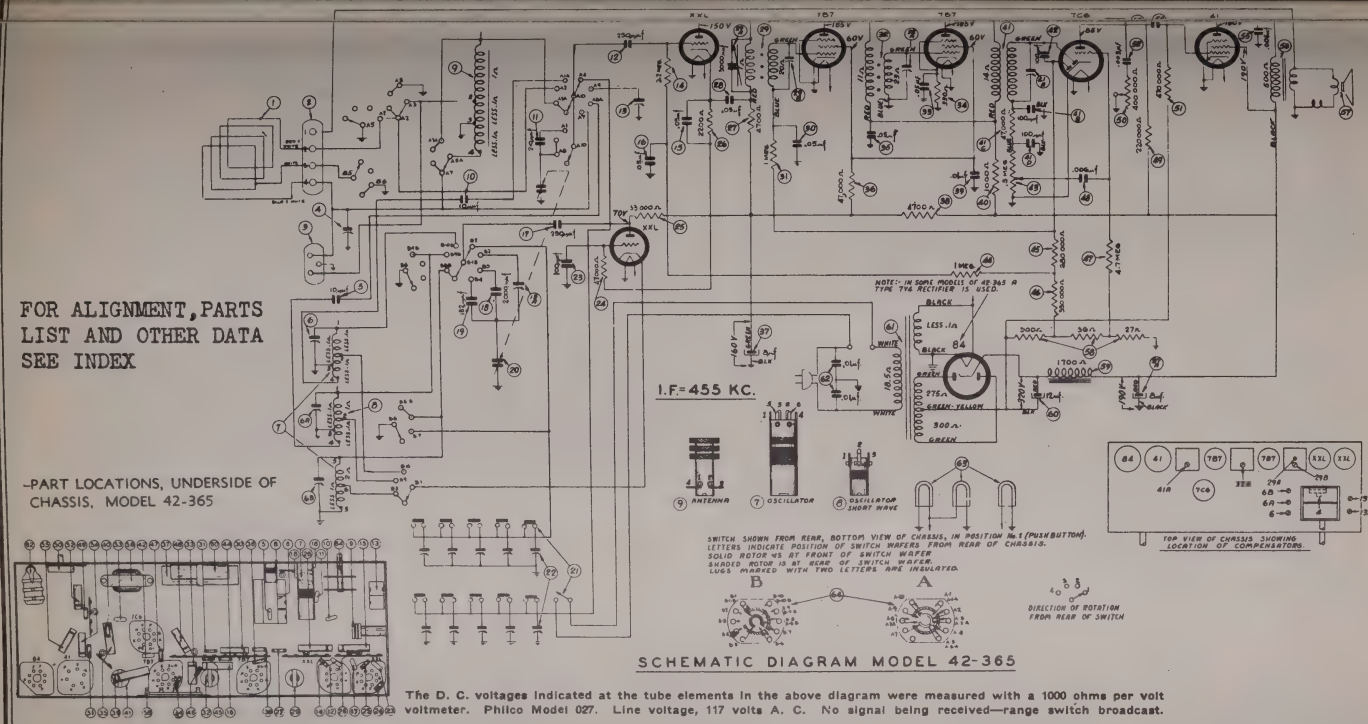

FOR ALIGNMENT, PARTS LIST AND OTHER DATA SEE INDEX
-PART LOCATIONS, UNDERSIDE OF CHASSIS, MODEL 42-365
I.F.=455 KC.
NOTE:-IN SOME MODELS OF 42-365 A TYPE 7Y4 RECTIFIER IS USED.
9 ANTENNA
7 OSCILLATOR
8 OSCILLATOR SHORT WAVE
SWITCH SHOWN FROM REAR, BOTTOM VIEW OF CHASSIS, IN POSITION No 1 (PUSH BUTTON).
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM REAR OF CHASSIS.
SOLID ROTOR "S" AT FRONT OF SWITCH WAFER
SHADED ROTOR "S" AT REAR OF SWITCH WAFER.
LUGS MARKED WITH TWO LETTERS ARE INSULATED.
DIRECTION OF ROTATION FROM REAR OF SWITCH
TOP VIEW OF CHASSIS SHOWING LOCATION OF COMPONENTS
SCHEMATIC DIAGRAM MODEL 42-365

The D. C. voltages indicated at the tube elements in the above diagram were measured with a 1000 ohms per volt voltmeter. Philco Model 027. Line voltage, 117 volts A. C. No signal being received—range switch broadcast.

MODEL 42-365

Circuit Description: Model 42-365, Code 121, is a seven (7) tube, alternating current (A. C.) operated superheterodyne radio with three tuning bands covering Standard, Police, Amateur and Shortwave broadcast stations and the sound of a television program tuned in by special Philco Television Radios. The radio incorporates six (6) electric push-buttons for automatically selecting five (5) stations in the broadcast band; built-in Philco low impedance loop aerial completely rotatable; provisions for an external aerial; Philco LOKTAL tubes, including the XXL noise reducing converter tube; two intermediate frequency stages; continuously variable tone control; automatic volume control; pentode audio output stage and a dynamic speaker.

Intermediate Frequency: 455 KC.

Tuning Band Frequencies: 540 to 1720 KC; 2.3 to 6.7 MC; 9 to 15.5 MC.

Audio Output: 2 watts.

Power Supply: 115 volts, 60 cycle A. C.

This model can also be operated on 115 volts, 25 cycle A. C. by changing the power transformer as indicated in the parts list.

Electric Push-Button Tuning: Six (6) electric tuning push-buttons are provided for automatically selecting stations. Five (5) of the push-buttons are used from broadcast stations and one push-button for controlling (ON-OFF) the power supply. The procedure for adjusting the push-buttons will be found in the instructions supplied with the radio.

MODEL 42-380

PHILCO RADIO & TELEV. CORP.

Model 42-380

FOR CHANGES, SEE INDEX

Schem. No.	Description	Part No.
1.	External Aerial Socket	27-8145
	Mtg. Rivets	W-207FA5
2.	Loop Aerial	76-1307
	Terminal Panel	38-9870
	Mtg. Rivet	W-207FA5
	Mtg. Screw	W-288FE11
	Mtg. Sleeve	28-3806FA3
	Mtg. Sleeve	56-1545FA3
	Spring Washer	28-4186FA3
3.	Aerial Transformer	32-3745
	Mtg. Clip	28-5002
4.	Compensator (Broadcast Osc.)	31-6433
4a.	Compensator (S. W. Aerial) Part of 4	
4b.	Compensator (Broadcast Aerial) Part of 4	
4c.	Compensator (S. W. Osc.) Part of 4	
4d.	Compensator (Police Osc.) Part of 4	
4e.	Compensator (Broadcast Osc., 580 KC) Part of 4	
5.	Mica Condenser (370 mmfd.)	30-1157
6.	Mica Condenser (500 mmfd.)	60-130157
7.	Resistor (22,000 ohms)	33-322339
8.	Resistor (10,000 ohms)	33-310339
9.	Mica condenser (370 mmfd.)	30-1157
10.	Mica condenser (250 mmfd.)	60-125157
11.	Oscillator transformer (S. W.)	32-3749
	Mtg. clip	28-5002
12.	Mica Condenser (185 mmfd.)	30-1197
13.	Mica condenser (2500 mmfd.)	60-225324
14.	Oscillator transformer (Police)	32-3748
	Mtg. clip	28-5002
15.	Oscillator Transformer (Broadcast)	32-3747
	Mtg. Clip	28-5002
16.	Tuning Condenser	31-2578
	Drive Cord (Pointer)	31-2576
	Spring	28-8953
	Drive Cord (Condenser Drive)	31-2577
	Spring	28-8751
	Tuning Drum	78-1293
	Tuning Shaft	56-6152
	"C" Washer	28-2043
	Mtg. Screw	W-2002
	Mtg. Grommet	27-4596
	Mtg. Sleeve	56-1505
17.	Mica Condenser (185 mmfd.)	30-1197
18.	Push-Button Padder (900 to 1600KC)	31-6439
18a.	Push-Button Padder (850 to 1500KC)	Part of 18
18b.	Push-button Padder (650 to 1300KC)	Part of 18
18c.	Push-button Padder (600 to 1200KC)	Part of 18
18d.	Push-button Padder (540 to 1000KC)	Part of 18
	Mtg. Screw	W-2150
19.	Push-button Oscillator Coil (900 to 1600 KC)	32-3779
19a.	Push-button Oscillator Coil (850 to 1500KC)	32-3779
19b.	Push-button Oscillator Coil (650 to 1300 KC)	32-3780
19c.	Push-button Oscillator Coil (600 to 1200 KC)	32-3780
19d.	Push-button Oscillator Coil (540 to 1000 KC)	32-3780
20.	Electrolytic Condenser (8-8 mfd., 475 volts)	30-2513
20a.	Electrolytic Condenser (8 mfd., 475 volts)	Part of 20
21.	Resistor (10,000 ohms)	33-310339
22.	Resistor (15,000 ohms)	33-315339
23.	Resistor (2.2 megohms)	33-522339
24.	Condenser (.01 mfd., 400 volts)	30-4572
25.	Condenser (250 mmfd.)	60-125257
26.	Resistor (4700 ohms)	33-247339
27.	Condenser (.05 mfd., 400 volts)	30-4518
28.	Resistor (4700 ohms)	33-247339
29.	1st I. F. Transformer	32-3742
29a.	Primary Compensator (Iron Core)	Part of 29
29b.	Secondary Compensator	Part of 29
29c.	Mica Condenser (3000 mmfd.)	Part of 29
	Mtg. Nut	W-1949
30.	Condenser (.05 mfd., 400 volts)	30-4518
31.	2nd I. F. Transformer	32-3743
31a.	Secondary Compensator	Part of 31
	Mtg. Nut	W-1949
32.	Resistor (330 ohms)	33-133336
33.	Condenser (.05 mfd., 400 volts)	30-4518
34.	3rd I. F. Transformer	32-3744
34a.	Secondary Compensator	Part of 34
34b.	Mica Condenser (100 mmfd.)	Part of 34a
34c.	Resistor (47,000 ohms)	33-347339
34d.	Mica Condenser (100 mmfd.)	Part of 34a
35.	Resistor (470,000 ohms)	33-447339
36.	Condenser (.01 mfd., 400 volts)	30-4572
37.	Mica Condenser (100 mmfd.)	60-110157
38.	Resistor (68,000 ohms)	33-368339
39.	Tone Control (Audio Base)	33-5460
	Mtg. Nut	W-2157
40.	Condenser (.005 mfd., 400 volts)	30-4501
41.	Resistor (2.2 megohms)	33-522339
42.	Resistor (1 megohm)	33-510339
43.	Volume Control	33-5456
	Mtg. Nut	W-2157FA3
44.	Mica Condenser (100 mmfd.)	60-110157
45.	Condenser (.01 mfd., 400 volts)	30-4572
46.	Resistor (10 megohms)	33-610339
47.	Condenser (100 mmfd.)	60-110157
48.	Resistor (220,000 ohms)	33-422339
49.	Resistor (470,000 ohms)	33-447339
50.	Resistor (one megohm)	33-510339
51.	Condenser (.01 mfd., 400 volts)	30-4572
52.	Condenser (.01 mfd., 400 volts)	30-4572
53.	Tone Control (Audio Treble)	33-5461
	Mtg. Nut	W-2157
54.	Condenser (.01 mfd., 400 volts)	30-4572
55.	Resistor (3900 ohms)	33-239339
56.	Condenser (.0015 mfd., 600 volts)	30-4621
57.	Output Transformer	32-8120
58.	Speaker 36-1514-2 or 36-1514-4	
	Cone assembly (for Speaker 36-1514-2)	36-4173
	Cone Assembly (for Speaker 36-1514-4)	36-4170
	Mtg. washer	27-7467
	Mtg. nut	W-124FA3
	Cable	41-3610
59.	Field coil (Replace speaker, 36-1514)	
60.	Bias Resistor (15-31-145 ohms)	33-3383
61.	Electrolytic Condenser (18 mfd., 475 volts)	30-2517
	Mtg. clamp	56-1848
62.	Power Transformer (115 volts, 60 cycle)	32-8177
	Power Transformer (115 volts, 25 cycle)	
63.	Line Filter Condenser (.01-.01 mfd.)	39083-DDG
64.	Push-button Switch and Power Switch	42-1581
	Mtg. screw	W-823
64a.	Power Switch	Part of 64

Operations in order	SIGNAL GENERATOR: Output Connections to Receiver	SIGNAL GENERATOR: Dial Setting	RECEIVER: Dial Setting	RECEIVER: Control Settings	RECEIVER: Adjust Compensators in order	SPECIAL INSTRUCTIONS
1	High side to No. 4 terminal loop panel.	455 K. C.	580 K. C.	Vol. Max. Range Switch "S.W." Positions	34A, 31A 29A, 29B	
2	Use loop on generator	1500 K. C.	1500 K. C.	Vol. Max. Range Switch Broadcast	4, 4B	Note A
3	Use loop on generator	580 K. C.	580 K. C.	Vol. Max. Range Switch Broadcast	4E	Roll Tuning Condensers Note B
4	Use loop on generator	Perform operation No. 2 again				
5	Use loop on generator	6 M. C.	6 M. C.	Range Switch "Police"	4D	
6	Use loop on generator	15 M. C.	15 M. C.	Range Switch "S. W."	4C, 4A	Note C

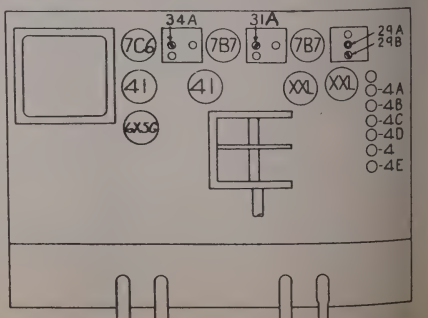
NOTE A—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in the schematic.

NOTE B—When adjusting the low frequency compensator of Range One (Broadcast) or the aerial padders of the high frequency tuning range; the receiver tuning condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum ouput reading is obtained.

NOTE C—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator (4C) to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second peak is obtained on the output meter. Adjust the compensator for maximum output at this second peak.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the signal generator dial 910 KC above the frequency being used on any high frequency range.

The aerial padder (4A) must be adjusted to maximum by rolling the tuning condenser. If two signal peaks occur when turning the padder, adjust to maximum output on the first signal peak from the tight position (screw all the way down) of the padder.



LOCATIONS OF COMPENSATORS—TOP OF CHASSIS

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PHILCO RADIO & TELEV. CORP.

MODEL 42-380

PUSH-BUTTON TUNING
Adjustments are the same as for Model 42-355 except that Button 8 is for police band and Button 9 is for short-wave band.

POWER SUPPLY:
115 V 60~
This model can also be operated on 115 V 25~ by changing the power transformer

IF PEAK 455 KC
TUNING BAND FREQUENCIES:
540 - 1720 KC
2.3 - 7.0 MC
9.0 - 15.5 MC
AUDIO OUTPUT: 3 WATTS
POWER CONSUMPTION: 65 WATTS

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SPECIFICATIONS

MODEL 42-395, CODE 121

Model 42-395, Code 121, is a nine (9) tube A. C. operated superheterodyne designed for reception of standard, shortwave and frequency modulation broadcast stations, and the sound of a television program tuned in by special Philco television radios. The radio incorporates ten (10) electric push buttons which automatically tune six stations in the standard broadcast band and selects the standard, shortwave and frequency modulation bands; Philco built-in Super Aerial System for standard and shortwave reception; the Philco F M Dipole Aerial for frequency modulation reception; three tuning bands; two intermediate frequency stages; two tone controls (Treble and Bass); push-pull pentode audio output stage driven by a phase inverter audio amplifier stage; Philco Loktal tubes and a fourteen (14) inch electro-dynamic speaker.

Power Supply: 115 volts, 60 cycle A. C.

This model can also be operated on 115 volt, 25 cycle or 220 volts, 60 cycle A. C. current. To do this it is necessary to change the power transformers as indicated in the replacement parts list.

Power Consumption:

Intermediate Frequency: Standard and shortwave bands 455 KC; Frequency Modulation 4.3 MC.

Tuning Band Frequencies: 540 to 1720 KC; 9 to 15.5 MC; 42 to 50 MC (FM).

Audio Output: 4 watts.

FOR CHANGES SEE INDEX

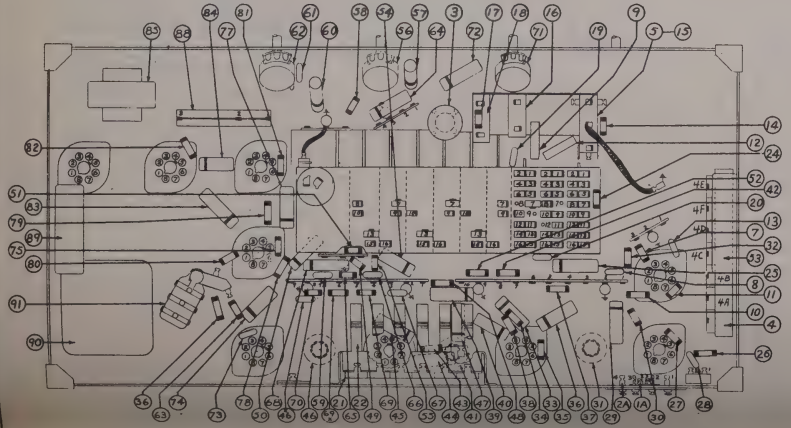

Fig. 2—Locations of Parts—Under Chassis Model 42-395

ELECTRIC PUSH-BUTTON TUNING ADJUSTMENTS

The electric push-button tuning mechanism consists of ten (10) push-buttons. Six of the push-buttons are used for selecting standard broadcast stations, one for the power control (ON-OFF) and three (3) for selecting the standard, shortwave and FM tuning bands.

Viewing the front of the cabinet from left to right the first push-button is the power control (ON-OFF); the next six (6) push-buttons for standard broadcast stations, and the eighth, ninth and tenth for selecting the standard, shortwave and FM tuning bands, respectively.

When setting up stations on the push-buttons the lowest frequency station is set up for reception on the second push-button from the left and the remaining stations according to increasing frequency in the next five push-buttons. The push-buttons are adjusted by the padders located on the rear of the chassis. The frequency range covered by each push-button and the procedure for adjusting is listed in the adjacent tabulation. The second push-button from the left can also be adjusted for reception of the sound channel of a television program received by special Philco television radios. This push-button may also be used in conjunction with a Philco wireless Record Player. The procedure for setting up these models is included in the instructions supplied with each model.

Padders right to left from rear	Circuit	Buttons left to right from front	Frequency Range
		1	ON-OFF
1	Ant. Osc.	2	540 to 1000 KC
2	Ant. Osc.	3	600 to 1200 KC
3	Ant. Osc.	4	650 to 1300 KC
4	Ant. Osc.	5	850 to 1500 KC
5	Ant. Osc.	6	900 to 1600 KC
6	Ant. Osc.	7	900 to 1600 KC
		8	Standard Band
		9	Shortwave Band
		10	FM Band

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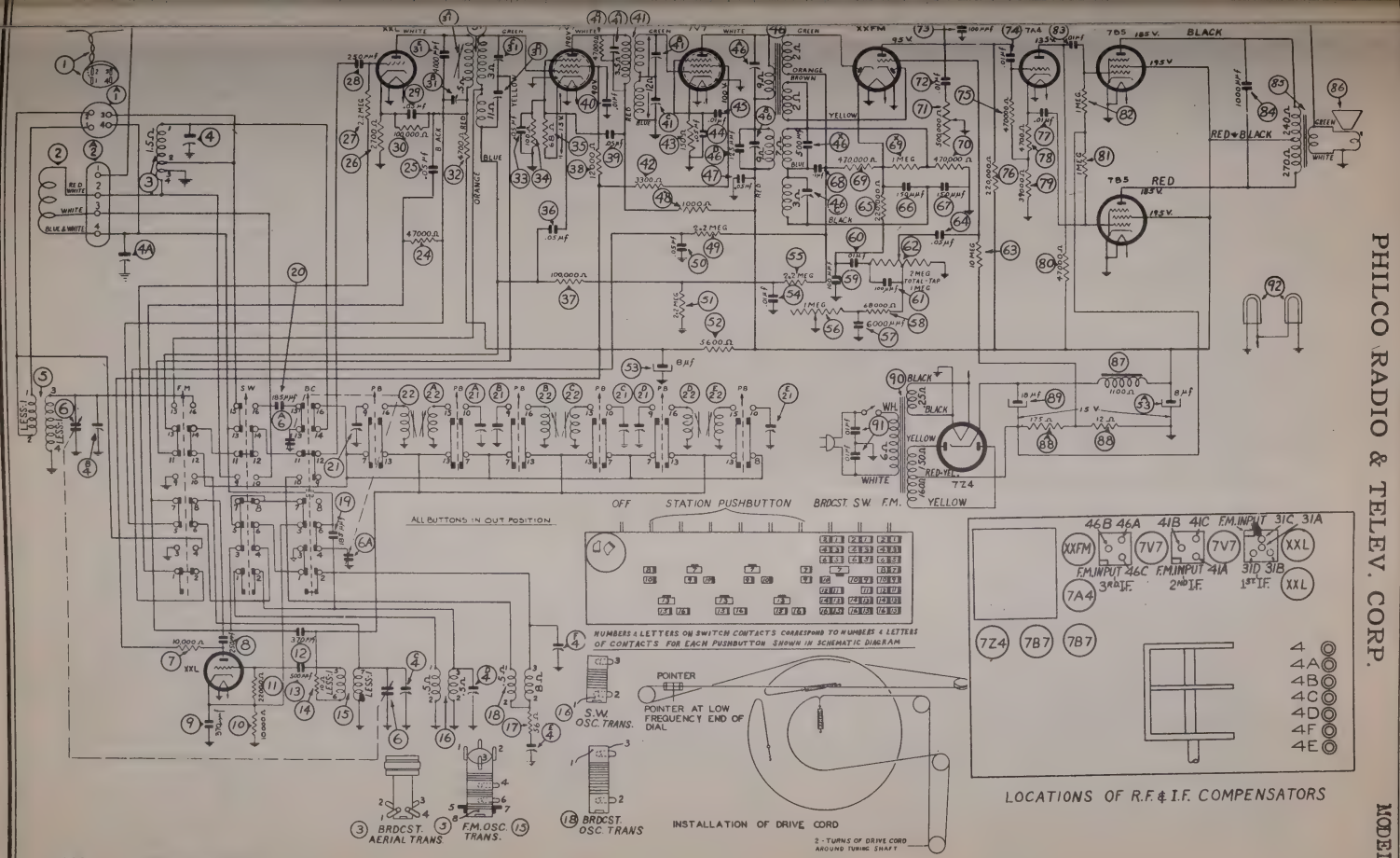
ALL BUTTONS IN OUT POSITION
OFF STATION PUSHBUTTON BRDCST SW F.M.
NUMBERS & LETTERS ON SWITCH CONTACTS CORRESPOND TO NUMBERS & LETTERS OF CONTACTS FOR EACH PUSHBUTTON SHOWN IN SCHEMATIC DIAGRAM
POINTER
POINTER AT LOW FREQUENCY END OF DIAL
S.W. OSC. TRANS.
BRDCST. OSC. TRANS
BRDCST. AERIAL TRANS.
F.M. OSC. TRANS.
INSTALLATION OF DRIVE CORD
2 - TURNS OF DRIVE CORD AROUND TUNING SHAFT
LOCATIONS OF R.F. & I.F. COMPENSATORS
46B 46A 41B 41C F.M. INPUT 31C 31A
F.M. INPUT 46C F.M. INPUT 41A 31D 31B
3rd I.F. 2nd I.F. 1st I.F.
7Z4 7B7 7B7
4
4A
4B
4C
4D
4F
4E

AM IF PEAK 455 KC
FM IF PEAK 4.3 MC

Fig. 1—Schematic Diagrams—Model 42-395, Code 121

The D. C. voltages indicated at the tube elements in the above diagram were measured with a 1000 ohms per voltmeter. Philco Model 027. Line voltage 115 volts A. C. No signal being received—range switch broadcast.

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STANDARD AND S. W. BANDS ALIGNING PROCEDURE

Operations in Order	SIGNAL GENERATOR Output Connections	SIGNAL GENERATOR Dial Setting	RECEIVER Dial Setting	RECEIVER Control Settings	Adjust Compensators in Order	Special Instructions
1	High side to No. 4 terminal loop panel	455 KC	580 KC	Vol. max. push-button Bdcst. "IN"	46B, 41C, 31C, 31A	
2	Use loop on generator	1500 KC	1500 KC	"	4F, 4	Note A
3	Use loop on generator	580 KC	580 KC	"	4E	Roll Tuning Condensers Note B
4	Use loop on generator	Readjust as given in Operation 2				
5	Use loop on generator	15 MC	15 MC	Push-button S. W. "IN"	4D, 4A	Note C

NOTE A.—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial pointer must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale.

NOTE B.—When adjusting the low frequency compensator of the broadcast or the aerial padders of the high frequency tuning range; the receiver tuning condenser must be adjusted (rolled) as follows: First, tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C.—Adjust compensator (4D) to the second signal peak from the closed position (maximum capacity). The aerial compensator (4A) must also be adjusted to maximum on the first signal peak by rolling the tuning condenser. (See Note B.)

FREQUENCY MODULATION ALIGNING PROCEDURE

Note: The Frequency Modulation Circuits Must Be Adjusted With the Dipole Aerial Connected.

CRITICAL WIRING LOCATIONS

NOTE

1. Wire from F. M. oscillator transformer (15) to compensator 4C must be short, also the blue wire from F. M. oscillator transformer (15) to the tuning condenser should be short and away from chassis.
2. Wire from compensator (4A) to the lug No. 4 of the loop aerial terminal panel 2A must be short.
3. Wires from lugs 3 and 4 of the loop aerial terminal panel (2A) to the short-wave push button lugs 10 and 13 of the push button switch must have one complete twist only.
4. All wires from the lugs of the F. M. oscillator transformer (15) should be dressed away from the push button switch and the wires of the F. M. aerial transformer (5) which is part of the F. M. oscillator transformer (15).
5. The black wire from the first I. F. transformer (31) to lug 5 of the F. M. push button must be dressed along the chassis and away from the orange and yellow lead of the I. F. transformer.
6. Wires from the 1st, 2nd and 3rd I. F. transformers must come through the holes as indicated in Fig. 3.
7. The yellow and green leads from the third I. F. transformer (46) to contact 5 and 6 of the XXFM socket must be dressed away from the chassis and other wiring.
8. The white, brown, black and orange wires from the third I. F. transformer (46) must be dressed away from chassis base.
9. Condenser (68) must be away from chassis base.
10. Wire from contact 3 of the XXFM socket must be dressed away from the leads of the 3rd I. F. transformer (46) and the test socket lead.
11. Wire from compensator 4F to lug 2 of the broadcast push button must be dressed away from the chassis base.
12. The blue wire from electrolytic condenser (53) to lug 10 of terminal panel No. 2 must be dressed close along chassis base under condenser (25) and close to terminal panel.

F. M. BAND ALIGNING PROCEDURE

Operations in Order	SIGNAL GENERATOR Output Connections	SIGNAL GENERATOR Dial Setting	RECEIVER Dial Setting	RECEIVER Control Settings	Adjust Compensators in Order	Special Instructions
1	2nd I. F., F. M. input connection	4.3 MC	580 KC	Vol. max. F. M. push-button "IN"	46C (Note D) 46A (Note E)	
2	1st I. F., F. M. input connection	4.3 MC	580 KC	F. M. push-button "IN"	41A, 41B (Note F)	
3	High side to No. 1 contact, F. M. socket. Ground to No. 2 contact	4.3 MC	580 KC	F. M. push-button "IN"	31B, 31D (Note F)	
4	Use test loop on generator; place near dipole aerial	48.5 MC	85 (Note G)	F. M. push-button "IN"	4C (Note G) 4B (Note H)	Roll tuning condenser when adjusting 4B. See Note B
5	"	48.5 MC	85	F. M. push-button "IN"	4C oscillator	

NOTE D.—With the signal generator set to 4.3 MC, padder (46C) is adjusted to the point where minimum signal indication is observed on the output meter.

NOTE E.—Turn the signal generator first to approximately 125 KC below 4.3 MC (4.17 MC) and then 125 KC above 4.3 MC (4.42 MC). A signal peak should be observed on the output meter at approximately each of these points (4.17 and 4.42). The two peak signals should be of equal reading on the output meter and equally spaced in frequency each side of 4.3 MC. If the peaks are unequal in amplitude, padder (46A) must be adjusted in the direction necessary to make both peaks equal. This is done by slightly turning padder and then turning signal generator above and below 4.3 to observe peaks. After equal peaks readings are obtained, set the signal generator to 4.3 MC. The output meter should show zero reading at 4.3 MC. If a signal indication is observed, readjust padder (46C) until zero reading is obtained on the meter. After this adjustment is made padder No. 46A should be reset for equal peaks as given above.

NOTE F.—Adjust padders 41A, 41B, 31B, and 31D for equal signal peaks and equal frequency spacing each side of 4.3 MC.

NOTE G.—The dial scale numbers are listed in tenths of megacycles less the first digit: i. e., 49 MC is 90, 48.5 is 85. Set the tuning dial pointer to 85 on the F. M. scale. Adjust padder (4C) to the point where minimum signal indication is observed on the output meter.

NOTE H.—In order to adjust padder (4B) the signal generator should be set to either the signal peak approximately 125 KC below 48.5 MC (48.375 MC), or 125 KC above 48.5 MC (48.625 MC). Adjust padder (4B) to maximum output reading on either of these peak signals. As padder 4B is being adjusted roll the tuning condenser as given in Note B.

EXTERNAL AERIAL CONNECTIONS

The built-in aerial system is designed to operate without an outside aerial or ground and to give exceptionally high receiving performance of stations in the standard, shortwave, or FM bands.

To operate the radio in steel reinforced buildings and other shielded locations where signal strength is weak, an external aerial is recommended. Three different types of aerial combinations are available, to improve reception on the standard, shortwave, or FM bands.

1—For Additional Sensitivity on Frequency Modulation only:

*Philco Dipole Outdoor Aerial, Part No. 45-2926.

The plug at the end of the transmission line is inserted in the socket at the back of the chassis in place of the plug connected to the FM loop in the cabinet.

2—For Additional Sensitivity on ALL ranges:

*Philco Dipole Outdoor Aerial, Part No. 45-2926.

Philco Aerial Coupler, Part No. 45-1361.

The coupler plugs into the socket at the back of the chassis in place of the plug connected to the FM loop. The aerial transmission line then connects to the terminals on the coupler marked "red" and "black". The local-distance switch on the coupler connects or disconnects the outdoor aerial from the standard broadcast and shortwave tuning ranges. The dipole remains connected to the FM band regardless of the position of the switch.

3—For Additional Sensitivity on Standard Broadcast and Shortwave only in Areas where FM reception is not available:

Philco Safety Aerial, Part No. 40-6370.

Philco Aerial Coupler, Part No. 45-1361.

Connect the single wire lead-in of the aerial to the "black" terminal on the aerial coupler.

*Accessories for this aerial are the Philco Aerial Mast Kit, the Philco Reflector Kit and Philco High Efficiency Transmission Line. See Service Bulletin No. 396 on Dipole Aerials.

NOTE: When installing the FM Philco Outdoor Dipole Aerial, it is very important that the aerial compensating condensers of the standard and shortwave band are repadded.

Audio Output Meter: Terminal No. 1 is provided on the loop aerial panel for connecting one lead of the audio output meter to the voice coil of the speaker. The other lead of the meter is connected to the chassis. When using these connections, the lowest A. C. scale of the meter must be used. (0 to 10 volts.) The audio output meter can also be connected between the plate of the output tube and the chassis.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet and dipole aerial lead. Do not remove the receiving loops from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

PHILCO RADIO & TELEV. CORP.

REPLACEMENT PARTS—Model 42-395, Code 121

Schem. No.	Description	Part No.
	F. M. Dipole Aerial (Mounted in Cabinet)	76-1394
A.	Socket F. M. Dipole Aerial	27-6181
	Loop Aerial (Broadcast and Shortwave)	76-1395
	Mtg. Screw	W-288FE11
	Mtg. Sleeve	56-1545
	Mtg. Sleeve	28-3906
	Spring Washer	28-4186
	Mtg. Washer	W-425FA3
	Mtg. Washer	W-648FA3
A.	Terminal Panel (Loop Aerial)	38-9870
	Mtg. Rivet	W-207
	Broadcast Aerial Transformer	32-3790
	Mtg. Clip	28-5002
	Compensator (Broadcast Aerial)	31-6443
A.	Compensator (Short Wave Aerial) Part of 4	
B.	Compensator (F. M. Aerial) Part of 4	
C.	Compensator (F. M. Oscillator) Part of 4	
D.	Compensator (S. W. Oscillator) Part of 4	
E.	Compensator (Brdcst., Oscillator 580 KC) Part of 4	
F.	Compensator (Brdcst. Oscillator 1500 KC) Part of 4	
	F. M. Aerial Transformer (Part of 15)	
	Mtg. Clip	28-5002
	Tuning Condenser (F. M. Section)	31-2592
A.	Tuning Condenser (Brdcst., S. W. Section) Part of 6	
	Drive Drum	76-1293
	Drive Cord (Pointer)	31-2576
	Spring	28-8953
	Drive Cord (Tuning Cond.)	31-2603
	Spring	28-8751
	Drive Shaft	56-6164
	"C" Washer	28-2043
	Mtg. Grommet	27-4596
	Mtg. Sleeve	56-1505
	Mtg. Screw	W-1351FA3
	Pointer (Dial)	56-2331
	Resistor (10000 ohms)	33-310339
	Mica Condenser (250 mmfd)	60-125257
	Mica Condenser (370 mmfd)	30-1110
	Resistor (10000 ohms)	33-310339
	Resistor (22000 ohms)	33-322339
	Mica Condenser (370 mmfd)	30-1110
	Mica Condenser (500 mmfd)	60-150257
	Resistor (10 ohms)	33-010339
	F. M. Oscillator Transformer Mtg. Clip	32-3792 28-5002
	S. W. Oscillator Transformer	32-3793
	Mtg. Clip	28-5002
	Resistor (56 ohms)	33-056334
	Broadcast Oscillator Transformer	32-3791
	Mica Condenser (185 mmfd)	20-018511
	Mica Condenser (185 mmfd)	20-018511
	Push Button Station Padder (900 to 1600 KC)	31-6449
A.	Push-Button Station Padder (900 to 1600 KC) Part of 21	
B.	Push-Button Station Padder (850 to 1500 KC) Part of 21	
C.	Push-Button Station Padder (650 to 1300 KC) Part of 21	
D.	Push-Button Station Padder (600 to 1200 KC) Part of 21	
E.	Push-Button Station Padder (540 to 1000 KC) Part of 21	
	Push-Button Oscillator Transformer (900 to 1600 KC)	32-3779
22A.	Push-Button Oscillator Transformer (900 to 1600 KC)	32-3779
22B.	Push-Button Oscillator Transformer (850 to 1500 KC)	32-3779
22C.	Push-Button Oscillator Transformer (650 to 1300 KC)	32-3780
22D.	Push-Button Oscillator Transformer (600 to 1200 KC)	32-3780
22E.	Push-Button Oscillator Transformer (540 to 1000 KC)	32-3780
	Iron Core	56-6100
	Clip	56-2250
	Cap	28-6936
23.	Push-Button Switch	42-1705
	Mtg. Screw	W-523FA3
	Mtg. Grommet	27-4596
24.	Resistor (47000 ohms)	33-347339
25.	Condenser (.05 mfd, 400 volts)	30-4518
26.	Resistor (2700 ohms)	33-227339
27.	Resistor (2.2 megohms)	33-522339
28.	Mica Condenser (250 mmfd)	60-125257
29.	Condenser (.05 mfd, 400 volts)	30-4518
30.	Resistor (100000 ohms)	33-410339
31.	First I. F. Transformer	32-3828
	Mtg. Nut	W-2157
31A.	Primary Compensator (iron core) Part of 31	
31B.	Primary Compensator (4.3 KC) Part of 31	
31C.	Secondary Compensator (455 KC)) Part of 31	
31D.	Secondary Compensator (4.3 KC) Part of 31	
31E.	Condenser (4000 mmfd) Part of 31	
32.	Resistor (4700 ohms)	33-247339
33.	Condenser (.05 mfd, 200 volts)	30-4519
34.	Resistor (100 ohms)	33-110339
35.	Resistor (68 ohms)	33-068339
36.	Condenser (.05 mfd, 200 volts)	30-4519
37.	Resistor (100000 ohms)	33-410339
38.	Resistor (12000 ohms)	33-312339
39.	Condenser (.05 mfd, 400 volts)	30-4518
40.	Condenser (.01 mfd, 400 volts)	30-4572
41.	Second I. F. Transformer	32-3836
	Mtg. Nut	W-2157
41A.	Primary Compensator (4.3 KC) Part of 41	
41B.	Secondary Compensator (4.3 KC) Part of 41	
41C.	Secondary Compensator (455 KC) Part of 41	
41D.	Resistor (47000 ohms) Part of 31	33-347339
42.	Resistor (3300 ohms)	33-233339
43.	Resistor (150 ohms)	33-115339
44.	Condenser (.05 mfd, 400 volts)	30-4518
45.	Condenser (.01 mfd, 400 volts)	30-4572
46.	Third I. F. Transformer	32-3829
	Mtg. Nut	W-2157
46A.	Primary Compensator (4.3 KC) Part of 46	
46B.	Primary Compensator (455 KC) Part of 46	
46C.	Secondary Compensator (4.3 KC) Part of 46	
46D.	Mica Condenser (125 mmfd) Part of 46	
46X.	Condenser (500 mmfd)	60-150227
47.	Condenser (.05 mfd, 400 volts)	30-4518
48.	Resistor (1000 ohms)	33-210339
49.	Resistor (2.2 megohm)	33-522339
50.	Condenser (.05 mfd, 200 volts)	30-4519
51.	Resistor (9.2 megohms)	33-522339
52.	Resistor (5600 ohms)	33-256339
53.	Electrolytic Condenser (8 mfd, 475 volts)	30-2526
53A.	Electrolytic Condenser (8 mfd, 475 volts) Part of 53	
	Mtg. Clamp	56-1466
54.	Condenser (.01 mfd, 400 volts)	30-4572
55.	Resistor (2.2 megohm)	33-522339
56.	Bass Tone Control	33-5479
57.	Condenser (.006 mfd, 400 D. C.)	30-4591
58.	Resistor (68000 ohms)	33-368339
59.	Mica Condenser (100 mmfd)	60-110157
60.	Condenser (.01 mfd, 400 volts)	30-4572
61.	Mica Condenser (100 mmfd)	60-110157
62.	Volume Control	33-5478
63.	Resistor (10 megohms)	33-610339
64.	Condenser (.05 mfd, 200 volts)	30-4519
65.	Resistor (220000 ohms)	33-422339
66.	Condenser (150 mmfd)	60-115137
67.	Mica Condenser (150 mmfd)	60-115137
68.	Condenser (.1 mfd, 200 volts)	30-4586
69.	Resistor (470000 ohms)	33-447339
69X.	Resistor (1 megohm)	33-510339
70.	Resistor (470000 ohms)	33-447339
71.	Treble Tone Control	33-5480
72.	Condenser (.01 mfd, 400 volts)	30-4572
73.	Mica Condenser (100 mmfd)	60-110157
74.	Condenser (.01 mfd, 400 volts)	30-4572
75.	Resistor (470000 ohms)	33-447339
76.	Resistor (220000 ohms)	33-422339
77.	Condenser (.01 mfd, 400 volts)	30-4572
78.	Resistor (4700 ohms)	33-247339
79.	Resistor (39000 ohms)	33-339339
80.	Resistor (47000 ohms)	33-347339
81.	Resistor (1 megohm)	33-510339
82.	Resistor (1 megohm)	33-510339
83.	Condenser (.006 mfd, 1000 volts)	30-4317
84.	Condenser (.001 mfd, 1000 volts)	30-4601
85.	Output Transformer	32-8191
86.	Speaker	36-1530
	Cone Assembly (for Speaker 36-1530)	36-4181
	Cable (Speaker)	41-3610
	Mtg. Washer	27-7467
	Mtg. Nut	W-124FA3
87.	Field Coil (Replace Speaker 36-1530)	
88.	Bias Resistor (12 ohms)	33-3416
88A.	Bias Resistor (175 ohms) Part of 88	
89.	Electrolytic Condenser (18 mfd, 475 volts)	30-2517
	Mtg. Clip	56-1466
90.	Power Transformer (115 volts, 60 cycles)	32-8192
	Power Transformer (115 volts, 25 cycles)	32-8209
91.	Power Line Filter Condenser (.01-01 mfd)	39030DG
92.	Dial Lamps	34-2141
	Socket Assembly	76-1295
	Miscellaneous Parts—Model 42-395	
	Bezel	54-4128
	Screw	W-2073FB26
	Cable (Power)	L-3199
	Cabinet	10587A
	Dial Scale	27-5789
	Background Reflector	27-9984
	Rubber Channel	54-4114
	Spring (Background)	28-8990
	Knob (Turning—Tone—Volume)	54-4105
	Knob (Push-Buttons)	54-4144
	Spring Assembly (Push-Buttons)	76-1294
	Rubber Corner (Chassis)	54-4015
	Rubber Grommet (Chassis Mtg.)	27-4571
	Screw (Chassis Mtg.)	W-1345FA3
	Socket (Loktal)	27-6177
	Mtg. Rivet	W-239FA5
	Socket (Single Prong, AVE Test)	27-6180
	Tab Kit	40-6663
	Tab (Broadcast)	27-5739
	Tab (Shortwave)	27-5740
	Tab (F. M.)	27-5741
	Tab (OFF)	27-5742
	Tab Cover	27-5815
	Tab (Television)	27-5779
	Wiring Panel	38-7178
	Wiring Panel	38-8369
	Wiring Panel	38-8764
	Wiring Panel	38-9015
	Wiring Panel	38-9791
	Washer (Chassis Mtg.)	28-5114

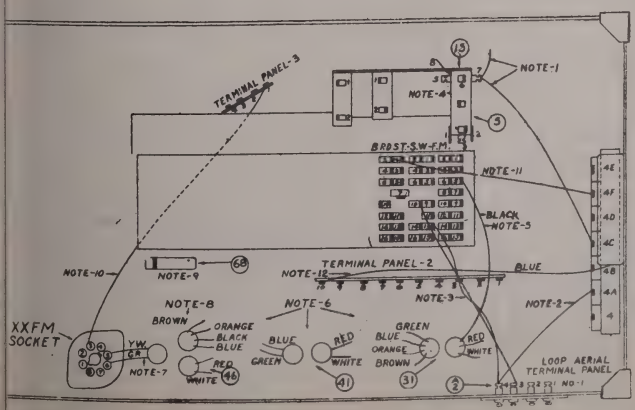

Fig. 3—Critical Wiring Locations—

F. M. Aligning Model 42-395

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MODEL 42-400

PHILCO RADIO & TELEV. CORP.

STANDARD AND S. W. BANDS ALIGNING PROCEDURE

Operations in Order	SIGNAL GENERATOR		RECEIVER			Special Instructions
	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	High side to No. 4 terminal loop panel	455 KC	580 KC	Vol. max. push-button Bdcst. "IN"	59B, 44C, 41C, 31B, 31E	
2	Use loop on generator	1500 KC	1500 KC	"	18, 18C	Note A
3	Use loop on generator	580 KC	580 KC	"	18A	Roll Tuning Condensers Note B
4	Use loop on generator	Readjust as given in Operation 2				
5	Use loop on generator	12 MC	12 MC	Push-button S. W. 1.	18B, 18D	Note C
6	Use loop on generator	18 MC	18 MC	Push-button S. W. 2.	15, 15A	Roll Cond. Note C

FREQUENCY MODULATION ALIGNING PROCEDURE

Note: The Frequency Modulation Circuits Must Be Adjusted With the Dipole Aerial Connected.

CRITICAL WIRING LOCATIONS

STANDARD SHORTWAVE AND F. M. ALIGNING

NOTE

1—F. M. Aerial wires from F. M. aerial socket 2A to F. M. aerial transformer (3) must be twisted (for shielding). The twisted wires should also be dressed away from the switch and other wiring.

2—All wires from F. M. Oscillator transformer (3A) (3A is a part of (3) F. M. aerial transformer) must be dressed away from the F. M. aerial transformer section.

3—Dress yellow wire from 4th I. F. transformer (59) to the diode connection 5 of the XXFM socket down against chassis base. The green lead from the same transformer to connection 6 of the XXFM socket must be pulled away from the chassis base. (These lead dresses are necessary for proper peak separation when aligning F. M. circuits.)

4—Dress wire from F. M. push-button contact (12) to terminal panel lug 1 around end of P. B. switch next to the underside of the chassis (this dress prevents frequency shift when chassis is mounted in the cabinet).

5—Dress close to the push button switch the wire which connects from contact 12 of the lower switch wafer 97 to contact 64 of he upper switch wafer 97A.

6—Wire from SW2 push-button contact No. 22 to padder 15 must be dressed close to the switch.

F. M. BAND ALIGNING PROCEDURE

Operations in Order	SIGNAL GENERATOR		RECEIVER			Special Instructions
	Output Connections	Dial Setting	Dial Setting	Control Settings	Adjust Compensators in Order	
1	3rd I. F., F. M. input connection	4.3 MC	1400 KC	Vol. max. F. M. push-button "IN"	59C (Note D) 59A (Note E)	
2	2nd I. F., F. M. input connection	4.3 MC	1400 KC	F. M. push-button "IN"	44A, 44B. (Note F)	
6	1st I. F., F. M. input connection	4.3 MC	1400 KC	F. M. push-button "IN"	41A, 41B (Note F)	
3	Ant. Section of F. M. Tuning Cond. and Grd.	4.3 MC	1400 KC	F. M. push-button "IN"	31A, 31C (Note F)	
4	Use test loop on generator; place near dipole aerial	48.5 MC	85 (Note G)	F. M. push-button "IN"	5A (Note G) 5 (Note H)	Roll tuning condenser when adjusting 5B. See Note B.
5	"	48.5 MC	85	F. M. push-button "IN"	5A oscillator	

NOTE A.—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial pointer must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale.

NOTE B.—When adjusting the low frequency compensator of the broadcast or the aerial padders of the high frequency tuning range; the receiver tuning condenser must be adjusted (rolled) as follows: First, tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until maximum output reading is obtained.

NOTE C.—Adjust compensators (15 and 18B) to the second signal peak from the closed position (maximum capacity). The aerial compensators (15A and 18D) must also be adjusted to maximum on the first signal peak by rolling the tuning condenser. (See Note B.)

NOTE D.—With the signal generator set to 4.3 MC, padder (59C) is adjusted to the point where minimum signal indication is observed on the output meter.

NOTE E.—Turn the signal generator first to approximately 125 KC below 4.3 MC (4.17 MC) and then 125 KC above 4.3 MC (4.42 MC). A signal peak should be observed on the output meter at approximately each of these points (4.17 and 4.42). The two peak signals should be of equal reading on the output meter and equally spaced in frequency each side of 4.3 MC. If the peaks are unequal in amplitude, padder (59A) must be adjusted in the direction necessary to make both peaks equal. This is done by slightly turning padder and then turning signal generator above and below 4.3 to observe peaks. After equal peaks readings are obtained, set the signal generator to 4.3 MC. The output meter should show zero reading at 4.3 MC. If a signal indication is observed readjust padder (59C) until zero reading is obtained on the meter. After this adjustment is made padder No. 59A should be reset for equal peaks as given above.

NOTE F.—Adjust padders 44A, 44B, 41A, 41B, 31A, 31C for equal signal peaks and equal frequency spacing each side of 4.3 MC.

NOTE G.—The dial scale numbers are listed in tenths of megacycles less the first digit; i. e., 49 MC is 90, 48.5 is 85. Set the tuning dial pointer to 90 on the F. M. scale. Adjust padder (5A) to the point where minimum signal indication is observed on the output meter.

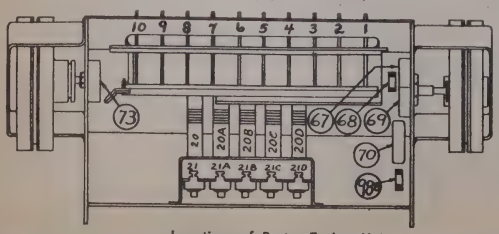
NOTE H.—In order to adjust padder (5) the signal generator should be set to either the signal peak approximately 125 KC below 48.5 MC (48.375 MC), or 125 KC above 48.5 MC (48.625 MC). Adjust padder (5) to maximum output reading on either of these peak signals. As padder 5 is being adjusted roll the tuning condenser as given in Note B.

ELECTRIC PUSH-BUTTON TUNING ADJUSTMENTS

The Electric push-button tuning mechanism consists of ten (10) push-buttons. Five of the push-buttons are used for selecting standard broadcast stations, one for the power control (ON-OFF); and four for selecting standard tuning, shortwave and Frequency Modulation brands.

Viewing the front of the cabinet from left to right the first push-button is the power control (ON-OFF), the next five push-buttons for tuning standard broadcast stations, and the seventh, eighth, ninth and tenth for selecting the tuning ranges—standard, shortwave 1, shortwave 2, and F. M., respectively.

When setting up stations on the push-buttons the lowest frequency station is set up in the second push-button from the left and the remaining stations according to increasing frequency in the next four push-buttons. These push-buttons are adjusted by the padders located on the rear of the tuning unit. The second push-button from the left can also be adjusted for reception of the sound channel of a television program received by special Philco television radios. This push-button may also be used in conjunction with a Philco Wireless Record Player.



Locations of Parts—Tuning Unit

The frequency ranges covered by the station tuning push-buttons and procedure for adjusting is as follows:

Padders right to left from rear	Circuit	Buttons left to right from front	Frequency Range
		1	ON-OFF
1	Ant. Osc.	2	540 to 1080 KC
2	Ant. Osc.	3	600 to 1200 KC
3	Ant. Osc.	4	650 to 1300 KC
4	Ant. Osc.	5	850 to 1500 KC
5	Ant. Osc.	6	900 to 1600 KC
		7	Standard Band
		8	Shortwave Band 1
		9	Shortwave Band 2
		10	Frequency Modulation

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PHILCO RADIO & TELEV. CORP.

MODEL 42-400

Tuning Band Frequencies: 540 to 1720 K. C.
9 to 12 M. C.
14.4 to 18 M. C.
42 to 50 M. C.

Audio Output: 7 watts.

Power Supply: 115 Volt, 60 cycle A. C.
This model can also be operated on a 115 Volt, 25 cycle or 220 Volt, 60 cycle power supply. To do this it is necessary to change the power transformers as indicated in the replacement parts list.

Power Consumption: 110 Watts

Intermediate Frequencies: Standard and shortwave bands, 455 K. C.; Frequency Modulation band, 4.3 M. C.

LOCATION OF COMPENSATORS — TOP OF CHASSIS

Critical Wiring Locations—F.M. Aligning

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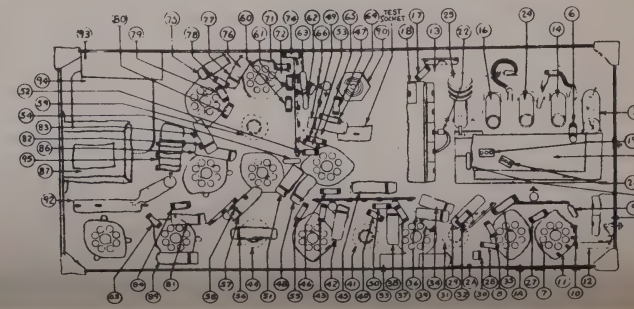
REPLACEMENT PARTS—MODEL 42-400

Schematic No.	Description	Part No.
1	Loop Aerial (Standard & S.W. Bands)	76-1393
	Mtg. Sleeve	28-3806FA3
	Mtg. Sleeve	56-1545FA3
	Spring Washer	28-4186FE7
	Screw	W-288FE11
	Washer	W-425FA3
	Washer	W-648FA3
1A	Terminal Panel (Loop Aerial)	38-9870
2	F.M. Dipole Aerial (Mounted in Cabinet)	76-1394
2A	Socket (F.M. Aerial)	27-6181
3	F.M. Aerial and Oscillator Transformer	32-3825
	Mtg. Clip	28-5002FA3
4	Tuning Condenser (F.M. Section)	31-2600
4A	Tuning Condenser (Standard & S.W. Section)	Part of 4
	Coupling Assembly	31-2291
	Cable Drum Assembly	38-9716
	Drive Cord (Pointer)	31-2316
	Drive Cord (Tuning)	31-2315
	Spring	28-8913
	Pointer	56-2272FCP
	Rubber Grommet	27-4771
	Screw (Mtg. Condenser)	W-1974FA3
5	Compensator (F.M. Aerial)	31-6364
5A	Compensator (F.M. Oscillator) Part of 5	
6	Resistor (10 ohms)	33-010339
7	Mica Condenser (250 mmfd.)	60-125157
8	Resistor (10,000 ohms)	33-310339
9	Mica Condenser (250 mmfd.)	60-125157
10	Resistor (47,000 ohms)	33-347339
11	Resistor (2200 ohms)	33-222339
12	Mica Condenser (500 mmfd.)	30-1138
13	Mica Condenser (280 mmfd.)	30-1213
14	S.W.-1 and S.W.-2 Oscillator Transformer	32-3827
15	Compensator (S.W.-2, Oscillator)	31-6448
15A	Compensator (S.W.-2, Aerial) Part of 15	
16	Broadcast Oscillator Transformer	32-3809
	Mtg. Clip	28-5002
17	Resistor (33 ohms)	33-033336
18	Compensator (Brdcst Oscillator)	31-6451
18A	Compensator (Brdcst Oscillator 580 K.C.)	Part of 18
18B	Compensator (S.W. 1, Oscillator)	Part of 18
18C	Compensator (Brdcst Aerial)	Part of 18
18D	Compensator (S.W. 1, Aerial)	Part of 18
19	Mica Condenser (145 mmfd.)	20-014517
20	Push-button Oscillator Transformer (900 to 1600 K.C.)	32-3779
20A	Push-button Oscillator Transformer (850 to 1500 K.C.)	32-3779
20B	Push-button Oscillator Transformer (650 to 1300 K.C.)	32-3780
20C	Push-button Oscillator Transformer (600 to 1200 K.C.)	32-3780
20D	Push-button Oscillator Transformer (540 to 1000 K.C.)	32-3780
	Iron Core	56-6100
	Clip	56-2250
	Cup	28-6936
21	Push-button Compensator (900 to 1600 K.C.)	31-6447
21A	Push-button Compensator (850 to 1500 K.C.)	Part of 21
21B	Push-button Compensator (650 to 1300 K.C.)	Part of 21
21C	Push-button Compensator (600 to 1200 K.C.)	Part of 21
21D	Push-button Compensator (540 to 1000 K.C.)	Part of 21
22	Condenser (1 mmfd., consisting of Wire and Lug)	
23	Mica Condenser (155 mmfd.)	20-015517
24	S.W. Aerial Transformer	32-3824
	Mtg. Clip	28-5002
25	Broadcast Aerial Transformer	32-3823
	Mtg. Clip	28-5002
26	Mica Condenser (250 mmfd.)	60-125157
27	Resistor (2.2 Megohms)	33-522339
28	Resistor (4700 ohms)	33-247339
29	Condenser (.05 mfd., 400 Volts)	30-4518
30	Condenser (.01 mfd., 400 Volts)	30-4572
31	First I.F. Transformer	32-3820
31A	Primary Compensator	
31B	Secondary Compensator	
31C	Secondary Compensator	
31D	Condenser (4000 mmfd.)	
	Mtg. Nut	W-1949FA3
32	Resistor (15,000 ohms)	33-315339
33	Electrolytic Condenser (8 mfd., 350 Volts)	30-2437
34	Condenser (.03 mfd., 400 Volts)	30-4517
35	Resistor (15,000 ohms)	33-315439
36	Condenser (.05 mfd., 200 Volts)	30-4519
37	Resistor (220 ohms)	33-122336
38	Condenser (.01 mfd., 400 Volts)	30-4572
39	Resistor (100 ohms)	33-110339
40	Resistor (100,000 ohms)	33-410339
41	Second I.F. Transformer	32-3821
41A	Primary Compensator	
41B	Secondary Compensator	
41C	Secondary Compensator	
	Mtg. Nut	W-1949FA3
42	Condenser (.05 mfd., 200 Volts)	30-4519
43	Resistor (330 ohms)	33-133336
44	Third I.F. Transformer	32-3821
44A	Primary Compensator	
44B	Secondary Compensator	
44C	Secondary Compensator	
	Mtg. Nut	W-1949FA3
45	Condenser (.05 mfd., 400 Volts)	30-4518
46	Resistor (1000 ohms)	33-210339
47	Resistor (220,000 ohms)	33-422339
48	Condenser (.05 mfd., 200 Volts)	30-4519
49	Resistor (4700 ohms)	33-247339
50	Resistor (100,000 ohms)	33-410339
51	Condenser (.02 mfd., 400 Volts)	30-4516
52	Resistor (1 megohm)	33-510339
53	Resistor (1 megohm)	33-510339
54	Mica Condenser (100 mmfd.)	60-110157
55	Resistor (68,000 ohms)	33-368339
56	Condenser (.05 mfd., 400 Volts)	30-4518
57	Condenser (.05 mfd., 200 Volts)	30-4519
58	Resistor (330 ohms)	33-133336
59	Fourth I.F. Transformer	32-3822
59A	Primary Compensator	Part of 59
59B	Primary Compensator	Part of 59
59C	Secondary Compensator	Part of 59
59D	Condenser (500 mmfd.)	Part of 59
	Mtg. Nut	W-1949FA3
60	Resistor (330,000 ohms)	33-433339
61	Resistor (330,000 ohms)	33-433339
62	Mica Condenser (150 mmfd.)	60-115137
63	Mica Condenser (150 mmfd.)	60-115137
64	Resistor (220,000 ohms)	33-422339
65	Mica Condenser (100 mmfd.)	60-110157
66	Condenser (.006 mfd., 400 Volts)	30-4591
67	Volume Control	33-5280
68	Resistor (68,000 ohms)	33-368339
69	Audio Bass Control	33-5472
70	Condenser (.006 mfd.)	30-4591
71	Resistor (10 megohms)	33-610339
72	Condenser (.006 mfd., 400 Volts)	30-4591
73	Audio Treble Control	33-5470
	Mtg. Nut	W-2157FA3
74	Resistor (330,000 ohms)	33-433339
75	Condenser (.006 mfd., 400 Volts)	30-4591
76	Mica Condenser (250 mfd.)	60-125157
77	Condenser (.006 mfd., 400 Volts)	30-4591
78	Resistor (1 megohm)	33-510339
79	Resistor (4700 ohms)	33-247339
80	Resistor (47,000 ohms)	33-347339
81	Condenser (.006 mfd., 400 Volts)	30-4591
82	Resistor (47,000 ohms)	33-347339
83	Condenser (.006 mfd., 400 Volts)	30-4591
84	Resistor (470,000 ohms)	33-447339
85	Resistor (470,000 ohms)	33-447339
86	Condenser (.003 mfd., 1,000 Volts)	30-4469
87	Audio Output Transformer	32-8197
88	Speaker	36-1515
	Cone Assembly	36-4173
	Cable	41-3430
	Mtg. Fiber Washer	27-7467
	Mtg. Nut	W-121FA3
89	Condenser (.003 mfd., 1,000 Volts)	30-4469
90	Electrolytic Condenser (25 mfd., 250 Volts)	30-2531
	Mtg. Nut	W-2000
91	Speaker Field Coil (Replace Speaker)	36-1515
92	Bias Resistor (10-165 ohms)	33-3416
93	Electrolytic Condenser (18 mfd., 400 Volts)	30-2525
	Mtg. Strap	56-1452FA5
94	Power Transformer (115 Volts, 60 cycle)	32-8198
	Power Transformer (115 Volts, 25 cycle)	32-8214
	Power Transformer (115/220 Volts, 60 cycle)	32-8092
	Conversion Plug (115/220 Volts)	L-3275
	Mtg. Nut	W-317FA3
	Lockwasher	W-752FE7
95	Condenser (.01-01 mfd.)	3903-ODG
96	Push-button Switch (Tuning Unit)	42-1703
	Screw (Mtg. Switch)	W-523FA3
	Washer (Mtg. Switch)	W-151FA3
	Rubber Grommet	27-4596
	Mtg. Sleeve	28-3806
96A	Power Switch (Part of 96)	
	Switch Cover	76-1343
97	Push-button Band Switch (Mounted Under Chassis)	42-1704
97A	Push-button Band Switch (Part of 97)	
	Snapbuttons (Connecting Rods)	28-4342FA3
	Mtg. Nut	W-151FA3
	Mtg. Screw	W-523FA3
	Rubber Grommet	27-4967
98	Dial and Push-button Lamps	34-2064
	Socket Assembly (Dial Lights)	38-9605
	Socket Assembly (Push-button Lights)	76-1359
	Socket Assembly (Cabinet Light)	76-1391
98A	Cabinet Lamp	34-2210
	Socket Assembly (Cabinet Light)	76-1391
98B	Resistor (10 ohms)	33-010439

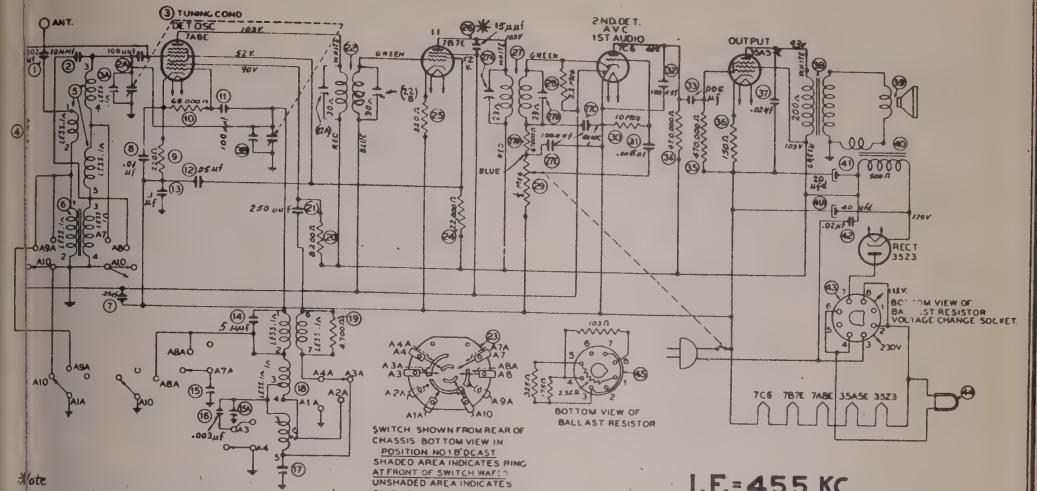
MISCELLANEOUS PARTS

Bezel	40-6685
Screw	W-2073FA9
Cabinet	10588A
Cord (Power)	L-3199
Control Drums (Bass and Treble)	54-4149
Control Drum (Volume)	54-4150
Control Drum (Tuning)	54-4119
Shaft Bearing (Control Drums)	56-1036
Spring Washer (Bronze)	56-1385
Spring Washer (Steel)	56-1659
Keyed Washer	56-1029FA3
Washer (Steel)	28-3976
Dial Scale	27-5760
Felt Gasket	27-9224
Clamp	56-1034FA3
Screw	W-2150FA3
Jewel (Cabinet Pilot Lamp)	27-4777
Push-buttons	54-4138
Spring	76-1376
Rubber Corner (Chassis)	54-4015
Rubber Grommet (Tuning Unit Mtg.)	3914
Rubber Grommet (Tuning Unit Mtg.)	3815
Rubber Grommet (Chassis Mtg.)	27-4571
Screw (Tuning Unit Mtg.)	W-758FA3
Screw (Chassis Mtg.)	W-1345FA3



MODEL 42-706

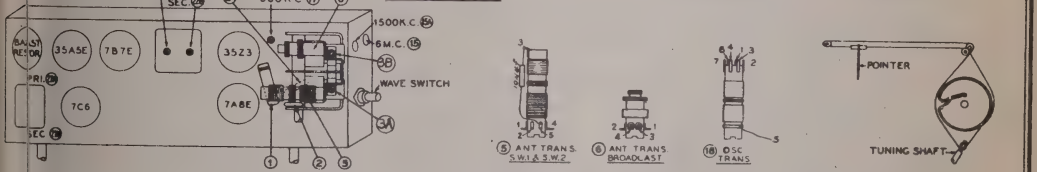
PHILCO RADIO & TELEV. CORP.



*Note
Condenser (26) Used on Early Production Radios. This Condenser is Removed from Later Production Radios to Increase Sensitivity

I.F.=455 KC.

FOR ALIGNMENT, SEE INDEX

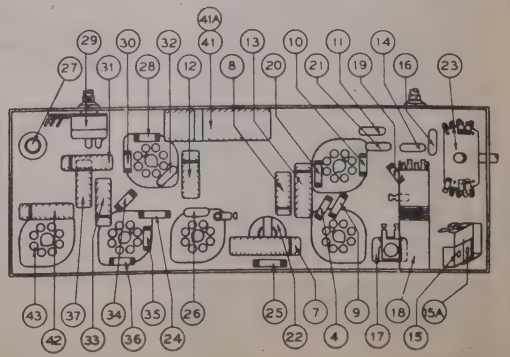


REPLACEMENT PARTS — MODEL 42-706, CODE 121

Schem. No.	Description	Part No.
1	ndenser (.002 mfd.)	30-4622
2	ca Condenser (10 mmfd.)	60-010237
2A	ca Condenser (100 mmfd.)	60-110457
3	ning Condenser	31-2579
3A	mpensator (Aerial, 21 M.C.)	Part of 3
3B	mpensator (Oscillator, 21 M.C.)	Part of 3
	Drive Cord	31-2580
	Spring	28-8954
	Drive Shaft	76-1299
	Rubber Grommet	27-4610
	Pointer	56-2076
4	Mtg. Nut (Drive Shaft)	W-2157FA3
5	sistor (1 megohm)	33-510339
	rial Transformer (S.W.)	32-3753
	Mtg. Clip	28-5002
6	rial Transformer (Brdcst)	32-3166
	Mtg. Clip	28-5002
7	ndenser (.05 mfd., 200 volts)	30-4609
8	ndenser (.01 mfd., 400 volts)	30-4572
9	sistor (220 ohms)	33-122339
10	sistor (68,000 ohms)	33-368339
11	ca Condenser (100 mmfd.)	60-110257
12	ndenser (.05 mfd., 200 volts)	30-4519
13	ndenser (.1 mfd., 400 volts)	30-4527
14	ca Condenser (5 mmfd.)	60-005457
15A	mpensator (6 M.C., Osc.)	31-6436
15	mpensator (1500 K.C., Osc.)	Part of 15
16	ca Condenser (.003 mfd.)	60-230124
17	mpensator (550 K.C., Osc.)	31-6435
18	illator Transformer (B.C. and S.W.-1)	32-3427
19	Mtg. Clip	28-5003
20	sistor (4,700 ohms)	33-247339
21	sistor (8200 ohms)	33-282339
22	ca Condenser (250 mmfd.)	60-125457
	st I.F. Transformer	32-3603
	Mtg. Nut	W-1949FA3
22A	mary Compensator	Part of 22
22B	ondary Compensator	Part of 22
23	nd Switch	42-1682
	Mtg. Nut	W-2157FA3
24	sistor (22,000 ohms)	33-322339
25	sistor (220 ohms)	33-122339
26	ca Condenser (15 mmfd.) (See note diagram)	
27	ond I.F. Transformer	60-015437
	Mtg. Nut	32-3781
27A	mary Compensator	W-1949FA3
27B	ondary Compensator	Part of 27
27C	denser (100 mmfd.)	Part of 27
27D	sistor (47,000 ohms—Part of 27)	Part of 27A
27E	denser (100 mmfd.)	33-347339
27F	sistor (2.2 megohms)	Part of 27A
28	lume Control	33-522339
	Mtg. Nut	33-5434
		W-2157FA3

Schematic No.	Description	Part No.
30	Resistor (10 megohms)	33-610339
31	Condenser (.006 mfd., 400 volts)	30-4610
32	Mica Condenser (100 mmfd.)	60-110257
33	Condenser (.006 mfd., 400 volts)	30-4610
34	Resistor (470,000 ohms)	33-447339
35	Resistor (470,000 ohms)	33-447339
36	Resistor (150 ohms)	33-115336
37	Condenser (.02 mfd., 400 volts)	30-4516
38	Output Transformer	32-8164
39	Speaker	36-1533-4 or 36-1559-4
	Cone Assembly	36-4210
40	Field Coil (Replace Speaker)	36-1559-4 or 36-1533-4
41	Electrolytic Condenser (20 mfd.)	30-2510
41A	Electrolytic Condenser (40 mfd.) Mtg. Clamp	Part of 41 56-1466
42	Condenser (.02 mfd., 600 volts)	30-4599
43	Ballast Resistor Socket	27-6143

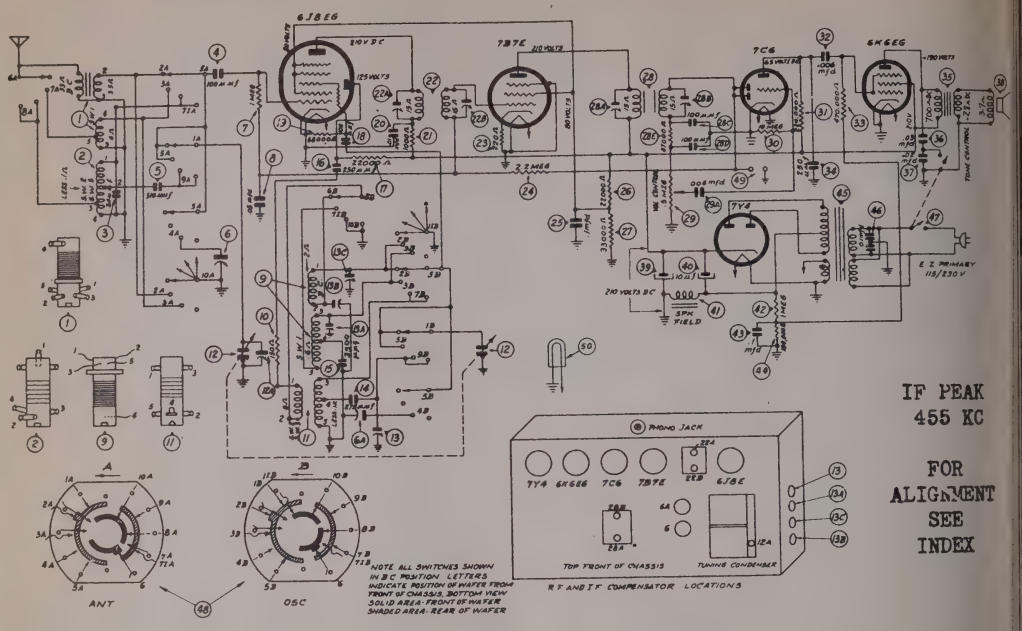
Schematic No.	Description	Part No.
44	Pilot Lamp	34-2068E
	Socket Assembly	76-1177
45	Ballast Resistor	33-3414
	MISCELLANEOUS PARTS	
	Cabinet	10524E
	Cabinet Back	27-9817
	Mtg. Stud	W-2235FA9
	Cord (Power)	L-3274
	Plug	L-3275
	Dial Scale	27-5692
	Mtg. Screw	W-2249FA3
	Knob (Volume-Tuning)	54-4052
	Knob (Band)	27-4878
	Screw (Chassis)	W-1921FA3
	Socket (LOKTAL Tubes)	27-6177
	Mtg. Rivet	W-239FA3
	Washer (Chassis Mtg.)	28-2615FA9
	Washer (Chassis Mtg.)	W-152FA9



PART LOCATIONS — UNDER SIDE OF CHASSIS MODEL 42-706

MODEL 42-716

PHILCO RADIO & TELEV. CORP.



IF PEAK 455 KC

FOR ALIGNMENT SEE INDEX

Replacement Parts — Model 42-716

No. SCHE.	DESCRIPTION	No. PART
1.	Aerial Transformer (Brdcst-SW-1)	32-3655
	Coil Clip	28-5002
2.	Aerial Transformer (SW-2)	32-3652
	Coil Clip	28-5002
3.	Mica Condenser (20 mmfd.)	60-020337
4.	Mica Condenser (100 mmfd.)	60-110457
5.	Mica Condenser (310 mmfd.)	30-1201
6.	Compensator (SW-2 Aerial)	31-6416
7.	Resistor (1 megohm)	33-510339
8.	Condenser (.05 mfd., 200 volts)	30-4609
9.	Oscillator Transformer (Brdcst.-SW-1)	32-3656
10.	Resistor (150 ohms)	33-115339
11.	Oscillator Transformer (SW-2)	32-3651
12.	Tuning Condenser	31-2534
	Drive Cord (Tuning Cond.)	31-2542
	Drive Cord (Pointer)	31-2543
	Drive Shaft	56-6123
	Spring	57-1468
	"C" Washer	28-2043
	Rear Bearing	27-9437
	Rubber Connector	27-9432
	Sleeve (Tuning Cond. Mtg.)	56-1307
	Spring (Cond. Drive Cord)	28-8751
	Spring (Pointer Drive Cord)	28-8953
	Mtg. Rubber (Tuning Condenser)	27-4596
	Drive Drum	38-9883
	Screw (Mtg. Tuning Cond.)	97-0028
12A.	Compensator ..... Part of 12	
12B.	Compensator ..... Part of 12	
13.	Compensator (21 mc.)	31-6411
13A.	Compensator (6 mc.) ..... Part of 13	
13B.	Compensator (580 kc.) ..... Part of 13	
13C.	Compensator (1500 kc.) ..... Part of 13	
14.	Silver Mica Condenser (275 mmfd.)	30-1200
15.	Mica Condenser (3,500 mmfd.)	60-235224
16.	Mica Condenser (250 mmfd.)	60-125457
17.	Resistor (22,000 ohms)	33-322339
18.	Mica Condenser (100 mmfd.)	60-110457
19.	Resistor (68,000 ohms)	33-368339
20.	Condenser (.01 mfd., 400 volts)	30-4572
21.	Resistor (1,000 ohms)	33-210339
22.	1st I. F. Transformer	32-3653
	Nut	W-1949
23.	Resistor (220 ohms)	33-122339
24.	Resistor (2.2 megohms)	33-522339
25.	Condenser (.1 mfd., 200 volts)	30-4586
26.	Resistor (22,000 ohms)	33-322439
27.	Resistor (33,00 ohms)	33-333339
28.	2nd I. F. Transformer	32-3654
28A.	Compensator ..... Part of 28	
28B.	Compensator ..... Part of 28	
28C.	Condenser ..... Part of 28	
28D.	Condenser ..... Part of 28	
28E.	Resistor ..... Part of 28	
29.	Volume Control	33-347339
	Nut	31-5465
		W-2157
29A.	Condenser (.006 mfd., 400 volts)	30-4591
30.	Resistor (10 megohms)	33-610339
31.	Resistor (220,000 ohms)	33-422339
32.	Condenser (.006 mfd., 400 volts)	30-4610
33.	Resistor (470,000 ohms)	33-447339
34.	Mica Condenser (250 mmfd.)	60-125457
35.	Output Transformer	32-8106
	Nut	W-95
	Screw	W-2121
36.	Condenser (.03 mfd., 400 volts)	30-4517
37.	Condenser (.02 mfd., 400 volts)	30-4516

No. SCHE.	DESCRIPTION	PART No.
38.	Cone Assembly (for Speaker 36-1504-2)	36-4126
39.	Electrolytic Condenser (10 mfd.)	30-2459
40.	Electrolytic Condenser (10 mfd.)	30-2459
41.	Field Coil (replace Speaker 36-1594)	
42.	Resistor (1 megohm)	33-510339
43.	Condenser (.1 mfd., 200 volts)	30-4586
44.	Resistor (180,000 ohms)	33-418339
45.	Power Transformer	
	(115/220 volt 60 cycle primary)	32-8093
	(115 Volts, 25 cycle, primary)	32-8075
	Plug	L-3275
	Screw	W-1974
46.	Condenser (Dual .01 mfd.)	3909-ODG
47.	Tone Control and OFF-ON Switch	42-1520
48.	Band Switch	42-1658
	Nut	W-684
49.	Phonograph Input Socket	27-6149
	Rivet	W-207
50.	Pilot Lamp	34-2064E
	Cable (Power)	L-3274

MISCELLANEOUS PARTS

DESCRIPTION	PART No.
Cabinet	1047
Disc Feet	27-48
Cabinet Back	27-96
Screw	W-20
Baffle & Cloth	40-65
Fasteners	56-66
Dial Scale	27-57
Dial Pointer	56-22
Mtg. Straps (Scale)	56-17
Washer Scale Mtg.	W-13
Screw	W-20
Knob	27-4
Shield (Power Transformer)	56-15
Shield Base (Power Transformer)	56-15
Socket (7B7E, 7C6, 7Y4 Tubes)	27-61
Rivet	W-23
Socket (6J8EG, 6K6EG Tubes)	27-61
Rivet	W-23
Socket Assembly (Pilot Lamp)	76-11
Speaker	36-15

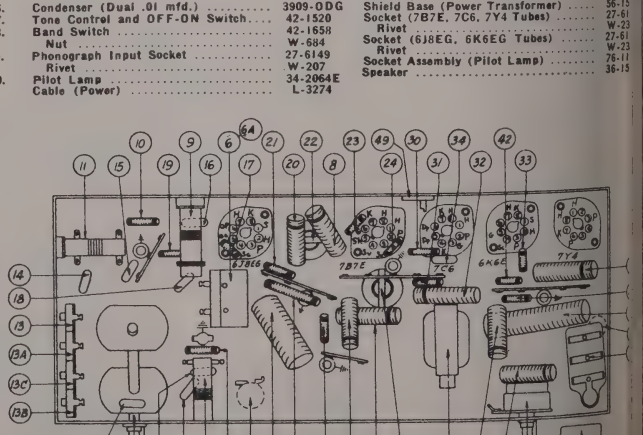


FIG. 1—LOCATIONS OF PARTS — UNDERSIDE OF CHASSIS — MODEL 42-71

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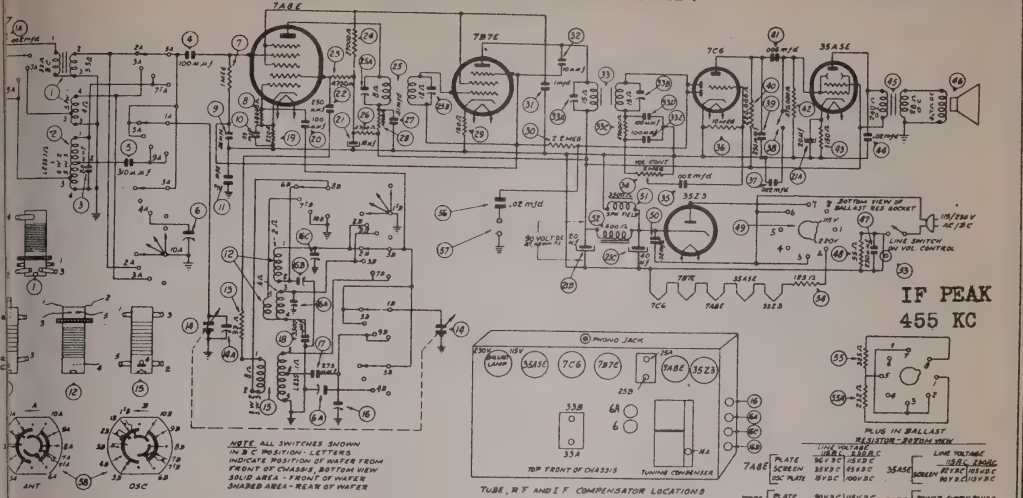
PHILCO RADIO & TELEV. CORP.

MODEL 42-717


7A8E
7B7E
7C6
35A5E
35Z3
IF PEAK
455 KC
PHONO JACK
TOP FRONT OF CHASSIS
TUNING CONDENSER
PLUG IN BALLAST
RESISTOR-BOTTOM VIEW
ANT
OSC
NOTE ALL SWITCHES SHOWN IN B C POSITION - LETTERS INDICATE POSITION OF WAFER FROM FRONT OF CHASSIS, BOTTOM VIEW SOLID AREA - FRONT OF WAFER SHADED AREA - REAR OF WAFER
TUBE, R F AND I F COMPENSATOR LOCATIONS
TUBE SOCKET VOLTAGES AT 115 & 230 V.A.C. LINE VOLTAGE

FOR ALIGNMENT, SEE INDEX

Model 42-717

SCHE. No.	DESCRIPTION	PART No.
1.	Aerial Transformer (Brdcst. & SW-1).	32-3655
	Mounting Clip	28-5002
2.	Aerial Transformer (SW-2, SW-3)	32-3652
	Mounting Clip	28-5002
3.	Mica Condenser (20 mmfd.)	60-020437
4.	Mica Condenser (100 mmfd.)	60-110457
5.	Mica Condenser (310 mmfd.)	30-1201
6.	Compensator (SW-2 Aerial)	31-6416
6A.	Compensator (SW-2 Osc.)	part of 6
7.	Resistor (1 megohm)	33-510339
8.	Resistor (68,000 ohms)	33-368339
9.	Condenser (.05, 200 volts)	30-4609
10.	Condenser (.05 mfd., 200 volts)	30-4519
11.	Condenser (.2 mfd., 400 volts)	30-4594
12.	Oscillator Transformer (Brdcst. & SW-1)	32-3709
	Mounting Clip	28-5002
13.	Resistor (33 ohms)	33-033339
14.	Tuning Condenser	31-2534
	Drive Drum	38-98H3
	Drive Cord (Tuning Cond.)	31-2542
	Drive Cord (Pointer)	31-2543
	Drive Shaft	56-6123
	Shaft & Rubber Connector	27-9432
	Shaft Bearing	27-9437
	"C" Washer	28-2043
	Spring (Drive Shaft)	57-1468
	Spring (Tuning Condenser Drive Cord)	28-8751
	Spring (Pointer Drive Cord)	28-8953
	Sleeve (Mtg. Tuning Cord)	56-1307
	Screw (Mtg. Tuning Cord)	W-1974
	Pointer (Dial Scale)	56-2228
	Rubber Mtg. (Tuning Condenser)	27-4596
	Oscillator Transformer (SW-2, SW-3)	32-3651
	Mounting Clip	28-5002
6A.	Compensator (Osc. 21 mc.)	31-6411
6B.	Compensator (Osc. 6 mc.)	part of 16
6C.	Compensator (Osc. 580 kc.)	part of 16
	Compensator (Osc. 1500 kc.)	part of 16
	Mica Condenser (275 mmfd.)	30-1200
	Mica Condenser (3,500 mmfd.)	60-235224
	Resistor (220 ohms)	33-122334
	Mica Condenser (100 mmfd.)	60-110457
	Electrolytic Condenser (10 mfd.)	30-2506
A.	Electrolytic Condenser (20 mfd.)	part of 21
B.	Electrolytic Condenser (20 mfd.)	part of 21
C.	Electrolytic Condenser (40 mfd.)	part of 21
	Mica Condenser (250 mmfd.)	60-125457
	Resistor (4,700 ohms)	33-247339
	Resistor (27,000 ohms)	33-327339
	I. F. Transformer	32-3704
	Nut	W-1949
	Resistor (4,700 ohms)	33-247339
	Condenser (.01 mfd., 400 volts)	30-4572
	Resistor (1,000 ohms)	33-210339
	Resistor (150 ohms)	33-115339
	Resistor (2.2 megohms)	33-522339
	Condenser (.1 mfd., 200 volts)	30-4586
	Mica Condenser (10 mmfd.)	60-010437
A.	2d I. F. Transformer	32-3654
B.	Compensator	part of 33
C.	Compensator	part of 33
D.	Resistor (47,000 ohms) part of 33	33-347339
E.	Condenser	part of 33
	Condenser	part of 33
	Volume Control	33-5446
	Nut	W-2157
	Condenser (.002 mfd., 400 volts)	30-4579
	Resistor (10 megohms)	33-610339
	Condenser (.002 mfd., 400 volts)	30-4579

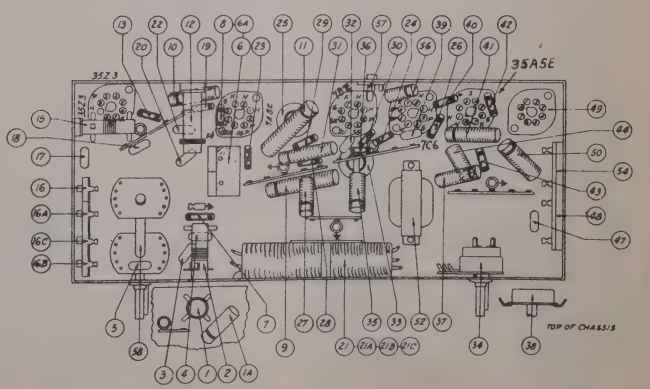
SCHE. No.	DESCRIPTION	PART No.
38.	Tone Control	42-1574
	Nut	W-2157
39.	Mica Condenser (250 mmfd.)	60-125457
40.	Resistor (220,000 ohms)	33-422339
41.	Condenser (.006 mfd., 400 volts)	30-4610
42.	Resistor (470,000 ohms)	33-447339
43.	Resistor (150 ohms)	33-115339
44.	Condenser (.02 mfd., 600 volts)	30-4599
45.	Output Transformer (for Speaker 36-1509-3)	32-8158
46.	Cone Assembly (for Speaker 36-1509-3)	36-4162
47.	Mica Condenser (250 mmfd.)	60-125457
48.	Filament Resistor (55 ohms)	33-3397
49.	Ballast Resistor Socket	27-6143
	Eyelet (Mtg. Socket)	W-1650
50.	Condenser (.02 mfd., 400 volts)	30-4516
51.	Speaker Field Replace Speaker	36-1509
52.	Filter Choke	32-7868
	Nut	W-95
	Screw	W-2131
53.	Pilot Lamp	34-2068E
54.	Filament Resistor (125 ohms)	part of 48
55.	Ballast Resistor	33-3389
55A.	Ballast Resistor	33-3389
56.	Condenser (.02 mfd., 400 volts)	33-4516
57.	Phonograph Socket	27-6149
	Rivet	W-207
58.	Band Switch	42-1658

MISCELLANEOUS PARTS

DESCRIPTION	PART No.
Cable (Rectifier)	41-3573
Cabinet	10478H
Disc, Foot	27-4804
Cabinet Back	27-9661
Baffle & Cloth	40-6548
Fasteners (Baffle Mtg.)	56-6082
Screw (Back Mtg.)	W-2076
Screw (Back Mtg.)	W-2168
Cord (Power)	L-3274
Plug (Power Cable)	L-3275
Dial Scale	27-5703
Mtg. Straps	56-1752
Washers (Scale Mtg.)	W-152
Screw	W-2062
Knob	27-4332
Socket (Loktal Tubes)	27-6177
Rivet	W-239
Socket Assembly (Pilot Lamp)	76-1051
Speaker	36-1509
Screw	W-2150
Terminal Panel (3 lug)	38-9778
Terminal Panel (4 lug)	38-9809
Terminal Panel (2 lug)	38-9777
Terminal Panel (5 lug)	38-9929

MOUNTING PARTS

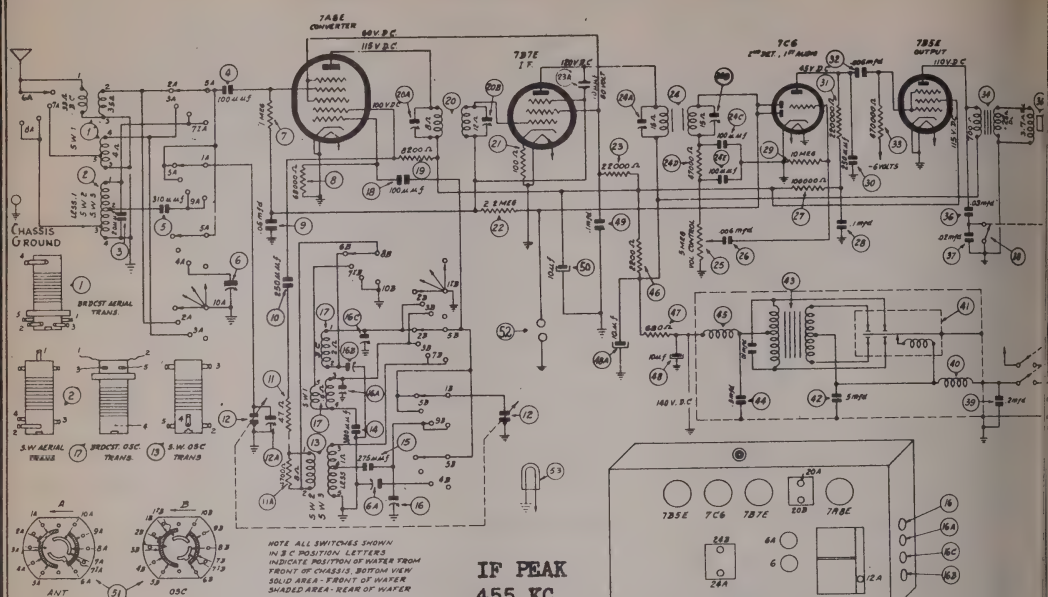
Rubber Grommet	27-4596
Screw (Chassis Mtg.)	W-2076
Screw (Chassis Mtg.	W-2192



LOCATIONS OF PARTS — UNDERSIDE OF CHASSIS — MODEL 42-717

MODEL 42-718

PHILCO RADIO & TELEV. CORP.


7A8E CONVERTER
7B7E I.F.
7C6 2ND DET., 1ST AUDIO
7B5E OUTPUT
CHASSIS GROUND
BRDCST AERIAL TRANS.
S.W. AERIAL TRANS
BRDCST. OSC. TRANS.
S.W. OSC TRANS
ANT
OSC
NOTE ALL SWITCHES SHOWN IN 3 C POSITION LETTERS INDICATE POSITION OF WAFER FROM FRONT OF CHASSIS, BOTTOM VIEW
SOLID AREA - FRONT OF WAFER
SHADED AREA - REAR OF WAFER
IF PEAK
455 KC
TOP FRONT OF CHASSIS
TUBES, R.F. AND I.F. COMPENSATOR LOCATIONS

FOR CHANGES, SEE INDEX

Replacement Parts — Model 42-718

SCHE. No.	DESCRIPTION	PART No.
1.	Aerial Transformer (Brdcst. & SW-1)	32-3655
	Mounting Clips	28-5002
2.	Aerial Transformer (SW-2, SW-3)	32-3652
	Mounting Clips	28-5002
3.	Mica Condenser (20 mmfd.)	60-020437
4.	Mica Condenser (100 mmfd.)	60-110457
5.	Mica Condenser (310 mmfd.)	20-031017
6.	Compensator (Aerial 6 mc.)	31-6416
6A.	Compensator (Osc. 6 mc.)	part of 6
7.	Resistor (1 megohm)	33-510339
8.	Resistor (68,000 ohms)	33-368339
9.	Condenser (.05 mfd., 200 volt)	30-4609
10.	Mica Condenser (250 mmfd.)	60-125457
11.	Resistor (47 ohms)	33-047339
11A.	Resistor (4,700 ohms)	33-247339
12.	Tuning Condenser	31-2534
	Drive Shaft	56-6123
	Drive Shaft Spring	54-1468
	Drive Shaft Bearing	27-9437
	"C" Washer (Drive Shaft)	28-2043
	Drive Cord (Tuning Cond.)	31-2542
	Drive Cord (Pointer)	31-2543
	Drive Drum (Tuning Cond.)	38-9883
	Pointer (Dial)	56-2228
	Rubber Connector (Drive Shaft)	27-9432
	Spring (Cond. Drive Cord)	28-8751
	Spring (Pointer Drive Cord)	28-8953
	Sleeve (Mtg. Tuning Cond.)	56-1307
	Screw (Tuning Cond. Mtg.)	W-1974
	Washer (Tuning Cond. Mtg.)	W-151
13.	Oscillator Transformer (SW-2, SW-3)	32-3651
	Mounting Clips	28-5002
14.	Mica Condenser (3,500 mmfd.)	60-235224
15.	Mica Condenser (275 mmfd.)	30-1200
16.	Compensator (Osc. 21 mc.)	31-6411
16A.	Compensator (Osc. 6 mc.)	part of 16
16B.	Compensator (Osc. 580 kc.)	part of 16
16C.	Compensator (Osc. 1,500 kc.)	part of 16
17.	Oscillator Transformer (Brdcst. SW-1)	32-3709
	Mounting Clips	28-5002
18.	Mica Condenser (100 mmfd.)	60-110457
19.	Resistor (6,200 ohms)	33-262339
20.	1st I. F. Transformer	32-3704
	Nuts	W-1949
20A.	Compensator	part of 20
20B.	Compensator	part of 20
21.	Resistor (100 ohms)	33-110339
22.	Resistor (2.2 megohms)	33-522339
23.	Resistor (22,000 ohms)	33-322339
23A.	Mica Condenser (10 mmfd.)	60-010437
24.	2nd I. F. Transformer	32-3722
	Nut	W-1949
24A.	Compensator	part of 24
24B.	Compensator	part of 24
24C.	Condenser	part of 24
24D.	Resistor (47,000 ohms) part of 24	33-347339
24E.	Condenser	part of 24
25.	Volume Control	33-5465
	Nut	W-2157
26.	Condenser (.006 mfd., 400 volts)	30-4591
27.	Resistor (100,000 ohms)	33-410339
28.	Condenser (.1 mfd., 200 volts)	30-4586
29.	Resistor (10 megohms)	33-610339
30.	Mica Condenser (250 mmfd.)	60-125457
31.	Resistor (220,000 ohms)	33-422339
32.	Condenser (.006 mfd., 400 volts)	30-4610
33.	Resistor (470,000 ohms)	33-447339

SCHE. No.	DESCRIPTION	PART No.
34.	Output Transformer	32-8106
	Rivet	W-207
35.	Cone Assembly (for Speaker 36-1520-4)	36-4180
36.	Condenser (.03 mfd., 400 volts)	30-4517
37.	Condenser (.02 mfd., 400 volts)	30-4516
38.	Tone Control—OFF-ON Switch	42-1600
	Nut	W-2157
39.	Condenser (.2 mfd.)	30-4537
40.	"A" Choke	65-0151
41.	Vibrator	41-3553
42.	Condenser (.5 mfd., 200 volts)	30-4590
43.	Power Transformer	32-8128
	Screw	W-453
44.	Condenser (.5 mfd., 200 volts)	30-4590
45.	"B" Choke	32-3522
46.	Resistor (2,200 ohms)	33-222339
47.	Resistor (680 ohms)	33-168339
48.	Electrolytic Condenser (10 mfd.)	30-2479
48A.	Electrolytic Condenser (10 mfd.)	
49.	Condenser (.1 mfd., 200 volts)	30-4586
50.	Electrolytic Condenser (10 mfd.)	30-2478
51.	Band Switch	42-1658
52.	Phonograph Socket	27-8148
53.	Pilot Lamp	34-2068E

MOUNTING PARTS

DESCRIPTION	PART No.
Clamp Cable	28-1644
Screw	W-2106
Clamp (Electro Cond.)	56-1466
Kapox, small (Insulator Vibrator)	27-9717
Kapox, large (Insulating Vibrator)	27-9718
Rubber Grommet (Mtg. Vibrator Unit)	27-4596
Rubber Grommet (set to Cabinet)	27-48
Rubber Cushion (Vibrator)	27-48
Spacers (Vibrator Mtg.)	28-80

MISCELLANEOUS PARTS

DESCRIPTION	PART No.
Cabinet	1047
Cabinet Back	27-9
Baffle & Cloth	40-6
Fasteners	56-6
Screw	W-2
Screw	W-2
Dial Scale	27-5
Mtg. Straps	56-1
Washer	W-1
Screw	W-20
Knob	27-43
Shield Assembly (Vibrator)	76-1
Screw (Vibrator Shield Assembly)	W-15
Socket (Loktal)	27-61
Rivets	W-23
Socket (Vibrator)	27-6
Mtg. Plate	28-3
Eyelet	W-11
Socket Assembly (Pilot Lamp)	76-1
Speaker	36-15
Screw (Speaker Mtg.)	W-2
Terminal Panel (3 lug)	38-5
Terminal Panel (2 lug)	38-5
Terminal Panel (2 lug)	38-5
Terminal Panel (5 lug)	38-5
Terminal Panel (2 lug) (Vib. Socket support)	78-1

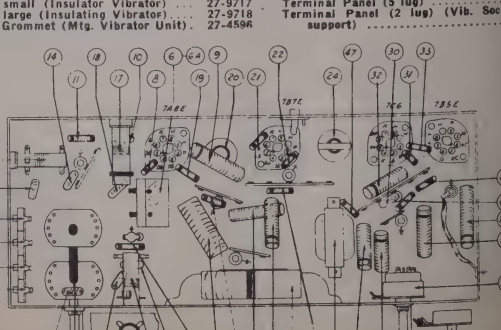


FIG B

LOCATIONS OF PARTS — UNDERSIDE OF CHASSIS 42-718.

John F. Rider

EQUIPMENT REQUIRED

SIGNAL GENERATOR: such as Philco Model 070, A.C. operated or Model 177 battery operated. These signal generators cover all frequencies required in aligning these models.

INDICATING DEVICE: To obtain maximum signal strength and accurate adjustments of the padders, a vacuum tube voltmeter similar to Philco Models 027 and 028 are recommended. These instruments also contain an audio output meter which may be used as an aligning indicator. The method of connecting either of these instruments is listed below.

ALIGNING TOOLS: Fibre handle screw driver, Philco part #45-2610. Service Aligning Scale, part #45-2909.

CONNECTING ALIGNING INSTRUMENTS

VACUUM TUBE VOLTMETER: To use the vacuum tube voltmeter as an aligning indicator it should be connected to the A.V.C. circuit as follows:

1—Connect the negative (—) terminal of the vacuum tube voltmeter through a 2 megohm resistor to any point in the circuit where the A.V.C. voltage can be measured.

2—Connect the positive (+) terminal to the chassis ground terminal.

AUDIO OUTPUT METER: If this type of meter is used as an aligning indicator, it should be connected to the plate and screen terminals of the 6K6EG tube in Model 42-716; 35A5E, Model 42-717; 7B5E, Model 42-718. Adjust the meter for the 0 to 30 volt A.C. scale.

After connecting the aligning meter, adjust the compensators in the order as shown in the tabulations below. Locations of the compensators are shown on the schematic diagram.

If the output meter pointer goes off scale when adjusting the padders, reduce the strength of the signal from the generator.

NOTE: The dial scale in these models is mounted on the cabinet. For convenience, when aligning the chassis outside of the cabinet, a special service aligning scale, part No. 45-2909, is available. This service dial scale is attached to the dial background plate. If the radio is aligned in the cabinet, the cabinet dial scale is used.

Operations In Order	SIGNAL GENERATOR: Output Connections to Radio	SIGNAL GENERATOR: Dummy Aerial Note A	SIGNAL GENERATOR: Dial Setting	*RECEIVER: Dial Setting	*RECEIVER: Control Settings	*RECEIVER: Adjust Compensators 42 716	42 717	42 718	42 706	SPECIAL INSTRUCTIONS
1	Lug of aerial tuning cond.	.1 mfd.	455 K. C.	580 K. C.	Band Switch "Brdcst" Volmax	28A 28B 22A 22B	33A 33B 25A 25B	24A 24B 20A 20B	27B 27A 22B 22A	
2	Aerial	400 ohms	21 M. C.	21 M. C.	Band Switch S. W. 3	13 12A	16 14A	16 12A	3B 3A	Note B Note C
3	Aerial	400 ohms	12 M. C.	12 M. C.	Band Switch S. W. 2	6A 6	6A 6	6A 6	OMIT	Note C
4	Aerial	400 ohms	6 M. C.	6 M. C.	Band Switch S. W. 1	13A	16A	16A	15	
5	Aerial	200 mmfd.	1500 K. C.	1500 K. C.	Band Switch "Brdcst"	13C	16C	16C	15A	
6	Aerial	200 mmfd.	580 K. C.	580 K. C.	Band Switch "Brdcst"	13B	16B	16B	17	Roll tuning condenser
7	Aerial	200 mmf.	1500 K. C.	1500 K. C.	Band Switch "Brdcst"	13C	16C	16C	15A	

NOTE A—The "Dummy Aerial" consists of a condenser or resistor connected in series with the signal generator output lead (highside). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B—Dial Calibration: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity) set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale.

NOTE C—When adjusting the aerial compensators, be sure to tune in the fundamental signal (21 M. C.) instead of the image signal. If the compensator is correctly adjusted the image signal will be found by turning the signal generator dial 910 K. C. above the fundamental signal which will be 21.910 M. C.

MODEL A-707, CODE 121

Model A-707 is a five tube A.C.-D.C. operated superheterodyne radio with three tuning bands. This model is identical to Model 42-706 with the exception of the cabinet and several parts. The service information (specifications, aligning instructions, schematic diagram and replacements parts) for Model 42-706 also covers the Model A-707 with the following replacement parts changes:

Schematic No.	Description	Part No.
23	Band Switch	42-1721
	Mtg. Nut	W-684FA4
26	Not used in Model A-707	

Miscellaneous Parts

Cabinet	10592-B	Knob (Volume-Tuning)	54-4105
Cabinet Back	54-7010	Knob (Band)	54-4174
Mtg. Stud	W-2023	Screw (Chassis)	W-2030FA3
		Washer (Chassis Mtg.)	W-410FA3
Dial Scale	27-5825		
Mtg. Screw	W-1822		
Mtg. Strap	54-4176		

TYPE OF CIRCUIT: Five tube alternating current (A.C.) operated superheterodyne circuit with four (4) tuning ranges. In addition this model includes a two point tone control; automatic volume control; pentode audio output circuit; band indicator and dial light.

TUNING RANGES: Broadcast—540 to 1600 K.C.; SW-1—3.0 to 9.5 MC; SW-2—9.4 to 12.0 MC; SW-3—11.8 to 22 MC.

INTERMEDIATE FREQUENCY: 455 K.C.

POWER SUPPLY: Operates on either a 115 or 230 volt, 50 to 60 cycle power supply. To use either of the above voltages change the power transformer primary wiring as indicated on the label at the rear of the chassis and schematic diagram. The model can also be operated on a 115 volt, 25 cycle power supply, by changing the power transformer as indicated in the parts list page.

POWER CONSUMPTION: 35 watts.

PHILCO TUBES USED: 6J8EG, converter; 7B7E, I.F. amplifier; 7C6, 2nd detector-1st audio; 6K6EG, audio output, and a 7Y4 rectifier.

AUDIO OUTPUT: 1.5 Watts.

Model 42-717

TYPE OF CIRCUIT: Five tube A.C.-D.C. operated superheterodyne circuit with four (4) tuning ranges. Included in this model is a two point tone control; automatic volume control; pentode audio output circuit; band indicator and a dial light.

TUNING RANGES: Broadcast—540 to 1600 K.C.; SW-1—3.0 to 9.5 MC; SW-2—9.4 to 12 MC; SW-3—11.8 to 22 MC.

INTERMEDIATE FREQUENCY: 455 K.C.

POWER SUPPLY: Operates on either a 115 volt or 230 volt power supply. To use either of the power supply voltages, insert the ballast lamp in the socket on the chassis as indicated for each voltage.

POWER CONSUMPTION: 115 volts, 33 watts.
230 volts, 67 watts.

PHILCO TUBES USED: 7A8E, converter; 7B7E, I. F. amplifier; 7C6, 2nd detector-1st audio; 35A5E, audio output, and a 35Z3 rectifier.

AUDIO OUTPUT: 1.2 watts D.C. operation.
1.8 watts A.C. operation.

Model 42-718

TYPE OF CIRCUIT: Four (4) tube storage battery (6 volts) operated superheterodyne circuit with four tuning ranges. A synchronous vibrator is used in the power supply circuit for converting the storage battery voltage to a high voltage for plate circuits. Other features included in this model are: two point tone control; automatic volume control; pentode audio output circuit, tuning band indicator; permanent magnet speaker and a dial light.

TUNING RANGES: Broadcast—540 to 1600 K.C.; SW-1—3.0 to 9.5 MC; SW-2—9.4 to 12 MC; SW-3—11.8 to 22 MC.

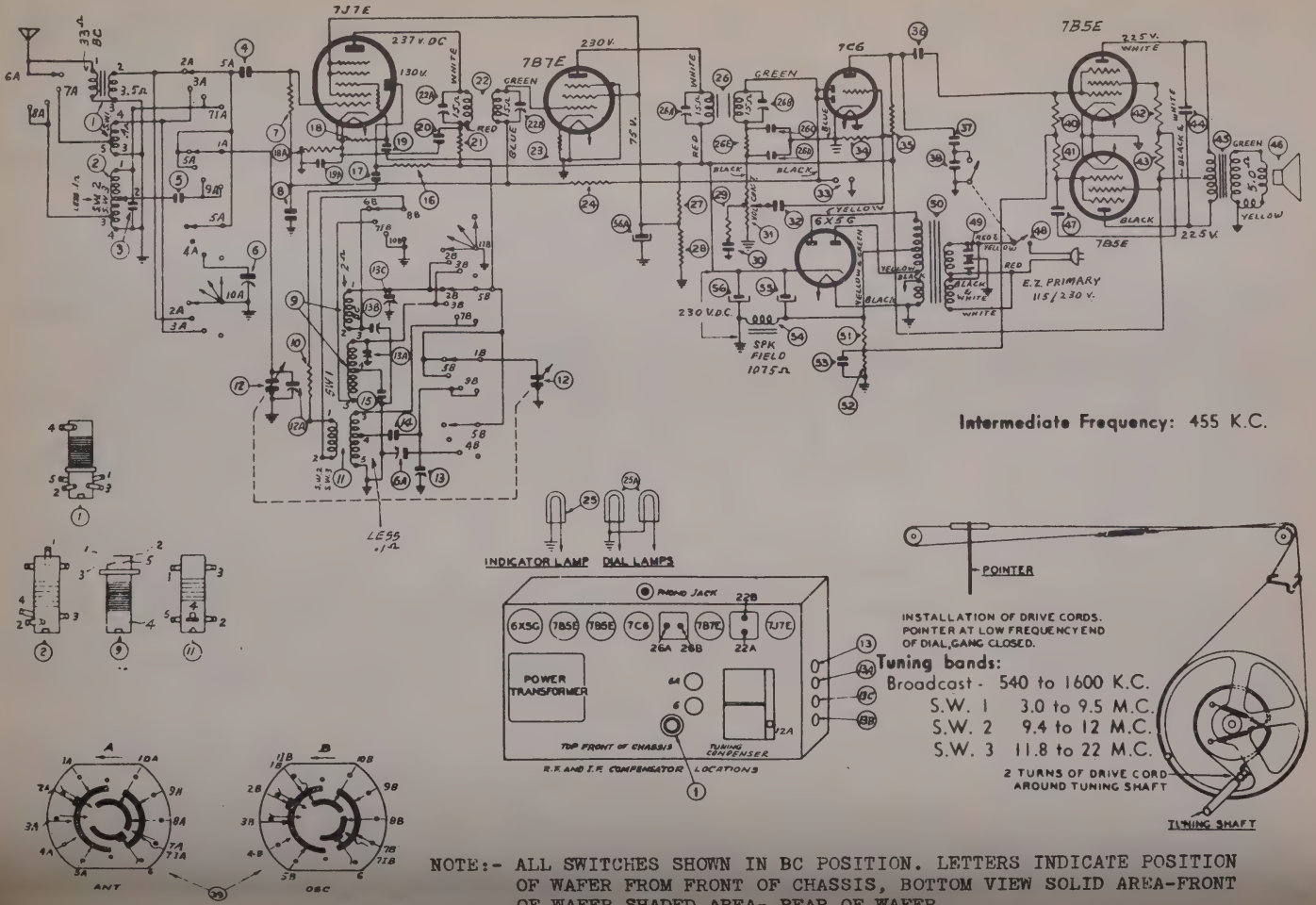
INTERMEDIATE FREQUENCY: 455 K.C.

POWER SUPPLY: 6 volt storage battery.

PHILCO TUBES USED: 7A8E converter; 7B7E, I. F. amplifier; 7C6 2nd detector-1st audio; 7B5E audio output.

POWER CONSUMPTION: 2 amperes.

AUDIO OUTPUT: .7 Watts.



NOTE:- ALL SWITCHES SHOWN IN BC POSITION. LETTERS INDICATE POSITION OF WAFER FROM FRONT OF CHASSIS, BOTTOM VIEW SOLID AREA-FRONT OF WAFER SHADED AREA- REAR OF WAFER

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MODEL 42-724

MODEL 42-724, CODE 121 — REPLACEMENT PARTS

Schematic No.	Description	Part No.
	Brdcst & S.W.-1 Aerial Transformer	32-3655
	Mtg. Clip	28-5002
2	Short Wave Aerial Transformer	32-3652
	Mtg. Clip	28-5002
3	Mica Condenser (20 mmfd.)	60-020237
4	Mica Condenser (100 mmfd.)	60-110457
5	Mica Condenser (310 mmfd.)	20-031017
6	Compensator (Aerial Shortwave 12 M.C.)	31-6416
6A	Compensator (Oscillator Shortwave 12 M.C.) Part of	6
7	Resistor (1 megohm)	33-610339
8	Condenser (.05 mfd., 200 volts)	30-4609
9	Brdcst & S.W.-1 Oscillator Transformer	32-3656
	Mtg. Clip	28-5002
10	Resistor (150 ohms)	33-115339
	Short Wave 2, Oscillator Transformer	32-3651
	Mtg. Clip	28-5002
	Tuning Condenser	31-2534
	Drive Cord (Tuning Cond.)	31-2542
	Spring	28-8751
	Drive Cord (Pointer)	31-2473
	Spring	28-8953
	Drive Shaft	56-6170
	Drive Drum	38-9883
	Spring	57-1468
	Rubber Connector	27-9432
	Rear Bearing	27-9437
	"C" Washer	28-2043
	Pointer	56-1856
	Mtg. Screw	97-0028
	Mtg. Rubber	27-4596
	Mtg. Sleeve	56-1307
12A	Compensator (Brdcst Aerial—Part of Tuning Cond.)	
12B	Compensator (Oscillator—21 M.C.)	31-6411
12C	Compensator (Oscillator—6 M.C.) Part of	13
13A	Compensator (Oscillator—580 K.C.) Part of	13
13B	Compensator (Oscillator—1500 K.C.) Part of	13
13C	Mica Condenser (275 mmfd.)	20-027511
	Mica Condenser (3500 mmfd.)	60-235224
	Resistor (22,000 ohms)	33-322339
	Mica Condenser (250 mmfd.)	60-125457
	Resistor (68,000 ohms)	33-368339
14A	Resistor (100 ohms)	33-110339
	Mica Condenser (100 mmfd.)	60-110257
15A	Condenser (.05 mfd., 200 volts)	30-4519
15B	Condenser (.01 mfd., 400 volts)	30-4572
15C	Resistor (1000 ohms)	33-210339
16	First I.F. Transformer	32-3813
17A	Primary Compensator (Part of 22)	
17B	Secondary Compensator (Part of 22)	
	Mtg. Nut	W-1949FA3
18	Resistor (68 ohms)	33-068339
19	Resistor (2.2 megohms)	33-522339
20	Indicator Lamp	34-2064E
	Socket Assembly	76-1344
21	Dial Lamps	34-2064E
	Socket Assembly	76-1062
22	Second I.F. Transformer	32-3814
23	Primary Compensator (Part of 26)	
24	Secondary Compensator (Part of 26)	
25	Condenser (100 mmfd.) Part of	26
26	Condenser (100 mmfd.) Part of	26
27	Resistor (47,000 ohms) Part of	26
	Mtg. Nut	33-347339
28	Resistor (22,000 ohms)	W-1949FA3
29	Resistor (33,000 ohms)	33-322439
30	Resistor (10,000 ohms) Part of	31
31	Condenser (.1 mfd., 200 volts)	33-333339
32	Volume Control (.5 megohm)	30-4586
	Mtg. Nut	33-5475
33	Condenser (.006 mfd., 400 volts)	W-2157FA3
34	Phono Input Jacks	30-4610
35	Resistor (10 megohms)	27-6149
36	Resistor (220,000 ohms)	33-610339
37	Condenser (.006 mfd., 400 volts)	33-422339
38	Condenser (.004 mfd., 600 volts)	30-4610
39	Mica Condenser (250 mmfd.)	30-4623
	Band Switch	60-125257
	Mtg. Nut	42-1689
40	Resistor (470,000 ohms)	W-2157FA3
41	Resistor (470,000 ohms)	33-447339
42	Resistor (10,000 ohms)	33-447339
43	Resistor (6800 ohms)	33-310339
44	Condenser (.003 mfd., 1500 volts)	33-268339
45	Output Transformer	30-4608
	Mtg. Screw	32-8189
46	Speaker	W-630
	Cone Assembly	36-1551-2
	Speaker Cable	36-4207
	Mtg. Nut	41-3535
		W-124FA3

Schematic No.	Description	Part No.
47	Condenser (.006 mfd., 400 volts)	30-4610
48	Power Switch and Tone Control	42-1698
	Mtg. Nut	W-2157FA3
49	Power line filter Condenser (.01-.01 mfd.)	3903-ODG
50	Power Transformer (115/220 Volts, 60 cycle)	32-8188
51	Resistor (1 Megohm)	33-510339
52	Resistor (270,000 ohms)	33-427339
53	Condenser (.1 mfd., 200 volts)	30-4586
54	Speaker Field (Replace Speaker)	36-1551-2
55	Electrolytic Condenser (40 mfd., 350 mfd.)	30-2529
	Mtg. Clip	56-1466
56	Electrolytic Condenser (16 mfd., 300 volts)	30-2521
56A	Electrolytic Condenser (5 mfd., 300 volts) Part of	56

MISCELLANEOUS PARTS

Cabinet	10557A
Back	27-9987
Cord (Power)	L-3274
Plug	L-3275
Knobs (Tuning, Volume)	54-4105
Lever and Link (Dial Indicator)	76-1348
Rubber Washer (Chassis)	27-4307
Rubber mtg. (Chassis)	54-4153
Socket (6X5G tube)	27-6174
Socket (Loktal)	27-6177
Mtg. Rivets	W-239
Sleeve (Chassis mtg.)	56-1545
Screw (Chassis mtg.)	W-1931FA3
Washer	W-410FA3

Audio output: 3 watts.

Aerial and Ground: To obtain maximum operating performance, an aerial with an over-all length of 100 feet should be used. The Philco aerial Part No. 40-6383 is recommended. A good ground connection to a water pipe or any other metal object in moist earth should also be used.

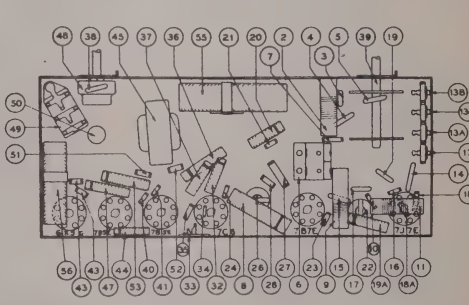
Power Supply: Operates on either a 115 or 230 volt, 50 to 60 cycle power supply. To use either of the above voltages change the power transformer primary wiring as indicated on the label at the rear of the chassis.

Power Consumption: 50 Watts

NOTE A—The "Dummy Aerial" consists of a condenser or resistor connected in series with the signal generator output lead (highside). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B—Dial Calibration: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity) set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale.

NOTE C—When adjusting the osc. compensators, be sure to tune in the fundamental signal (21 M.C.) (12 M.C.) instead of the image signal. If the compensator is correctly adjusted the image signal will be found by turning the signal generator dial 910 K.C. above the fundamental signal which will be 21.910 M.C. or 12.910 M.C.



Locations of Parts—Under Chassis

Operations In Order	SIGNAL GENERATOR: Output Connections to Radio	SIGNAL GENERATOR: Dummy Aerial Note A	SIGNAL GENERATOR: Dial Setting	RECEIVER: Dial Setting	RECEIVER: Control Settings	RECEIVER: Adjust Compensators	SPECIAL INSTRUCTIONS
1	Lug of aerial tuning cond.	.1 mfd.	455 K.C.	580 K.C.	Band Switch "Brdcst" Volmax	26A, 26B, 22A, 22B	
2	Aerial	400 ohms	21 M.C.	21 M.C.	Band Switch S. W. 3	13, 12A	Note B Note C
3	Aerial	400 ohms	12 M.C.	12 M.C.	Band Switch S. W. 2	6A, 6	Note C
4	Aerial	400 ohms	6 M.C.	6 M.C.	Band Switch S. W. 1	13A,	
5	Aerial	200 mmfd.	1500 K.C.	1500 K.C.	Band Switch "Brdcst"	13C	
6	Aerial	200 mmfd.	580 K.C.	580 K.C.	Band Switch "Brdcst"	13B	Roll tuning condenser
7	Aerial	200 mmf.	1500 K.C.	1500 K.C.	Band Switch "Brdcst"	13C	

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MODEL 42-730

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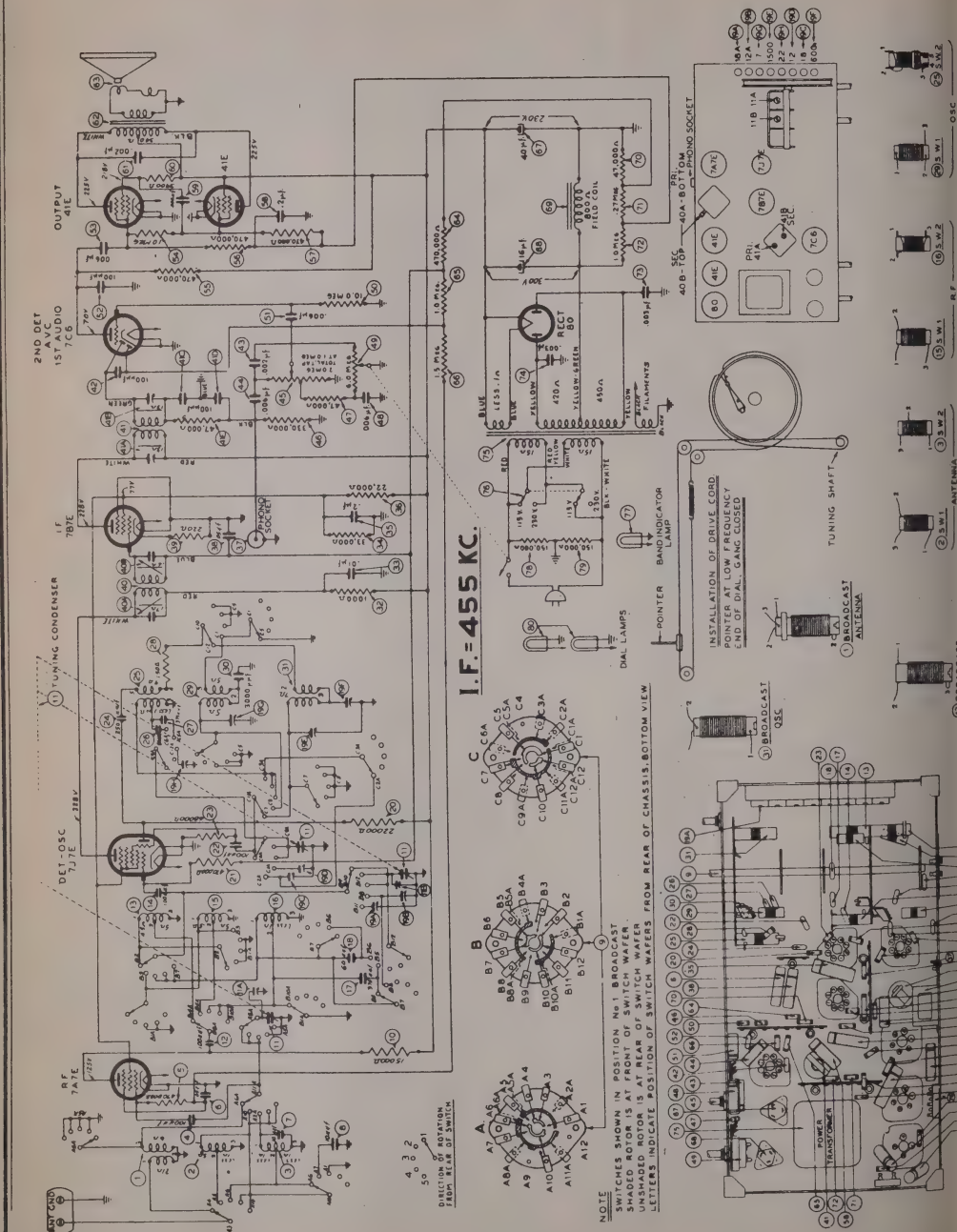

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CONNECTING ALIGNING INSTRUMENTS

VACUUM TUBE VOLTMETER: To use the vacuum tube voltmeter as an aligning indicator it should be connected to the A.V.C. circuit as follows:

1—Connect the negative (—) terminal of the vacuum tube voltmeter through a 2 megohm resistor to any point in the circuit where the A.V.C. voltage can be measured.

2—Connect the positive (+) terminal to the chassis ground terminal.

AUDIO OUTPUT METER: If this type of meter is used as an aligning indicator, it should be connected to the plate terminals of the output tubes. Adjust the meter for the 0 to 30 volt A. C. scale.

After connecting the aligning meter, adjust the compensators in the order as shown in the tabulations below. Locations of the compensators are shown on the schematic diagram.

If the output meter pointer goes off scale when adjusting the padders, reduce the strength of the signal from the generator.

Operations in Order	SIGNAL GENERATOR			RECEIVER			SPECIAL INSTRUCTIONS
	Ouput Connections to Radio	Dummy Aerial Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators	
1	Lug of aerial tuning cond.	.1 mfd.	455 KC.	580 KC.	Band Switch "Brdcst" Volmax	41A, 41B, 40A, 40B	
2	Aerial	400 ohms	22 MC.	22 MC.	Band Switch SW 2	19H, 11B, 11A	Note B Note C
3	Aerial	400 ohms	7 MC.	7 MC.	Band Switch SW 1	19G	Roll tuning cond. Note C
4	Aerial	200 mmfd.	1500 KC.	1500 KC.	Band Switch "Brdcst"	19E	Roll tuning cond.
5	Aerial	200 mmfd.	600 KC.	600 KC.	Band Switch "Brdcst"	19F	Roll tuning cond.
6	Aerial	200 mmf.	1500 KC.	1500 KC.	Band Switch "Brdcst"	19E	Roll tuning cond.
7	Aerial	400 ohms	18 MC.	18 MC.	Band Switch 16 & 19 M.	19C, 19A	Note C
8	Aerial	400 ohms	12 MC.	12 MC.	Band Switch 25 to 31 M.	19D, 19B	Note C

NOTE A—The "Dummy Aerial" consists of a condenser or resistor connected in series with the signal generator output lead (ghside). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B—Dial Calibration: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity) set the dial pointer on the first mark on the left edge (low frequency end) of the broadcast scale.

NOTE C—When adjusting the oscillator compensators, be sure to tune in the fundamental signal instead of the image signal. If the compensator is correctly adjusted the image signal will be found by turning the signal generator dial 910 KC. above the fundamental signal.

REPLACEMENT PARTS
MODEL 42-730

FOR CHANGES, SEE INDEX

Schematic No.	Description	Part No.
	Aerial Transformer (Broadcast) Mtg. Clips	32-3422 28-5002FE11
	Aerial Transformer (SW-1) Mtg. Clip	32-3693 28-5002FE11
	Aerial Transformer (SW-2) Mtg. Clip	32-3761 28-5002FE11
	Mica Condenser (100 mmfd.)	60-110457
	Resistor (470,000 ohms)	33-447339
	Condenser (.05 mfd., 200 volts)	30-4609
	Mica Condenser (10 mmfd.)	60-010237
	Mica Condenser (10 mmfd.)	60-010237
	Band Switch	42-1677
1	Resistor (15,000 ohms)	33-315339
1	Tuning Condenser	31-2549
1	Compensator (R. F.—SW 2), Part of 11	
1	Compensator (Aerial—SW 2), Part of 11	
	Drive Cord	31-2575
	Spring	28-8751
	Drum and Hub Assembly	31-2353
	Mtg. Spacer	56-1307
	Mtg. Screw & Washer	97-0028
	Pointer	56-1276FCP
	Tuning Shaft	76-1263
	Mtg. Nut	W-2157
1	Mica Condenser (100 mmfd.)	60-110457
1	R. F. Transformer (Broadcast) Mtg. Clip	32-3417 28-5002FE11
1	Mica Condenser (100 mmfd.)	60-110457
1	R. F. Transformer (SW-1) Mtg. Clip	32-3694 28-5002FE11
1	R. F. Transformer (SW-2) Mtg. Clip	32-3692 28-5002FE11
1	Mica Condenser (375 mmfd.)	20-037517
1	Mica Condenser (60 mmfd.)	20-006007
1	Compensator (Aerial—16 to 19 M. Band)	31-6417
1	Compensator (Aerial—25 to 31 M. Band), Part of 19A	
1	Compensator (Oscillator—16 to 19 M. Band), Part of 19A	
19D.	Compensator (Oscillator—25 to 31 M. Band), Part of 19A	
19E.	Compensator (Oscillator—1500 KC.), Part of 19A	
19F.	Compensator (Oscillator—600 KC.), part of 19A	
19G:	Compensator (Oscillator—SW-1), Part of 19A	
19H.	Compensator (Oscillator—SW-2), Part of 19A	
20.	Resistor (22,000 ohms)	33-322339
21.	Resistor (470,000 ohms)	33-447339
22.	Mica Condenser (100 mmfd.)	60-110257
23.	Resistor (68,000 ohms)	33-368339
24.	Mica Condenser (250 mmfd.)	60-125457
25.	Oscillator Transformer (SW-2)	32-3735
26.	Mica Condenser (80 mmfd.)	20-008007
27.	Mica Condenser (375 mmfd.)	20-037517
28.	Resistor (150 ohms)	33-115339
29.	Oscillator Transformer (SW-1) Mtg. Clip	32-3695 28-5002FE11
30.	Mica Condenser (3000 mmfd.)	60-230124
31.	Oscillator Transformer (Broadcast) Mtg. Clip	32-3423 28-5002FE11
32.	Resistor (1000 ohms)	33-210339
33.	Condenser (.01 mfd., 400 volts)	30-4572
34.	Resistor (33,000 ohms)	33-333339
35.	Condenser (.2 mfd., 400 volts)	30-4594
36.	Resistor (22,000 ohms, 1 watt)	33-322439
37.	Phonograph Input Socket	27-6149
38.	Condenser (.05 mfd., 200 volts)	30-4609
39.	Resistor (220 ohms)	33-122339
40.	1st I. F. Transformer	32-3696
40A.	Primary Compensator, Part of 40	
40B.	Secondary Compensator, Part of 40 Mtg. Nut	W-1949
41.	2nd I. F. Transformer	32-3657
41A.	Primary Compensator, Part of 41	
41B.	Secondary Compensator, Part of 41	
41C.	Condenser (100 mmfd.), Part of 41B	
41D.	Condenser (100 mmfd.), Part of 41B	
41E.	Resistor (47,000 ohms), Part of 41 Mtg. Nut	W-1949
42.	Mica Condenser (100 mmfd.)	60-110257
43.	Condenser (.002 mfd., 600 volts)	30-4622
44.	Condenser (.006 mfd., 400 volts)	30-4591
45.	Volume Control Mtg. Nut	33-5454 W-2157
46.	Resistor (330,000 ohms)	33-433339
47.	Resistor (47,000 ohms)	33-347339
48.	Condenser (.006 mfd., 400 volts)	30-4591
49.	Tone Control Mtg. Nut	33-5455 W-2157
50.	Resistor (10 megohms)	33-610339
51.	Condenser (.006 mfd., 400 volts)	30-4591
52.	Mica Condenser (100 mmfd.)	60-110257
53.	Condenser (.006 mfd., 400 volts)	30-4610
54.	Resistor (1 megohm)	33-510339
55.	Resistor (470,000 ohms)	33-447339
56.	Resistor (470,000 ohms)	33-447339
57.	Resistor (470,000 ohms)	33-447339
58.	Condenser (.2 mfd., 200 volts)	30-4587
59.	Condenser (.006 mfd., 400 volts)	30-4610
60.	Resistor (3900 ohms)	33-239339
61.	Condenser (.002 mfd., 600 volts)	30-4622
62.	Output Transformer	32-8179
63.	Speaker Cone Assembly (For Speaker 36-1549-2)	36-1549-2 36-4207
	Mtg. Nut (Speaker)	W-124
	Speaker Cable	41-3535
64.	Resistor (470,000 ohms)	33-447339
65.	Resistor (1 megohm)	33-510339
66.	Resistor (1.5 megohms)	33-515339
67.	Electrolytic Condenser (40 mfd., 350 volts D. C.)	30-2445
68.	Electrolytic Condenser (16 mfd.) Mtg. Plate	30-2465 27-9508
69.	Field Coil (Replace Speaker 36-1549-2)	
70.	Resistor (47,000 ohms)	33-347339
71.	Resistor (270,000 ohms)	33-427339
72.	Resistor (1 megohm)	33-510339
73.	Condenser (.002 mfd., 1500 volts D. C.)	30-4608
74.	Condenser (.002 mfd., 1500 volts D. C.)	30-4608
75.	Power Transformer (115/220 volts, 60 cycle)	32-8178
	Power Transformer (115 volts, 25 cycle)	32-8205
76.	Power Line Changeover Switch	42-1569
77.	Band Indicator Lamp Socket Assembly	34-2064E 76-1179
	Arm & Link Assembly	76-1352
	Light Housing Assembly	76-1262
78.	Resistor (150,000 ohms)	33-415359
79.	Resistor (150,000 ohms)	33-415359
80.	Dial Pilot Lamp Socket Assembly	30-2064E 76-1414

Tuning Band Frequencies:

Broadcast	540 to 1720 kc.
SW 1	2.3 to 7.5 mc.
SW 2	7.0 to 22 mc.
Spread Band 1	9.4 to 12 mc.
Spread Band 2	15.1 to 18 mc.

Intermediate Frequency: 455 kc.

Power Supply: Operates on either a 115 or 230 volt, 50 to 60 cycle, A. C. power supply. To use either of the above voltages, change the power transformer primary wiring as indicated on the label at the rear of the chassis and schematic diagram. This model can also be operated on a 115-volt, 25 cycle power supply, by changing the power transformer as indicated in the parts list.

Power Consumption: 50 watts.

Audio Output: 2.2 watts.

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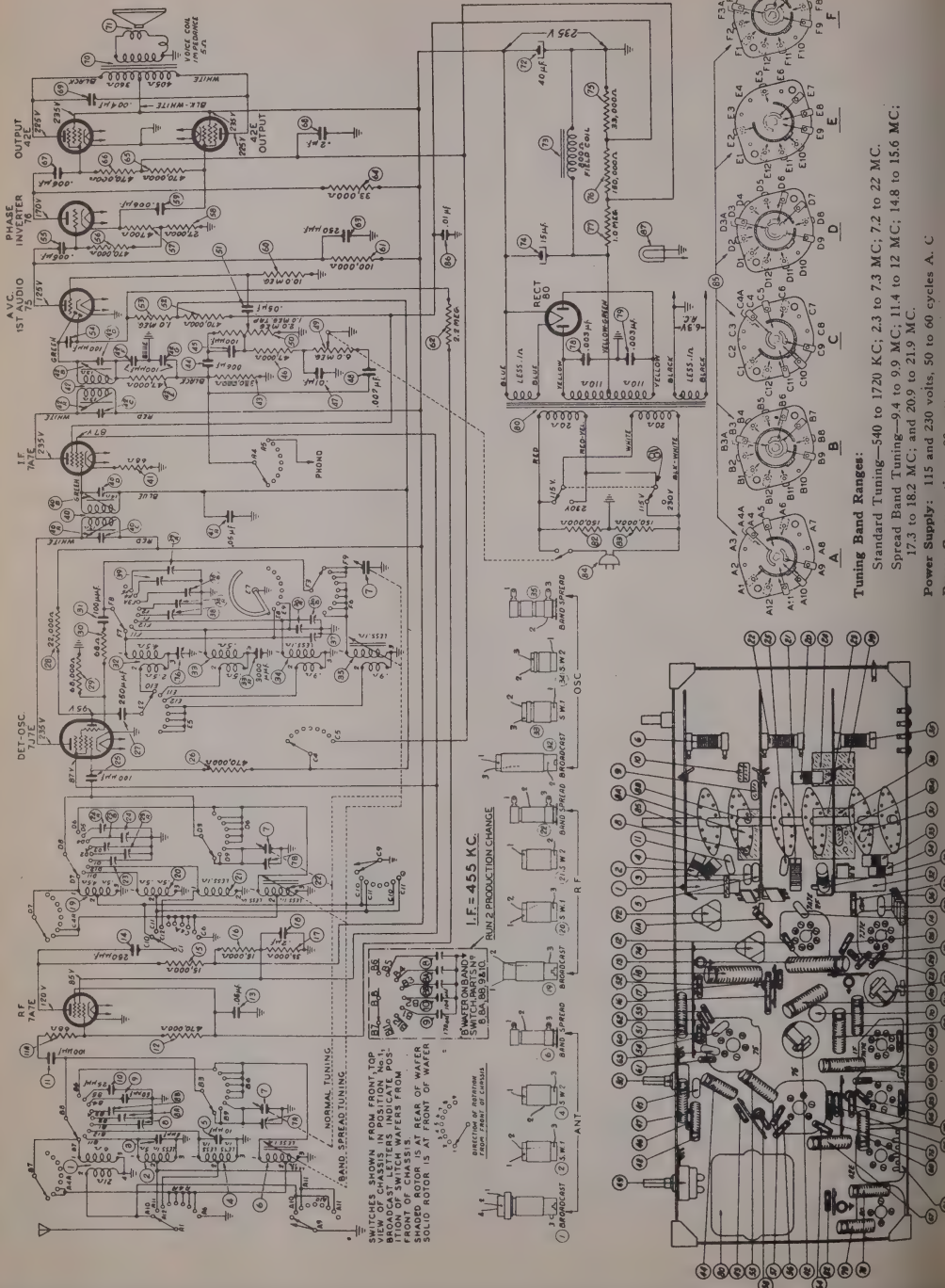
MODEL 42-760

PHILCO RADIO & TELEVISION CORP.



Tuning Band Ranges:
Standard Tuning—540 to 1720 KC; 2.3 to 7.3 MC; 7.2 to 22 MC.
Spread Band Tuning—9.4 to 9.9 MC; 11.4 to 12 MC; 14.8 to 15.6 MC; 17.3 to 18.2 MC; and 20.9 to 21.9 MC.

Power Supply: 115 and 230 volts, 50 to 60 cycles A. C

Power Consumption: 90 watts.

Audio Output: 6 watts.

FIG. 3—PART LOCATIONS—UNDER CHASSIS, Model 42-760

FOR OTHER DATA, SEE INDEX

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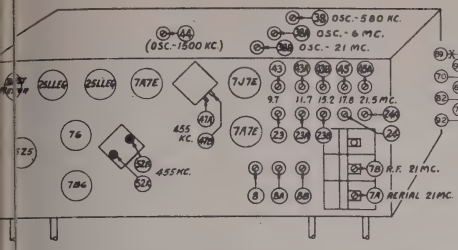
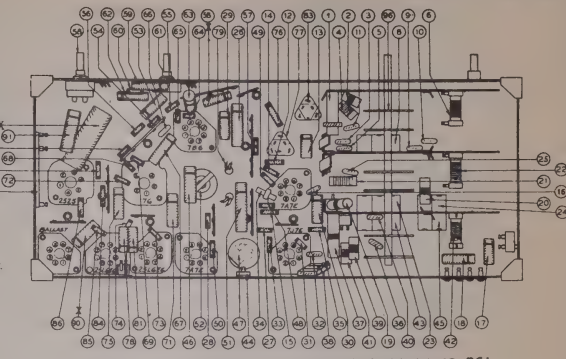
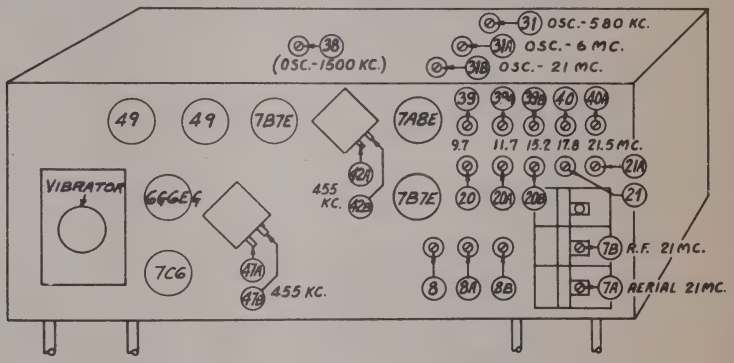
MODEL 42-760
MODEL 42-761
MODEL 42-762



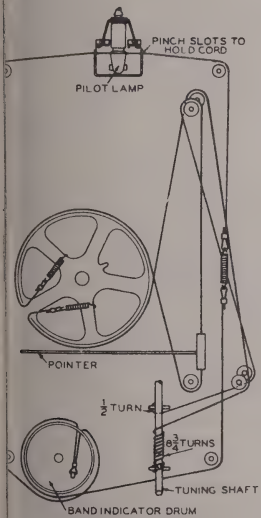
LOCATIONS OF COMPENSATORS—TOP CHASSIS
Model 42-761



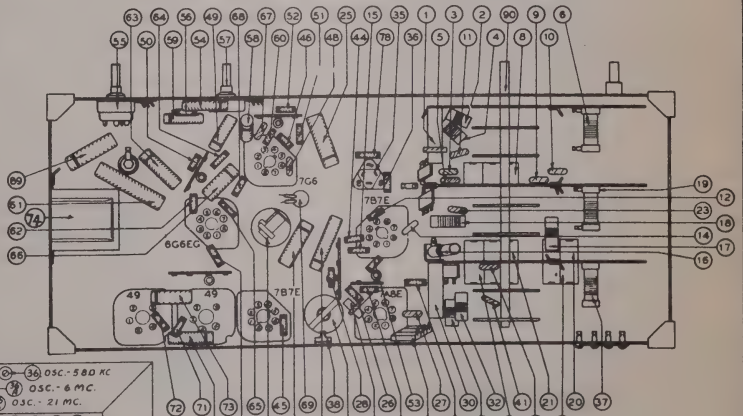
PART LOCATIONS—UNDER CHASSIS, Model 42-761



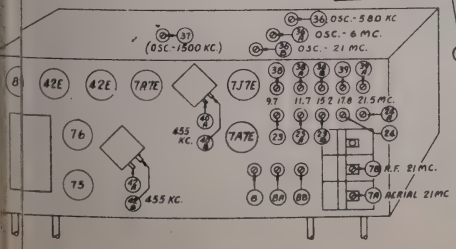
LOCATIONS OF COMPENSATORS, TOP OF CHASSIS, Model 42-762



INSTALLING TUNING
DRIVE CORD



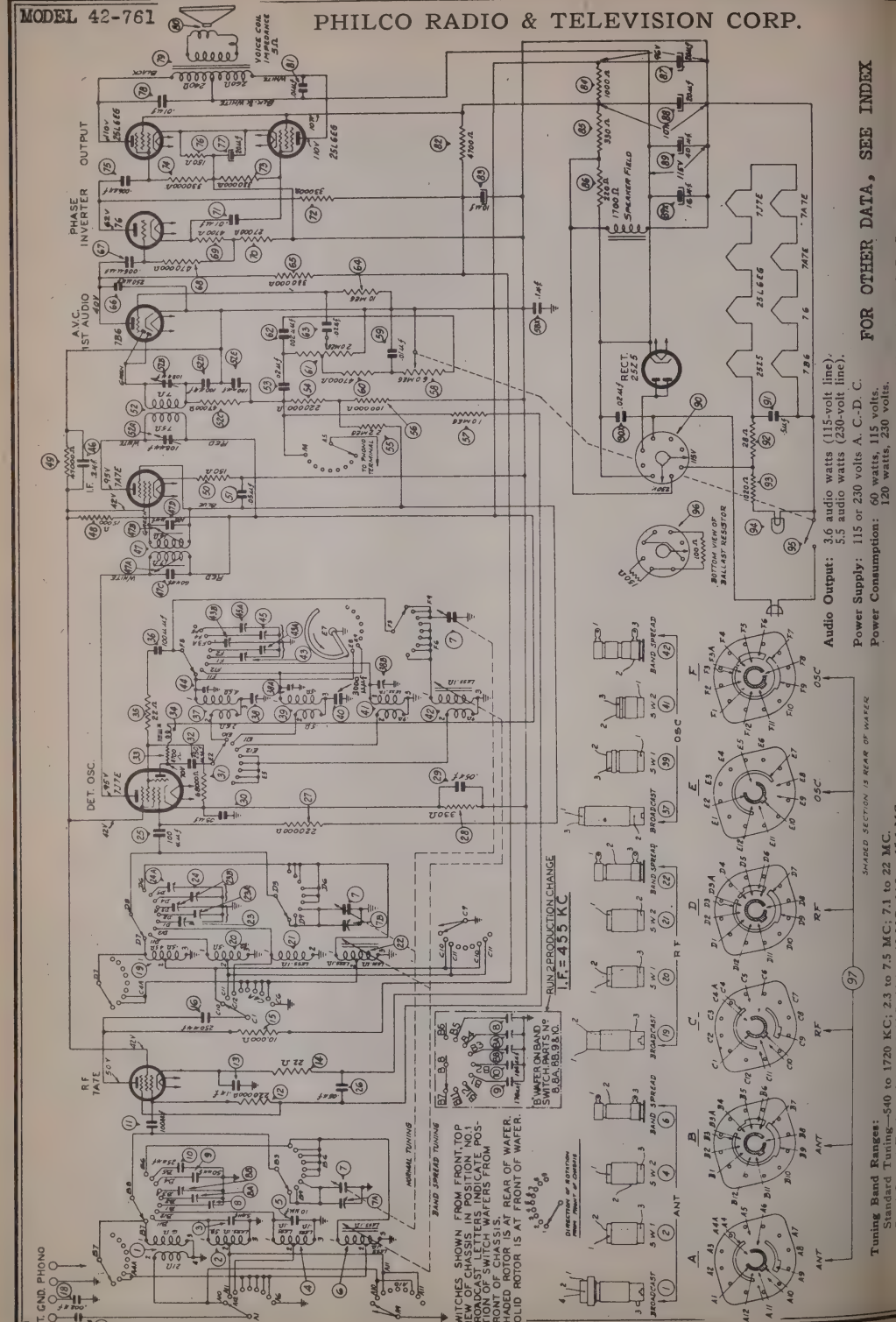
LOCATIONS OF PARTS—UNDER CHASSIS, Model 42-762



LOCATIONS OF COMPENSATOR—TOP CHASSIS
Model 42-760

MODEL 42-761

PHILCO RADIO & TELEVISION CORP.


PHASE INVERTER
OUTPUT
A.V.C. 1ST AUDIO
DET. OSC.
R.F.
ANT. GND. PHONO
SPEAKER FIELD
RECT.
VOICE COIL IMPEDANCE 5Ω
TO PHONO TERMINAL
BOTTOM VIEW OF BALLAST RESISTOR
I.F. = 455 KC
RUN 2 PRODUCTION CHANGE
6 WAFER BAND SWITCH PARTS Nos. 8, 8A, 8B, 9 & 10.
SHADED SECTION IS REAR OF WAFER
NORMAL TUNING
BAND SPREAD TUNING
DIRECTION OF ROTATION (REAR OF CHASSIS)
SWITCHES SHOWN FROM FRONT. TOP VIEW OF CHASSIS IN POSITION NO. 1 BROADCAST LETTERS INDICATE POSITION OF SWITCH WAFERS FROM FRONT OF CHASSIS.
SHADED ROTOR IS AT REAR OF WAFER.
SOLID ROTOR IS AT FRONT OF WAFER.

Audio Output: 3.6 audio watts (115-volt line).
5.5 audio watts (230-volt line).

Power Supply: 115 or 230 volts A. C.-D. C.

Power Consumption: 60 watts, 115 volts.
120 watts, 230 volts.

To operate the radio on either 115 volts or 230 volts A. C.-D. C. power

Tuning Band Ranges:
Standard Tuning—540 to 1720 KC; 2.3 to 7.5 MC; 7.1 to 22 MC.
Band Spread Tuning—9.4 to 9.9 MC; 11.4 to 12 MC; 14.8 to 15.6 MC; 17.3 to 18.2 MC; 20.9 to 21.9 MC.

FOR OTHER DATA, SEE INDEX

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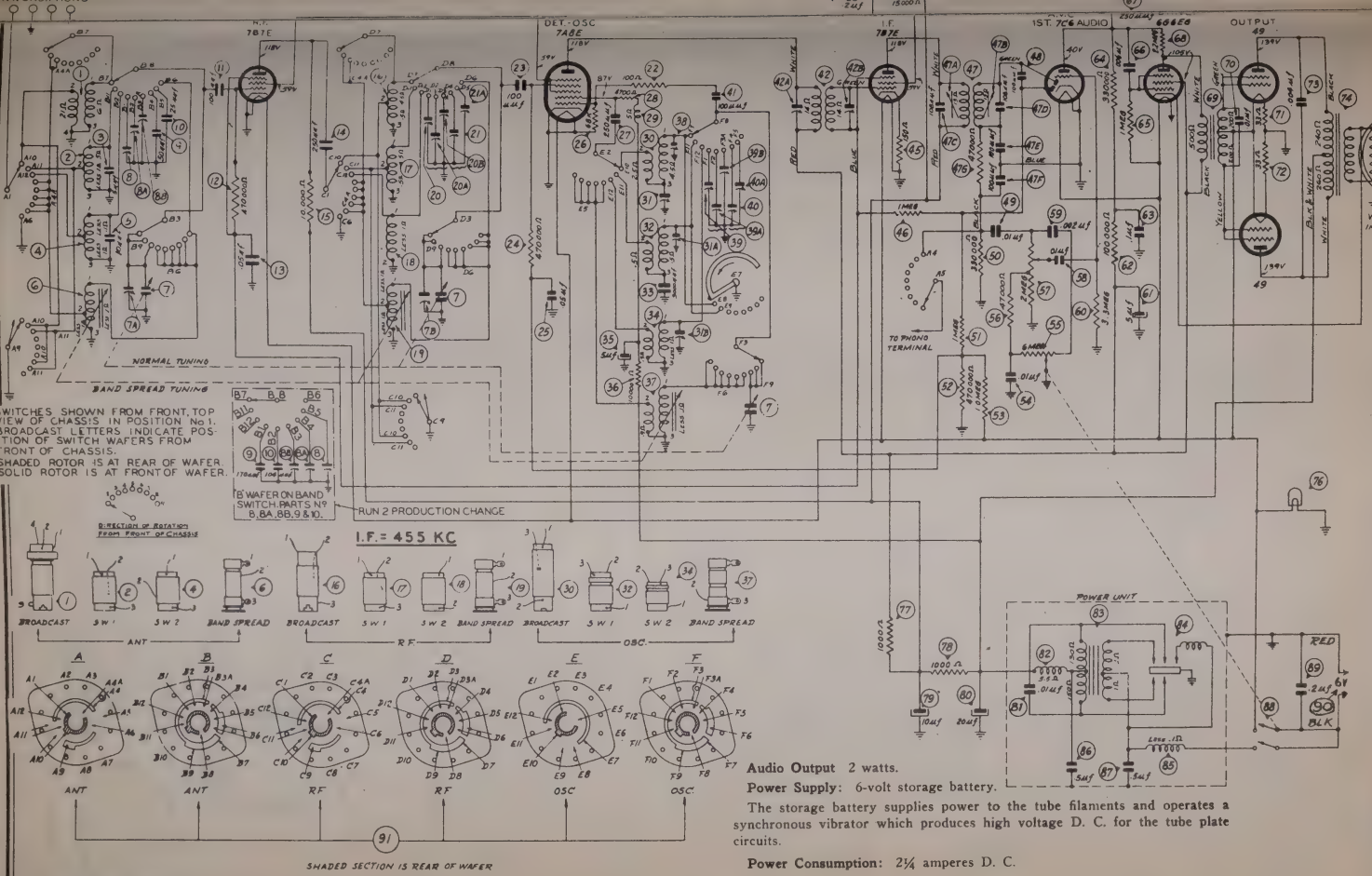
R.F. 7B7E
DET.-OSC 7A8E
I.F. 7B7E
1ST. 7C6 AUDIO
6B6EG
OUTPUT
NORMAL TUNING
BAND SPREAD TUNING
SWITCHES SHOWN FROM FRONT, TOP VIEW OF CHASSIS IN POSITION No 1. BROADCAST. LETTERS INDICATE POSITION OF SWITCH WAFERS FROM FRONT OF CHASSIS.
SHADED ROTOR IS AT REAR OF WAFER. SOLID ROTOR IS AT FRONT OF WAFER.
B WAFER ON BAND SWITCH. PARTS Nº B, BA, BB, 9 & 10.
RUN 2 PRODUCTION CHANGE
DIRECTION OF ROTATION FROM FRONT OF CHASSIS
I.F.= 455 KC
TO PHONO TERMINAL
VOICE COIL IMPEDANCE 3 Ω.
POWER UNIT
BROADCAST
SW 1
SW 2
BAND SPREAD
ANT
RF
OSC
SHADED SECTION IS REAR OF WAFER

Audio Output 2 watts.

Power Supply: 6-volt storage battery.

The storage battery supplies power to the tube filaments and operates a synchronous vibrator which produces high voltage D. C. for the tube plate circuits.

Power Consumption: 2¼ amperes D. C.

Tuning Band Ranges:

Standard Tuning—540 to 1720 KC; 2.3 to 7.5 MC; 7.1 to 22 MC.

Band Spread Tuning—9.4 to 9.9 MC; 11.4 to 12 MC; 14.8 to 15.6 MC; 17.3 to 18.2 MC; 20.9 to 21.9 MC.

FOR CHANGES, SEE INDEX

MODEL 42-760
MODEL 42-761

PHILCO RADIO & TELEVISION CORP.

MODEL 42-76

CONNECTING ALIGNING INSTRUMENTS

Vacuum Tube Voltmeter: To use the vacuum tube voltmeter as an aligning indicator, it should be connected to the A. V. C. circuit as follows:

1. Connect the negative (–) terminal of the vacuum tube voltmeter through a 2 megohm resistor to any point in the circuit where the A. V. C. voltage can be measured.
2. Connect the positive (+) terminal to the chassis ground terminal.

Audio Output Meter: If this type of meter is used as an aligning indicator, it should be connected to the plate and screen terminal of the output tube. Adjust the meter for the 0 to 30 volt A. C. scale.

After connecting the aligning meter, adjust the compensators in the order for each model as shown in the tabulation below. Locations of the compensators are shown in Figures 6, 7, 10.

If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

ADJUSTING NORMAL TUNING RANGES

Operations in Order	SIGNAL GENERATOR			RECEIVER					Special Instructions
	Output Connections to Receiver	Dummy Aerial Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators for Maximum Signal Models 42-760	42-761	42-762	
1	Grid 747E	.1 mfd	455 KC	580 KC	Range Switch Brdcst. Volume "Max"	42A 42B 40A 40B	52A 52B 47A 47B	47A 47B 42A 42B	
2	Aerial Lead	400 ohms	21 MC	21 MC	Range Switch "S. W. 2"	36B 7B 7A	38B 7B 7A	31B 7B 7A	Notes B, C
3	Aerial Lead	400 ohms	6.0 MC	6.0 MC	Range Switch "S. W. 1"	36A	38A	31A	Roll Gang
4	Aerial Lead	200 mmfd	1500 KC	1500 KC	Range Switch "Broadcast"	37	44	38	Roll Gang
5	Aerial Lead	200 mmfd	580 KC	580 KC	Range Switch "Broadcast"	36	38	31	Roll Gang

ADJUSTING BAND SPREAD TUNING RANGES

Mechanical Adjustments: Before the padders of the band spread tuning ranges are adjusted, the iron cores of the antenna, R. F. and oscillator transformers must be mechanically set as follows:

1. Turn the band spread tuning control to the extreme counterclockwise position (lowest frequency).

2. Adjust location of "OSC" iron cores so that the end of the iron core is flush with the end of the transformer. With the "OSC" iron core in this position the antenna R. F. cores will be correctly located.

3. When installing a new oscillator transformer or core, make sure that the iron core slides freely in the transformer. It is important to do this to eliminate backlash in the tuning mechanism. If adjustment is necessary slightly move transformer in the direction required.

After mechanically setting the transformers and iron cores, adjust the padders as given in the following tabulation:

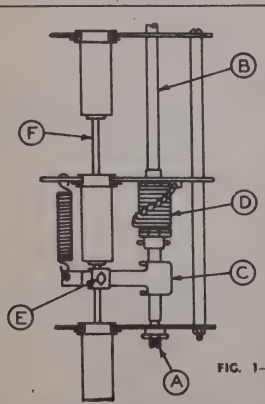

FIG. 1—BAND SPREAD TUNING MECHANISM

MECHANICAL ADJUSTMENTS—BAND SPREAD TUNING MECHANISM

1. ADJUSTMENT OF TUNING SHAFT

End play can be removed by adjusting the rear bearing No. (A), Fig. (1). Care should be taken when adjusting the screw so that shaft does not turn too tightly. In making this adjustment, the screw driver can be inserted in the chassis in line with shaft.

2. REMOVING TUNING SHAFT

(a) Remove tuning knob shaft and coupling.
(b) Loosen lock nut on rear bearing and remove adjusting screw and ball bearing.
(c) Remove cotter pin from stop assembly.
(d) Unscrew carriage as shaft is pulled out through front of R. F. tuner and chassis.
(e) When installing new shaft (B) adjust positions of stop assembly and carriage, before inserting cotter pin, so that the carriage (C) is approximately 5 turns from the stop assembly (D) with shaft in extreme counterclockwise position from front. The stop assembly is rotated until all washers are in contact. The bottom washer should be located between the stops fartherest apart.

3. ADJUSTING BAND SPREAD TUNING CORE ASSEMBLY

(a) Cores are correctly located when the rear of the oscillator core (blue identification) is flush with the rear of oscillator transformer and the tuning shaft is in extreme counterclockwise position.
(b) The carriage clamp (E) must not be tightened excessively as this will bend the tuning core rod (F) and cause backlash.

PROCEDURE FOR PRODUCTION RUN No. 1 CHASSIS

Operations in Order	SIGNAL GENERATOR			RECEIVER					Special Instructions
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators Models 42-760	42-761	42-762	
1	Antenna and Ground	400 ohms	9.7 MC	9.7 MC	Band Selector Position "31M" on Dial	38 23 8 Note E	42 23 8 Note E	39 20 8 Note E	Note B, Note D
2	Antenna and Ground	400 ohms	11.7 MC	11.7 MC	Band Selector Position "25M" on Dial	38A 23A 8A Note E	43A 23A 8A Note E	39A 20A 8A Note E	Note D
3	Antenna and Ground	400 ohms	15.2 MC	15.2 MC	Band Selector Position "19M" on Dial	38B 23B 8B Note E	43B 23B 8B Note E	39B 20B 8B Note E	Note D
4	Antenna and Ground	400 ohms	17.8 MC	17.8 MC	Band Selector Position "16M" on Dial	39 24	45 24	40 21	Note D
5	Antenna and Ground	400 ohms	21.5 MC	21.5 MC	Band Position Selector "13M" on Dial	39A 24A	45A 24A	40A 21A	Note D

PROCEDURE FOR PRODUCTION RUN No. 2 CHASSIS

Operations in Order	SIGNAL GENERATOR			RECEIVER					Special Instructions
	Output Connections to Receiver	Dummy Antenna Note A	Dial Setting	Dial Setting	Control Settings	Adjust Compensators Models 42-760	42-761	42-762	
1	Antenna and Ground	400 ohms	21.5 MC	21.5 MC	Band Selector Position "13M" on Dial	39A 24A 8	45A 24A 8	40A 21A 8	Note B, Note D
2	Antenna and Ground	400 ohms	17.8 MC	17.8 MC	Band Selector Position "16M" on Dial	39 24 8A	45 24 8A	40 21 8A	Note D
3	Antenna and Ground	400 ohms	15.2 MC	15.2 MC	Band Selector Position "19M" on Dial	38B 23B 8B	43B 23B 8B	39B 20B 8B	Note D
4	Antenna and Ground	400 ohms	11.7 MC	11.7 MC	Band Selector Position "25M" on Dial	38A 23A	43A 23A	39A 20A	Note D
5	Antenna and Ground	400 ohms	9.7 MC	9.7 MC	Band Selector Position "31M" on Dial	38 23	43 23	39 20	Note D

NOTE A—The "Dummy Antenna" consists of a condenser or resistance connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B—In order to adjust the receiver correctly the pointer must be aligned to track the dial properly. To adjust the dial proceed as follows: With the tuning condenser closed (maximum capacity) set the dial pointer on the first marks at the low frequency end of the scales. Make sure that the stop mechanism in the band spread permeability tuning reaches its counterclockwise end of rotation at the same time that the tuning condenser is completely closed.

NOTE C—When adjusting "OSC" compensator be sure to tune in the fundamental signal (21 MC) instead of the image signal. If the compensator is correctly adjusted, the image signal will be found by turning the signal generator dial 910 KC above the fundamental signal, which will be 21.910 MC.

NOTE D—To make sure that the dial reads properly after adjusting the compensators with the signal generator as outlined above, a known station on each band near the adjusting frequency should be tuned in with the spread band tuning control. If the dial reading is incorrect, adjust the oscillator compensators on each band until the stations are heard at the correct points on the dial. After adjusting the oscillator compensators to the correct frequency of the known station, the "antenna" and R. F. compensators should be adjusted to maximum signal.
ALTERNATIVE METHOD—Locate a known station near the center of each spread band and "Zero Beat" the signal generator with it at the time of aligning the band. This makes available a signal of adjustable strength and known frequency. This method will be found to be simpler when conditions make its use possible, because it is much easier to align a receiver to a strong signal.

NOTE E—The band spread compensator aligning procedure for Run 2 chassis differs from Run 1. The two procedures are listed above. Compensators 8, 8A and 8B on chassis marked Run 2 is used to adjust the 21.5, 17.8 and 15.2 MC bands, whereas in Run 1 chassis these compensators are used to adjust the 9.7, 11.7 and 15.2 MC bands. The locations of the padders remain the same as Run 1 chassis shown in Figures 6, 7 and 10.

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No.	Description	Part No.
1.	Aerial Transformer (Broadcast) Mtg. Clip	32-3661 28-5002
2.	Aerial Transformer (Police)	32-3664
3.	Mica Condenser (5 mmfd)	60-005357
4.	Aerial Transformer (Short Wave)	32-3667
5.	Mica Condenser (10 mmfd)	60-010337
6.	Band Spread Aerial Transformer Mtg. Clip Core Assembly	32-3670 57-0985 76-1281
7.	Tuning Condenser	31-2535
7A.	Compensator (S. W. 2—Aerial) Part of Cond.	
7B.	Compensator (S. W.—R. F.) Part of Cond.	
	Drive Cord	31-2536
	Drive Cord	31-2537
	Spring	28-8954
	Cotter Pin	W-2196
	Drive Drum	76-1244
	Set Screw	W-2008
	Rubber Mtg. Grommet	27-4596
	Tuning Shaft (Inside R. F. Unit)	76-1240
	Shaft Bushing (Threaded)	56-2152
	Carriage (Tuning Cores)	56-2145
	Core Clamp	56-2151
	Screw	97-0054
	Cotter Pin	W-2196
	Tuning Shaft and Bearing (Outside Chassis)	76-1245
	Rubber Disc	27-4272
	Mtg. Screw	W-2259
	Mtg. Screw (Condenser)	97-0028
8.*	Compensator (31 M Aerial)	31-6412
8A.	Compensator (25 M Aerial), Part of 8	
8B.	Compensator (19 M Aerial), Part of 8	
9.*	Silver Mica Condenser (50 mmfd)	30-1199
10.*	Silver Mica Condenser (25 mmfd)	30-1145
11.	Mica Condenser (100 mmfd)	60-110457
11A.	Resistor (68 ohms)	33-068339
12.	Resistor (470,000 ohms)	33-447339
13.	Condenser (.05 mfd. 200 volts)	30-4609
14.	Mica Condenser (250 mmfd)	60-125457
15.	Resistor (15,000 ohms)	33-315339
16.	Resistor (15,000 ohms)	33-315439
17.	Resistor (33,000 ohms)	33-333339
18.	Condenser (.2 mfd, 400 volts)	30-4594
19.	R. F. Transformer (Broadcast) Mtg. Clip	32-3662 28-5002
20.	R. F. Transformer (Police)	32-3665
21.	R. F. Transformer (Short Wave)	32-3668
22.	Band Spread R. F. Transformer Mtg. Clip Core Assembly	32-3671 57-0985 76-1281
23.	Compensator (31 M—R. F. Stage)	31-6412
23A.	Compensator (25 M—R. F. Stage), Part of 23	
23B.	Compensator (19 M—R. F. Stage), Part of 23	
24.	Compensator (16 M—R. F. Stage)	31-6413
24A.	Compensator (13 M—R. F.), Part of 24	
25.	Mica Condenser (100 M mfd)	60-110457
26.	Resistor (470,000 ohms)	33-447339
27.	Mica Condenser (250 M mfd)	60-125457
28.	Resistor (22,000 ohms)	33-322339
29.	Resistor (68,000 ohms)	33-368339
30.	Resistor (100 ohms)	33-110339
31.	Mica Condenser (100 mmfd)	60-110467
32.	Oscillator Transformer (Broadcast) Mtg. Clip	32-3663 28-5002
33.	Oscillator Transformer (Police)	32-3666
33A.	Condenser (3000 mmfd)	60-230124
34.	Oscillator Transformer (Short Wave)	32-3669
35.	Oscillator Transformer (Band Spread) Mtg. Clip Core Assembly	32-3672 57-0985 76-1281
36.	Compensator (580 KC Broadcast) Part of 36	31-6350
36B.	Compensator (S. W. 2—21 MC), Part of 36	
37.	Osc. Compensator (1500 KC—Broadcast)	31-6308
38.	Osc. Compensator (31 M Band—9.7 MC)	31-6414
38A.	Osc. Compensator (25 M Band—11.7 MC), Part of 38	
38B.	Compensator (19 M Band—15.2 MC), Part of 38	
39.	Osc. Compensator (16 M Band—17.8 MC)	31-6415
39A.	Osc. Compensator (13 M Band—21.5 MC), Part of 39	
40.	1st I. F. Transformer Mtg. Nut	32-3659 W-1949
40A.	Primary Compensator (Iron Core)	
40B.	Secondary Compensator (Iron Core)	
40C.	Condenser, Part of 40	
40D.	Condenser, Part of 40	
41.	Resistor (68 ohms)	33-068339
41A.	Condenser (.05 mfd. 200 volts)	30-4609
42.	2nd I. F. Transformer	32-3660
42A.	Primary Compensator (Iron Core)	
42B.	Secondary Compensator (Iron Core)	
42C.	Condenser, Part of 40	
42D.	Condenser, Part of 40	
42E	Resistor (47,000 ohms), Part of 42	33-347339
42F.	Condenser (100 mmfd)	
42G.	Condenser (100 mmfd), Part of 40	
43.	Resistor (330,000 ohms)	33-433339
44.	Condenser (.006 mfd, 400 volts)	30-4591
45.	Mica Condenser (100 mmfd)	60-110457
46.	Resistor (47,000 ohms)	33-347339
47.	Condenser (.01 mfd, 200 volts)	30-4591
48.	Condenser (.002 mfd, 600 volts)	30-4579
49.	Tone Control Mtg. Nut	33-5439 W-2157
50.	Volume Control Mtg. Nut	33-5438 W-2157
51.	Condenser (.05 mfd, 200 volts)	30-4519
52.	Resistor (470,000 ohms)	33-447339
53.	Resistor (1 megohm)	33-510339
54.	Mica Condenser (100 mmfd)	60-110437
55.	Condenser (.006 mfd, 400 volts)	30-4610
56.	Resistor (470,000 ohms)	33-447339
57.	Resistor (4700 ohms)	33-247339
58.	Resistor (27,000 ohms)	33-327339
59.	Condenser (.006 mfd, 400 volts)	30-4610
60.	Resistor (10 megohms)	33-610339
61.	Resistor (100,000 ohms)	33-410339
62.	Resistor (2.2 megohms)	33-522339
63.	Mica Condenser (250 mmfd)	60-125457
64.	Resistor (33,000 ohms)	33-333339
65.	Resistor (470,000 ohms)	33-447339
66.	Resistor (470,000 ohms)	33-447339
67.	Condenser (.006 mfd, 400 volts)	30-4610
68.	Condenser (.2 mfd, 200 volts)	30-4587
69.	Condenser (.004 mfd, 600 volts)	30-4623
70.	Output Transformer	32-8110
71.	Speaker Cone Assembly (For Speaker 36-1453-4, with ¾-inch voice coil and fiber spider) Speaker Cable	36-1453-4 36-4191 41-3535
72.	Electrolytic Condenser (40 mfd, 350 volts) Mtg. Plate	30-2445 56-1643
73.	Field Coil (Replace Speaker 36-1453)	
74.	Electrolytic Condenser (15 mfd) Mtg. Plate Insulation Tube	30-2465 27-9508 27-9506
75.	Resistor ($3,000 ohms)	33-333339
76.	Resistor (150,000 ohms)	33-415339
77.	Resistor (1 megohm)	33-510339
78.	Condenser (.003 mfd, 1500 volts)	30-4608
79.	Condenser (.003 mfd, 1500 volts)	30-4608
80.	Power Transformer (115 volts, 25 cycles)	32-8031
81.	Power Transformer Voltage Selector Switch This Switch is not used on 115 volts, 25 cycle model	42-1569
82.	Resistor (150,000 ohms)	33-415339
83.	Resistor (150,000 ohms)	33-415339
84.	Power Line Cord Power Plug	L-3274 L-3275
85.	Band Switch Band Indicator Drum Drive Cord Spring (Left Side) Spring (Right Side)	42-1660 76-1246 31-2538 28-8929 28-8953
86.	Condenser (.01 mfd, 400 volts)	30-4572
87.	Pilot Lamp Socket Assembly Rod	34-2064E 76-1236 56-2133

Miscellaneous Parts

	Cabinet	10541A
	Cabinet Back	27-9568
	Mtg. Screw	W-2076
	Dial Scale Assembly	76-1237
	Dial Pointer	56-2134
	Mtg. Screw	W-188
	Knobs	27-4332
	Rubber Washer (Chassis Mt.)	27-4571
	Socket (76 tube)	27-6035
	Socket (75, 42E tubes)	27-6036
	Socket (80 tube)	27-6044
	Socket (Loktal-7J7E tube)	27-6129
	Socket (Loktal-7A7E tubes)	27-6158-2
	Mtg. Eyelets	W-1650
	Screw (Chassis Mtg.)	W-1345
	Tube Shield (7A7E tube)	56-1566
	Tube Shield Base (7A7E tube)	56-1567
	Tube Shield (75 tube)	28-2726
	Tube Shield Base (75 tube)	28-2725
	Wire Panel (3 lugs)	38-9778
	Wire Panel (4 lugs)	38-9809
	Wire Panel (2 lugs)	38-9810
	Wire Panel (8 lugs)	38-9817
	Washer (Chassis Mtg.)	38-5114

* Beginning with production chassis marked Run 2 the wiring location of Compensators 8, 8A, and 8B on the "B" wafer of the band switch was changed as shown in the boxed diagram on the schematic diagram. The part number of the compensator changes from No. 31-6412 to 31-6450. The wiring locations and part numbers of Condensers 9 and 10 also change as indicated in the sketch. Condenser No. 9 changes from part No. 30-1199, 50 mmfd, to No. 20-010417, 104 mmfd. Condenser 10 changes from part No. 30-1145, 25 mmfd, to 20-017017, 170 mmfd.

REPLACEMENT PARTS—Model 42-761

Sch. No.	Description	Part No.
1.	Aerial Transformer (Broadcast) Mtg. Clip	32-3661 28-5002
2.	Aerial Transformer (Police)	32-3664
3.	Mica Condenser (5 mmfd)	60-005357
4.	Aerial Transformer (Short Wave)	32-3667
5.	Mica Condenser (10 mmfd)	60-010337
6.	Band Spread Aerial Transformer Mtg. Clip Core Assembly	32-3670 57-0985 76-1281
7.	Tuning Condenser	31-2535
7A.	Compensator (S. W.—Aerial), Part of 7	
7B.	Compensator (S. W.—R. F.), Part of 7	
	Drive Cord	31-2536
	Drive Cord	31-2537
	Spring	28-8954
	Cotter Pin	W-2196
	Drive Drum	76-1244
	Set Screw	W-2008
	Rubber Mtg. Grommet	27-4596
	Tuning Shaft (Inside R. F. Unit)	76-1240
	Shaft Bushing (Threaded)	56-2152
	Carriage (Tuning Cores)	56-2145
	Core Clamp	56-2151
	Screw	97-0054
	Cotter Pin	W-2196
	Tuning Shaft and Bearing (Outside Chassis)	76-1245
	Rubber Disc	27-4272
	Mtg. Screw	W-2259
	Mtg. Screw (Condenser)	97-0028
8.*	Compensator (31 M—Aerial)	31-6412
8A.	Compensator (25 M—Aerial), Part of 8	
8B.	Compensator (19 M—Aerial), Part of 8	
9.*	Silver Mica Condenser (50 mmfd)	30-1199
10.*	Silver Mica Condenser (25 mmfd)	30-1145
11.	Mica Condenser (100 mmfd)	60-110457
12.	Resistor (250,000 ohms)	33-422339
13.	Condenser (.1 mfd, 200 volts)	30-4586
14.	Resistor (22 ohms)	33-022339
15.	Resistor (10,000 ohms)	33-310339
16.	Mica Condenser (250 mmfd)	60-125457
17.	Condenser (.002 mfd, 400 volts)	30-4579
18.	Condenser (.002 mfd, 400 volts)	30-4579
19.	R. F. Transformer (Broadcast)	32-3662
20.	R. F. Transformer (Police)	32-3665
21.	R. F. Transformer (Short Wave)	32-3668
22.	R. F. Transformer (Band Spread) Mtg. Clip Core Assembly	32-3671 57-0985 76-1281
23.	Compensator (31 M Band—R. F. Stage)	31-6412
23A.	Compensator (25 M Band—R. F. Stage), Part of 23	
23B.	Compensator (19 M Band—R. F. Stage), Part of 23	
24.	Compensator (16 M—R. F. Stage)	31-6413
24A.	Compensator (13 M—R. F. Stage), Part of 24	
25.	Mica Condenser (100 mmfd)	60-110457
26.	Condenser (.05 mfd, 200 volts)	30-4609
27.	Resistor (220,000 ohms)	33-422339
28.	Resistor (330 ohms)	33-133339
29.	Condenser (.05 mfd, 200 volts)	30-4519
30.	Condenser (.05 mfd, 200 volts)	30-4519
31.	Resistor (68,000 ohms)	33-368339
32.	Mica Condenser (250 mmfd)	60-125457
33.	Resistor (4700 ohms)	33-247339
34.	Oscillator Choke Coil	32-3667
35.	Resistor (22 ohms)	33-022339
36.	Mica Condenser (100 mmfd)	60-110467
37.	Oscillator Transformer (Broadcast) Mtg. Clip	32-3663 28-5002
38.	Oscillator Compensator (580 KC—Broadcast)	31-6350
38A.	Oscillator Compensator (S. W. 1—6 MC), Part of 38	
38B.	Oscillator Compensator (S. W. 2—21 MC), Part of 38	
39.	Oscillator Transformer (Police)	32-3666
40.	Mica Condenser (3000 mmfd)	60-230124
41.	Oscillator Transformer (Short Wave)	32-3669
42.	Oscillator Transformer (Band Spread) Mtg. Clip Core Assembly	32-3672 57-0985 76-1281
43.	Oscillator Compensator (31 M Band—9.7 MC)	31-6414
43A.	Oscillator Compensator (25 M Band—11.7 MC), Part of 43	
43B.	Oscillator Compensator (19 M Band—15.2 MC), Part of 43	
44.	Osc. Compensator (1500 KC—Broadcast)	31-6308
45.	Oscillator Compensator (16 M Band—17.8 MC)	31-6415
45A.	Oscillator Compensator (13 M Band—21.5 MC), Part of 45	
46.	Condenser (.2 mfd, 200 volts)	30-4587
47.	1st I. F. Transformer Mtg. Nut	32-3659 W-1949
47A.	Primary Compensator (Iron Core), Part of 47	
47B.	Secondary Compensator (Iron Core), Part of 47	
47C.	Condenser (60 mmfd), Part of 47	
47D.	Condenser (108 mmfd), Part of 47	
48.	Resistor (15,000 ohms)	33-315339
49.	Resistor (47,000 ohms)	33-347339
50.	Resistor (150 ohms)	33-115336
51.	Condenser (.05 mfd, 200 volts)	30-4609
52.	2nd I. F. Transformer Mtg. Nut	32-3660 W-1949
52A.	Primary Compensator, Part of 52	
52B.	Secondary Compensator, Part of 52	
52C.	Resistor (47,000 ohms), Part of 52	
52D.	Condenser (100 mmfd), Part of 52	
52E.	Condenser (100 mmfd), Part of 52	
53.	Condenser (.02 mfd, 400 volts)	30-4516
54.	Resistor (220,000 ohms)	33-422339
55.	Resistor (2.2 megohms)	33-522339
56.	Resistor (100,000 ohms)	33-410339
57.	Resistor (1 megohm)	33-510339
58.	Tone Control Mtg. Nut	33-5439 W-2157

CONTINUED ON NEXT PAGE

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MODELS 42-761 (Con't.)

Sch. No.	Description	Part No.
58X	Condenser (.1 mfd, 200 volts)	30-4586
59	Condenser (.01 mfd, 400 volts)	30-4572
60.	Resistor (47,000 ohms)	32-347839
61.	Volume Control	33-5442
	Mtg. Nut	W-2157
62.	Condenser (.002 mfd, 400 volts)	30-4579
63.	Condenser (.02 mfd, 400 volts)	30-4516
64.	Resistor (10 megohms)	33-610339
65.	Resistor (330,000 ohms)	33-433339
66.	Mica Condenser (250 mmfd)	60-125457
67.	Condenser (.002 mfd, 400 volts)	30-4610
68.	Resistor (470,000 ohms)	33-447339
69.	Resistor (4700 ohms)	33-247339
70.	Resistor (27,000 ohms)	33-327339
71.	Condenser (.01 mfd, 400 volts)	30-4572
72.	Resistor (33,000 ohms)	33-333339
73.	Resistor (330,000 ohms)	33-433339
74.	Resistor (330,000 ohms)	33-433339
75.	Condenser (.006 mfd, 400 volts)	30-4610
76.	Resistor (150 ohms)	33-115436
77.	Electrolytic Condenser (20 mfd, 25 volts)	30-2435
	Mtg. Plate	27-9508
	Insulator Tube	27-9506
78.	Condenser (.01 mfd, 400 volts)	30-4572
79.	Output Transformer	32-8170
80.	Speaker	36-1567-4
	Cone Assembly	36-4213
	Cable	41-3664
81	Condenser (.01 mfd, 400 volts)	30-4572
82.	Resistor (4700 ohms)	33-247339
83.	Electrolytic Condenser (10 mfd, 200 volts)	30-2504
	Mtg. Plate	27-9508
	Insulator Tube	27-9506
84.	Resistor (1000 ohms, 1 watt)	33-210439
85.	Resistor (330 ohms)	33-133339
86.	Resistor (220 ohms, 2 watt)	33-122536
87.	Electrolytic Condenser (20 mfd, 150 volts), Part of 77	
88.	Electrolytic Condenser (20 mfd, 150 volts), Part of 77	
89.	Electrolytic Condenser (40 mfd, 200 volts), Part of 83	
89X.	Electrolytic Condenser (16 mfd, 350 volts)	30-2505
90.	Socket (Ballast Resistor)	27-6127
90X.	Condenser (.02 mfd, 400 volts)	30-4516
91.	Condenser (.5 mfd, 200 volts)	30-4590
92.	Filament Resistor (28 ohms)	33-3411
93.	Filament Resistor (1020 ohms), Part of 92	
94.	Pilot Lamp	34-2397E
	Socket Assembly	76-1247
	Rod	56-2133
95.	Power Switch, Part of 58	
96.	Ballast Resistor (115/230-volt operation)	33-3391
97.	Band Switch Assembly	42-1711
	Band Indicator Drum	76-1246
	Drive Cord	31-2538
	Spring (Left Side)	28-8936
	Spring (Right Side)	28-8953

Miscellaneous Parts

Cabinet	10541A
Cabinet Back	27-9868
Mtg. Screw	W-2076
Cord (Power Line)	L-3274
Plug	L-3275
Dial Scale Assembly	76-1237
Dial Pointer	56-2134
Mtg. Clamp (Dial)	56-2137
Mtg. Screw	W-333
Knobs	27-4332
Rubber Corner (Chassis)	27-4564
Rubber Washer (Chassis)	27-4571
Screw (Chassis Mtg.)	W-1345
Socket (7S tube)	27-6035
Socket (25Z5 tube)	27-6036
Socket (25L6EG tube)	27-6058
Socket (Loktal-7JE)	27-6129
Socket (Loktal-7A7E, 7B6 tubes)	27-6158-2
Mtg. Eyelet	W-1650
Terminal Panel (Aerial)	38-9744
Tube Shield (7A7E tube)	56-1566
Tube Shield Base (7A7E tube)	56-1567
Wire Panel (1 lug)	38-9777
Wire Panel (2 lugs)	38-9778
Wire Panel (3 lugs)	38-9809
Wire Panel (1 lug)	38-9810
Wire Panel (4 lugs)	38-9929
Washer (Chassis Mtg.)	28-5114

* Beginning with production chassis marked Run 2 the wiring location of Compensators 8, 8A, and 8B on the "B" wafer of the band switch was changed as shown in the boxed diagram on the schematic diagram. The part number of the compensator changes from No. 31-6412 to 31-6450. The wiring locations and part numbers of Condensers 9 and 10 also change as indicated in the sketch. Condenser No. 9 changes from part No. 30-1199, 50 mmfd, to No. 20-010417, 104 mmfd. Condenser 10 changes from part No. 30-1145, 25 mmfd, to 20-017017, 170 mmfd.

REPLACEMENT PARTS—Model 42-762

Sch. No.	Description	Part No.
1.	Aerial Transformer (Broadcast)	32-3661
	Mtg. Clip	28-5002
2.	Aerial Transformer (Police)	32-3664
3.	Mica Condenser (5 mmfd)	60-006357
4.	Aerial Transformer (Short Wave)	32-3667
5.	Mica Condenser (10 mmfd)	60-010337
6.	Band Spread Aerial Transformer	32-3670
	Mtg. Clip	57-0985
	Iron Core Assembly	76-1281
7.	Tuning Condenser	31-2535
7A.	Compensator (S. W.—Aerial), Part of 7	
7B.	Compensator (S. W.—R. F.), Part of 7	
	Drive Cord	31-2536
	Drive Cord	31-2537
	Spring	28-8954
	Cotter Pin	W-2196
	Drive Drum	76-1244
	Set Screw	W-2008
	Rubber Mtg. Grommet	27-4596
	Tuning Shaft (Inside R. F. Unit)	76-1240
	Shaft Bushing (Threaded)	56-2152
	Carriage (Tuning Cores)	56-2145
	Core Clamp	56-2151
	Screw	97-0054
	Cotter Pin	W-2196
	Tuning Shaft and Bearing (Outside Chassis)	76-1245
	Rubber Disc	27-4272
	Mtg. Screw	W-2259
	Mtg. Screw (Condenser)	97-0028
8.*	Compensator (31 M—Aerial)	31-6412
8A.	Compensator (25 M—Aerial), Part of 8	
8B.	Compensator (19 M—Aerial), Part of 8	
9.*	Mica Condenser (50 mmfd)	30-1199
10.*	Mica Condenser (25 mmfd)	30-1145
11.	Mica Condenser (100 mmfd)	60-110457
12.	Resistor (470,000 ohms)	33-447339
13.	Condenser (.05 mfd, 200 volts)	30-4609
14.	Mica Condenser (250 mmfd)	60-125457
15.	Resistor (10,000 ohms)	33-310339
16.	R. F. Transformer (Broadcast)	32-3662
	Mtg. Clip	28-5002
17.	R. F. Transformer (Police)	32-3665
18.	R. F. Transformer (Short Wave)	32-3668
19.	R. F. Transformer (Band Spread)	32-3671
	Mtg. Clip	57-0985
	Core Assembly	76-1281
20.	Compensator (31 M Band—R. F. Stage)	31-6412
20A.	Compensator (25 M Band—R. F. Stage), Part of 20	
20B.	Compensator (19 M Band—R. F. Stage), Part of 20	
21.	Compensator (16 M Band—R. F. Stage)	31-6413
21A.	Compensator (13 M Band—R. F. Stage), Part of 21	
22.	Resistor (100 ohms)	33-110339
23.	Mica Condenser (100 mmfd)	60-110457
24.	Resistor (470,000 ohms)	33-447339
25.	Condenser (.05 mfd, 200 volts)	30-4609
26.	Resistor (68,000 ohms)	33-368339
27.	Mica Condenser (25 mmfd)	60-125457
28.	Resistor (4,700 ohms)	33-247339
29.	Oscillator Choke Coil	32-3367
30.	Oscillator Transformer (Broadcast)	32-3663
	Mtg. Clip	28-5002
31.	Osc. Compensator (580 KC Broadcast)	31-6350
31A.	Osc. Compensator (S. W. 1—6 MC), Part of 31	
	Osc. Compensator (S. W. 2—21 MC), Part of 31	
32.	Oscillator Transformer (Police)	32-3666
33.	Mica Condenser (3000 mmfd)	60-230124
34.	Osc. Transformer (Short Wave)	32-3669
35.	Electrolytic Condenser (5 mfd)	30-2468
	Mtg. Plate	56-1643
36.	Resistor (10,000 ohms)	33-310339
37.	Osc. Transformer (Band Spread)	32-3672
	Mtg. Clip	57-0985
	Iron Core Assembly	76-1281
38.	Osc. Compensator (1500 KC Broadcast)	31 6308
39.	Osc. Compensator (31 M Band—9.7 MC)	31-6414
39A.	Osc. Compensator (25 M Band—11.7 MC), Part of 39	
39B.	Osc. Compensator (19 M Band—15.2 MC), Part of 39	
40.	Osc. Compensator (16 M Band—17.8 MC)	31-6415
40A.	Osc. Compensator (13 M Band—21.5 MC), Part of 40	
41.	Mica Condenser (100 mmfd)	60-110457
42.	1st I. F. Transformer	32-3710
43.	Condenser (.2 mfd, 200 volts)	30-4587
44.	Resistor (15,000 ohms)	33-315339
45.	Resistor (150 ohms)	33-115336
46.	Resistor (1 megohm)	33-510339
47.	2nd I. F. Transformer	32-3660
47A.	Primary Compensator (Iron Core), Part of 47	
47B.	Secondary Compensator (Iron Core), Part of 47	
47C.	Condenser (108 mmfd), Part of 47	
47D.	Condenser (108 mmfd), Part of 47	
47E.	Condenser (100 mmfd), Part of 47	
47F.	Condenser (100 mmfd), Part of 47	
47G.	Resistor (47,000 ohms), Part of 47	
48.	Mica Condenser (100 mmfd)	60-110457
49.	Condenser (.01 mfd, 400 volts)	30-4572
50.	Resistor (330,000 ohms)	33-433339
51.	Resistor (1 megohm)	33-510339
52.	Resistor (470,000 ohms)	33-447339
53.	Resistor (megohm)	33-510339
54.	Condenser (.01 mfd, 400 volts)	30-4572
55.	Tone Control	33-5445
	Mtg. Nut	W-2157
56.	Resistor (47,000 ohms)	33-347339
57.	Volume Control	33-5438
	Mtg. Nut	W-2157
58.	Condenser (.01 mfd, 400 volts)	30-4572
59.	Condenser (.002 mfd, 400 volts)	30-4579
60.	Resistor (3.3 megohms)	33-533339
61.	Electrolytic Condenser (5 mfd, 150 volts)	30-2469
62.	Resistor (100,000 ohms)	33-410339
63.	Condenser (.1 mfd, 200 volts)	30-4586
64.	Resistor (330,000 ohms)	33-433339
65.	Resistor (1 megohm)	33-510339
66.	Condenser (.006 mfd, 400 volts)	30-4610
67.	Mica Condenser (250 mmfd)	60-125457
68.	Resistor (2.2 megohms)	33-522339
69.	Audio Input Transformer	32-8027
70.	Condenser (.01 mfd, 400 volts)	30-4572
71.	Resistor (33 ohms)	33-033436
72.	Resistor (33 ohms)	33-033436
73.	Condenser (.004 mfd, 400 volts)	30-4578
74.	Output Transformer	32-8113
75.	Speaker	36-1508-3
	Cone Assembly (for Speaker 36-1508-3)	36-4161
	Speaker Cable	41-3534
76.	Pilot Lamp	34-2068E
	Socket Assembly	76-1236
	Mtg. Rod	56-2133
	Speed Nut	W-2263
77.	Resistor (1000 ohms)	33-210339
78.	Resistor (1000 ohms)	33-210339
79.	Electrolytic Condenser (10 mfd), Part of 35	
80.	Electrolytic Condenser (20 mfd), Part of 35	
81.	Condenser (.01 mfd, 1000 volts)	30-4598
82.	"B" Choke	32-3925
83.	Power Transformer	32-7602
84.	Vibrator	1-3222
	Rubber Cushion	27-4287
	Shield	38-8032
85.	"A" Choke	32-1954
86.	Condenser (.5 mfd, 200 volts)	30-4296
87.	Condenser (.5 mfd, 200 volts)	30-4296
88.	Power Switch, Part of 55	
89.	Condenser (.2 mfd, 400 volts)	30-4594
90.	Battery Cable	41-3540
91.	Band Switch Assembly	42-1711
	Band Indicator Drum	76-1246
	Drive Cord	31-2538
	Spring (left side)	28-8936
	Spring (right side)	28-8953

Miscellaneous Parts

Cabinet	10541A
Back (Cabinet)	27-9868
Mtg. Screw	W-2076
Dial Scale Assembly	76-1237
Dial Pointer	56-2134
Dial Clamp	56-2137
Mtg. Screw	W-333
Knob	27-4332
Rubber Washer (Chassis Mtg.)	27-4571
Rubber Corner (Chassis Mtg.)	27-4564
Rubber Washer (Vibrator Mtg., 3 required)	3914
Rubber Washer (Vibrator Mtg., 6 required)	27-4307
Shield (7B7E tube)	56-1566
Shield Clip	56-1567
Screw (Chassis Mtg.)	W-1345
Socket (49 tubes)	27-6035
Socket (4 Terminal)	27-6038
Socket (6G6EG tube)	27-6058
Socket (Loktal 7A8E)	27-6129
Socket (Loktal 7B7E-7C6 tubes)	27-6158-2
Mtg. Eyelet	W-1650
Spacer (Vibrator Unit)	28-3806
Washer (Chassis Mtg.)	28-5114

* Beginning with production chassis marked Run 2 the wiring location of Compensators 8, 8A, and 8B on the "B" wafer of the band switch was changed as shown in the boxed diagram on the schematic diagram. The part number of the compensator changes from No. 31-6412 to 31-6450. The wiring locations and part numbers of Condensers 9 and 10 also change as indicated in the sketch. Condenser No. 9 changes from part No. 30-1199, 50 mmfd, to No. 20-010417, 104 mmfd. Condenser 10 changes from part No. 30-1145, 25 mmfd, to 20-017017, 170 mmfd.

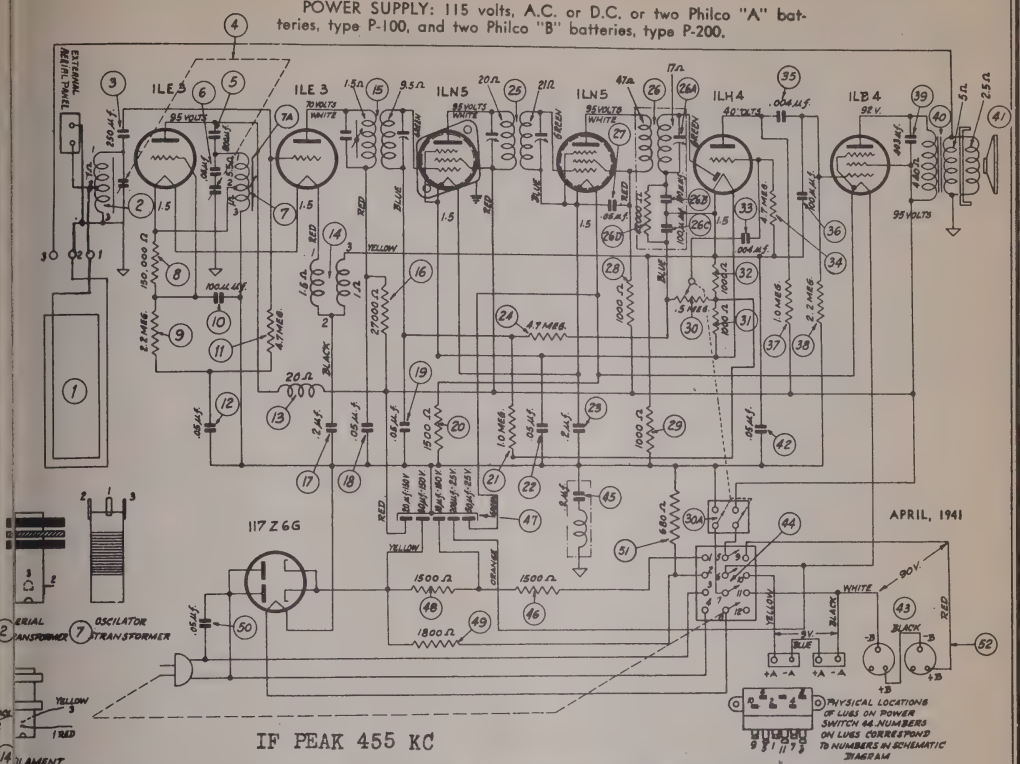
MODEL 42-126

MISCELLANEOUS PARTS

Cabinet	10548A
Dial Scale	27-5731
Indicator (Off-On)	56-2180
Drive Cord	31-2563
Operating Arm	56-2183
Pulley	27-4981
Stud	56-6994
Spring (Indicator Drive Cond.)	56-2179
Spring Washer (Transfer Lever)	56-1866
Transfer Lever	56-2184
Stud (Transfer Lever)	56-6143
Speaker Socket	27-6115
Mtg. Rivet	W-207
Speaker	36-1545
Cone Assembly	36-4206
Speaker Cable	41-3448
Mtg. Screw	W-1446
Resistor (800 ohms)	33-180336
Condenser (.0015 mfd, 600 volts)	30-4623
Battery Cable & Plug	41-3505
Dial Backing Card	27-9875
Dial Pointer	56-2159
Mtg. Straps	56-2806
Screws	W-822
Escutcheon (Push Buttons)	56-2233
Mtg. Screw	W-2071
Knob (Tuning, Volume, Tone)	54-4101
Knob (Push Buttons)	54-4126
Socket (Tubes)	27-6177
Adapter Plate (1st I. F. Socket)	56-2112
Rivet (Mtg. Adapter Plate)	W-492
Rivet (Mtg. Socket)	W-239
Rubber Washer (Socket Mtg. 1st I. F.)	27-4112
Rubber Grommet (Socket Mtg. 1st I. F.)	27-4797

PHILCO RADIO & TELEVISION CORP. MODELS 42-842, 42-843, 42-844

POWER SUPPLY: 115 volts, A.C. or D.C. or two Philco "A" batteries, type P-100, and two Philco "B" batteries, type P-200.



TUBE SOCKET VOLTAGES INDICATED ON DIAGRAM WERE MEASURED WITH A 1000 OHM PER VOLT METER. POWER SUPPLY 117 V. A.C. WHEN USING DRY BATTERIES, VOLTAGES WILL BE ABOUT 5 VOLTS LESS THAN SHOWN

REPLACEMENT PARTS

SCHEM. No.	DESCRIPTION	PART No.
1	Loop Aerial	76-1216
	Screw (Loop Mtg.)	W-2071
2	Aerial Transformer	32-3622
	Clip	28-5002
3	Mica Condenser (250 mmfd.)	60-125157
4	Tuning Condenser	31-2530
	Rubber Grommet (Mtg.)	27-4596
	Spacers (Mtg.)	28-5665
	Spring (Drive Cord)	28-8882
	Tuning Shaft	56-6132
	"C" Washer	57-0127
	Drive Cord	31-2380
5	Mica Condenser (800 mmfd.)	60-130137
6	Condenser (.05 mfd., 200 volts)	30-4519
7	Oscillator Transformer	32-3633
8	Resistor (150,000 ohms)	33-415339
9	Resistor (2.2 megohms)	33-522339
10	Mica Condenser (100 mmfd.)	60-110157
11	Resistor (4.7 megohms)	33-547339
12	Condenser (.05 mfd., 200 volts)	30-4519
13	Oscillator Choke	32-3615
14	Filament Choke	32-3632
15	1st I. F. Transformer	32-3620
	Painut (Mtg.)	W-1949
16	Resistor (27,000 ohms)	33-327339
17	Condenser (.2 mfd.)	30-4587
18	Condenser (.05 mfd., 200 volts)	30-4519
19	Condenser (.05 mfd., 200 volts)	30-4519
20	Resistor (1,500 ohms)	33-215339
21	Resistor (1 megohm)	33-510339
22	Condenser (.05 mfd., 200 volts)	30-4519
23	Condenser (.2 mfd.)	30-4587
24	Resistor (4.7 megohms)	33-547339
25	2nd I. F. Transformer	32-3621
	Painut (Mtg.)	W-1949
26	3rd I. F. Transformer	32-3631
	Painut (Mtg.)	W-1949
27	Condenser (.05 mfd., 200 volts)	30-4519
28	Resistor (1,000 ohms)	33-210339
29	Resistor (1,000 ohms)	33-210339
30	Volume Control	33-5436
	Painut (Mtg.)	W-2157
30	Switch (Part of 30)	
31	Resistor (1,000 ohms)	33-210339
32	Resistor (1,000 ohms)	33-210339
33	Condenser (.004 mfd., 400 volts)	30-4578
34	Resistor (4.7 megohms)	33-547339

SCHEM. No.	DESCRIPTION	PART No.
35.	Condenser (.004 mfd., 400 volts)	30-4578
36.	Mica Condenser (100 mmfd.)	60-110157
37.	Resistor (1 megohm)	33-510339
38.	Resistor (2.2 megohms)	33-522339
39.	Condenser (.003 mfd., 1,000 volts	30-4469
40.	Output Transformer	32-8169
41.	Cone Assembly (for Speaker 36-1540).	36-4201
42.	Condenser (.05 mfd., 200 volts)	30-4519
43.	Battery Plug and Cable	41-3570
44.	Automatic Power Change Over Switch	42-1650
45.	Condenser (.2 mfd.) & Choke Assy.	76-1227
46.	Resistor (1,500 ohms)	33-215339
47.	Electrolytic Condenser Clamp	30-2498
		56-1466
	Resistor (1,500 ohms)	33-215339
48.	Resistor (1,800 ohms)	33-218339
49.	Condenser (.05 mfd., 200 volts)	30-4519
50.	Resistor (680 ohms)	33-168339
51.	Battery Cable	41-3570
52.		

MISCELLANEOUS PARTS

DESCRIPTION	PART No.
Cabinet (42-842)	10533B
Cabinet (42-843)	10537C
Cabinet (42-844T)	10538A
Cable (Power)	L-3199
Clamp (Battery)	56-2178
Screw (Clamp)	W-827
Nut (Clamp)	W-2261
Dial Scale	27-5691
Dial Pointer	54-4069
Knob	27-4970
Speaker	36-1540
Socket (Tubes)	27-6151
Socket	27-6174
Grommet (Mtg. Socket)	54-4065
Adapter Plate	56-2112
Screw (Chassis Mtg.)	W-2030
Washer (Chassis Mtg.)	W-410

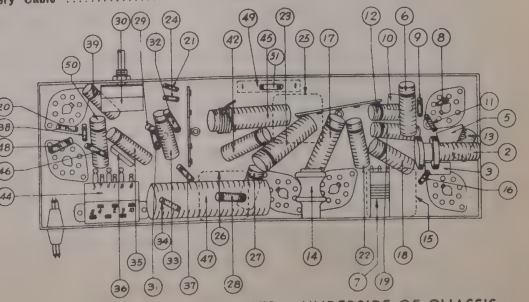


FIG. 2. LOCATIONS OF PARTS — UNDERSIDE OF CHASSIS.

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MODEL 42-842(122)
MODELS 42-842,42-843, 42-844
MODELS 42-853,42-854

PHILCO RADIO & TELEVISION CORP.

PRODUCTION CHANGES

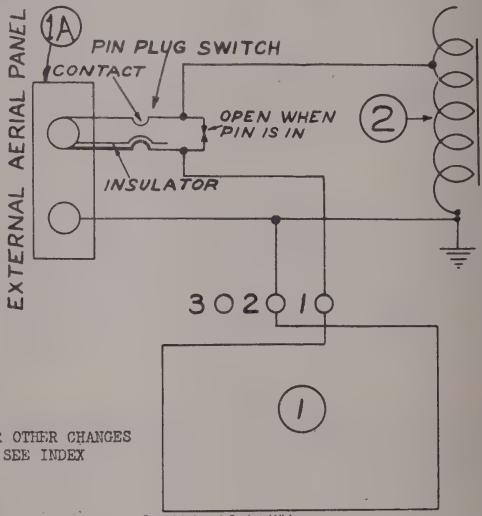
Model 42-842, Code 122 is similar to code 121 with the exception of the external aerial input panel, auxiliary plug-in loop aerial, cabinet and several parts. The schematic diagram, aligning instructions and specifications in service bulletin 391 for 42-842, code 121 applies to 42-842, code 122 with the parts and aerial panel change shown below. The Philco auxiliary plug-in loop aerial part No. 45-2935 should be used with this model when an outside aerial is required. This loop aerial is a low impedance type.

REPLACEMENT PARTS—MODEL 42-842, CODE 122.

SCHEM. No.	DESCRIPTION	PART No.
1.	Loop Aerial	76-1429
	Screw (Loop Mtg.)	W-2873
1A.	External Loop Terminal Socket	27-6163
2.	Aerial Transformer	32-3622
	Clip	26-5002
3.	Mica Condenser (250 mmfd.)	60-125157
4.	Tuning Condenser	31-2530
	Rubber Grommet (Mtg.)	27-4598
	Spacers (Mtg.)	26-3606
	Spring (Drive Cord)	24-8882
	Tuning Shaft	56-6123
	"C" Washer	26-5990
	Drive Cord	31-2300
5.	Mica Condenser (100 mmfd.)	60-100137
6.	Condenser (.05 mfd., 200 volts)	30-4519
7.	Oscillator Transformer	32-3685
	Iron Core	57-2325
8.	Resistor (150,000 ohms)	33-415339
9.	Resistor (2.2 megohms)	33-522339
10.	Mica Condenser (100 mmfd.)	60-110157
11.	Resistor (4.7 megohms)	33-547339
12.	Condenser (.05 mfd., 200 volts)	30-4519
13.	Oscillator Choke	32-3615
14.	Filament Choke	32-3632
15.	1st I. F. Transformer	32-3620
	Painut (Mtg.)	W-1949
16.	Resistor (27,000 ohms)	33-327339
17.	Condenser (.2 mfd.)	30-4587
18.	Condenser (.05 mfd., 200 volts)	30-4519
19.	Condenser (.05 mfd., 200 volts)	30-4519
20.	Resistor (1,500 ohms)	33-215339
21.	Resistor (1 megohm)	33-510339
22.	Condenser (.05 mfd., 200 volts)	30-4519
23.	Condenser (.2 mfd.)	30-4587
24.	Resistor (4.7 megohms)	33-547339
25.	2nd I. F. Transformer	32-3621
	Painut (Mtg.)	W-1949
26.	3rd I. F. Transformer	32-3631
	Painut (Mtg.)	W-1949
27.	Condenser (.05 mfd., 200 volts)	30-4519
28.	Resistor (1,000 ohms)	33-210339
29.	Resistor (1,000 ohms)	33-210339
30.	Volume Control	33-5436
	Painut (Mtg.)	W-2157
30A.	Switch	(Part of 30)
31.	Resistor (1,000 ohms)	33-210339
32.	Resistor (1,000 ohms)	33-210339
33.	Condenser (.004 mfd., 400 volts)	30-4578
34.	Resistor (4.7 megohms)	33-547339
35.	Condenser (.004 mfd., 400 volts)	30-4578
36.	Mica Condenser (100 mmfd.)	60-110157
37.	Resistor (1 megohm)	33-510339
38.	Resistor (2.2 megohms)	33-522339
39.	Condenser (.003 mfd., 1,000 volts)	30-4469
40.	Output Transformer	32-3699
41.	Cone Assembly (for Speaker 36-1540)	36-4201
42.	Condenser (.05 mfd., 200 volts)	30-4519
43.	Battery Plug and Cable	41-3570
44.	Automatic Power Change Over Switch	42-1650
	Spacer	57-0194
45.	Condenser (.2 mfd.) & Choke Assy.	76-1227
46.	Resistor (1,500 ohms)	33-215339
47.	Electrolytic Condenser	30-2496
	Clamp	56-1452
48.	Resistor (1,500 ohms)	33-215339
49.	Resistor (1,000 ohms)	33-3424
50.	Condenser (.05 mfd., 400 volts)	30-4518
51.	Resistor (680 ohms)	33-168339
52.	Battery Cable	41-3570

MISCELLANEOUS PARTS

Cabinet (42-842)		10533D
Cable Power		L-3299
Clamp (Battery)		56-2178
Screw (Clamp)		W-527
Nut (Clamp)		W-2281
Dial Scale		27-5699
Screw		W-483
Washers		W-548
Dial Pointer		27-4868
Knob		27-4970
Speaker		36-1540
Socket		27-6177
Socket		27-6174
Grommet (Mtg. Socket)		54-4965
Adapter Plate		56-2112
Screw (Chassis Mtg.)		W-2030
Washer (Chassis Mtg.)		W-410
External Low Impedance Loop Aerial		45-2935



External Aerial Socket Wiring
Model 42-842, Code 122

Filament Resistor Change in Models 42-842, 843, 844, 853, 854

In the above listed models, complaints may be received of a complete set of tubes testing weak. Replacement of the tubes restores normal operation for only a short time after which the same condition re-occurs.

The condition is caused by the overheating of the series filament resistor shown as No. 49 in Service Bulletin No. 391 and as No. 56 in Service Bulletin No. 388. When the overheating takes place, the resistor breaks down, its resistance value decreases, thus allowing an increased filament current to the tubes with resulting damage to the filaments.

An entirely new replacement resistor is available — Part No. 33-3424. This resistor is considerably longer than the one now in the set and is equipped with a protecting cover. The resistor is mounted vertically over one of the original holes in the chassis with a suitable drive screw. The tab on the cover is soldered to the chassis. The longer leads which are required for the installation and which should be fireproof, and not ordinary rubber covered, are brought down through the large hole in the chassis. The other large hole should be plugged up with a spring button, such as Philco Part No. W2232.

Although the Service Bulletin parts listing calls for resistor No. 33-218339, the number of the resistor which has been used is 33-3410. If a replacement is necessary, however, the new resistor No. 33-3424 should be used.

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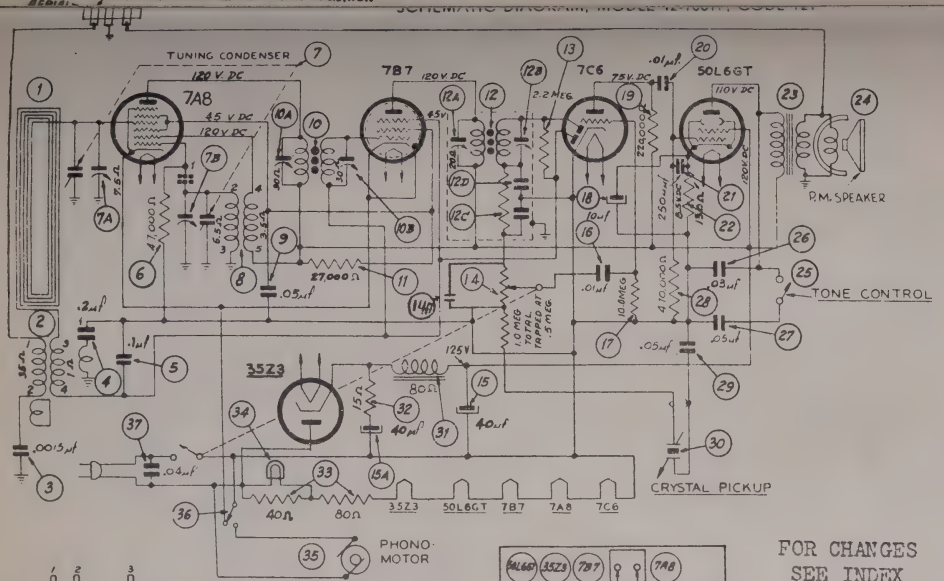
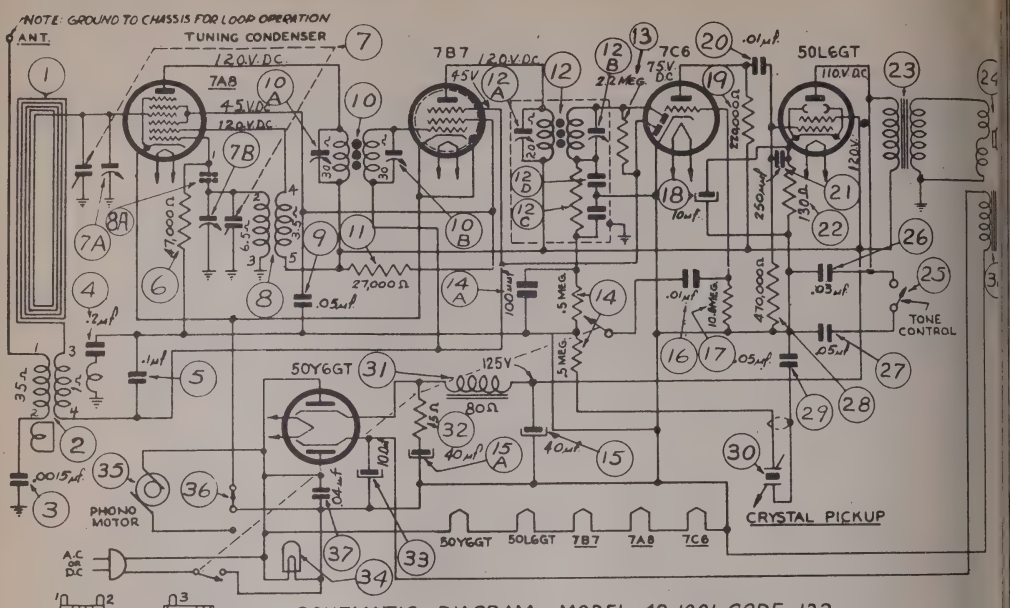


LOCATIONS OF PARTS — UNDERSIDE OF CHASSIS.

No.	DESCRIPTION	Philco No.
1.	Loop Aerial	76-1224
2.	Aerial Transformer	32-3394
	Clip	28-5002
3.	Condenser (.0015 mfd., 200 volts)	30-4555
4.	Condenser (.02 mfd.) & Choke Assy.	76-1161
5.	Condenser (.1 mfd., 200 volts)	30-4586
6.	Resistor (47,000 ohms)	33-347339
7.	Tuning Cond.	31-2527
7A.	Aerial Compensator (part of 7)	
7B.	Oscillator Comp. (part of 7)	
	Rubber Grommet	27-4610
	Drive Cord	31-2529
	Spring (Assy. Drive)	28-8954
	Drive Shaft	31-2531
	Nut	W-2157
8.	Oscillator Transformer	32-3562
	Mtg. Clip	28-5002
9.	Condenser (.05 mfd., 200 volts)	30-4519
10.	1st I. F. Transformer	32-3603
	Nut	W-1948
10A.	Primary Compensator (part of 10)	
10B.	Secondary Compensator (part of 10)	
11.	Resistor (27,000 ohms)	33-327339
12.	2nd I. F. Transformer	32-3604
	Nut	W-1949
12A.	Primary Compensator (part of 12)	
12B.	Secondary Compensator (part of 12)	
13.	Resistor (2.2 megohms)	33-522339
14.	Volume Control	33-5437
	Nut	W-2157
14A.	Mica Condenser (100 mmfd.)	60-110157
15.	Electrolytic Condenser (40 mfd., 150 volts; 40 mfd., 150 volts; 10 mfd., 25 volts)	30-2501
16.	Condenser (.01 mfd., 400 volts)	30-4572
17.	Resistor (10 megohms)	33-610339
18.	Electrolytic Condenser (10 mfd.; (part of 15)	
	Clamp	56-2229
19.	Resistor (220,000 ohms)	33-422339
20.	Condenser (.01 mfd., 400 volts)	30-4572
21.	Mica Condenser (250 mmfd.)	60-125157
22.	Resistor (130 ohms)	33-113336
23.	Output Transformer	32-8164
24.	Cone Assy. (for Speaker 36-1541)	36-4199
25.	Tone Control Switch	42-1562-2
	Nut	W-684
	Switch Insulator	27-9705
	Switch Cover	56-1880
26.	Condenser (.03 mfd., 400 volts)	30-4517
27.	Condenser (.05 mfd., 400 volts)	30-4518
28.	Resistor (470,000 ohms)	33-447339
29.	Condenser (.05 mfd., 400 volts)	30-4518
30.	Crystal Pickup Complete	35-2515
	Pickup Bumper	54-4070
	Cable (Chassis to Pickup)	41-3571
	Needle	40-6458
	Rubber Washer	54-4096
	Rubber Washer	54-4095
31.	Filter Choke	32-8168
32.	Resistor (15 ohms)	33-015339
33.	Filament Resistor (40-80 ohms)	33-3408
34.	Pilot Lamp	34-2068
35.	Phono Motor	35-1265-2
	Turntable	35-3047-2
	Screw (Mtg.)	W-333
	Washer	W-151
	Rubber Grommet	27-4596
	Sleeve	28-5665
36.	Motor Switch	42-1651
	Switch Insulator	27-9705
	Switch Cover	56-2109
	Switch Plate	56-1793
	Screw	W-560
37.	Condenser (.04 mfd.)	30-4119
	Cabinet	10535A
	Cable (Power)	L-3199
	Dial	27-5679
	Strap (Mtg.)	56-2068
	Screw	W-2150
	Dial Pointer	56-2076
	Knob (Tuning-Volume)	54-4052
	Speaker	36-1541
	Screw	W-2150
	Socket (Loktal)	27-6177
	Rivet	W-239
	Socket (50L6GT Tube)	27-6174
	Socket Assembly (Pilot Lamp)	76-1177
	Washer (Chassis Mtg.)	W-410
	Screw (Chassis Mtg.)	W-2065

MODEL 42-1001(122)

PHILCO RADIO & TELEVISION CORP.



SCHEMATIC DIAGRAM MODEL 42-1001, CODE-122

IF PEAK 455 KC

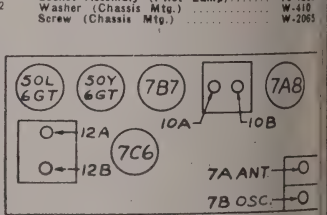
(2) ANT. TRANS. (8) OSC TRANS.

REPLACEMENT PARTS

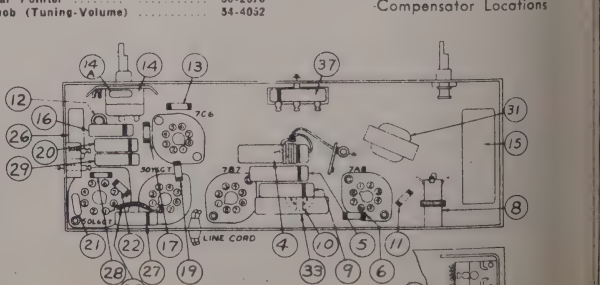
Schem. No.	Description	Part No.
1.	Loop Aerial	76-1224
	Washer (Mtg.)	W-152
	Screw (Mtg.)	W-188
2.	Aerial Transformer	32-3394
	Clip	28-5002
3.	Condenser (.0015 mfd., 200 volts)	30-4621
4.	Condenser (.02 mfd.) & Choke Assy.	76-1161
5.	Condenser (.1 mfd., 200 volts)	30-4586
6.	Resistor (47,000 ohms)	33-347339
7.	Tuning Cond.	31-2527
7A.	Aerial Compensator (part of 7)	
7B.	Oscillator Comp. (part of 7)	
	Rubber Grommet	27-4610
	Drive Cord	31-2529
	Spring (Assy. Drive)	28-4954
	Drive Shaft	31-2531
	Nut	W-2157
8.	Oscillator Transformer	32-3562
	Mtg. Clip	28-5002
8A.	Wire capacity (part of 8)	
9.	Condenser (.05 mfd., 200 volts)	30-4519
10.	1st I. F. Transformer	32-3603
	Nut	W-1919
10A.	Primary Compensator (part of 10)	
10B.	Secondary Compensator (part of 10)	
11.	Resistor (27,000 ohms)	33-327339
12.	2nd I. F. Transformer	32-3604
	Nut	W-1919
12A.	Primary Compensator (part of 12)	
12B.	Secondary Compensator (part of 12)	
13.	Resistor (2.2 megohms)	33-522339
14.	Volume Control	33-5437
	Nut	W-2157
14A.	Mica Condenser (100 mmfd.)	60-110157
15.	Electrolytic Condenser (40 mfd., 150 volts; 40 mfd., 150 volts; 10 mfd., 25 volts)	30-2501
16.	Condenser (.01 mfd., 400 volts)	30-4572
17.	Resistor (10 meghoms)	33-610339
18.	Electrolytic Condenser (10 mfd.) (part of 15)	
	Clamp	56-2229
19.	Resistor (220,000 ohms)	33-422339
20.	Condenser (.01 mfd., 400 volts)	30-4572
21.	Mica Condenser (250 mmfd.)	60-125157
22.	Resistor (130 ohms)	33-113336
23.	Output Transformer	32-3164
24.	Cone Assy. (for speaker)	36-4210
25.	Tone Control Switch	42-1562-2
	Nut	W-684
	Switch Insulator	27-9705
	Switch Cover	56-1880
26.	Condenser (.03 mfd., 400 volts)	30-4517
27.	Condenser (.05 mfd., 400 volts)	30-4518
28.	Resistor (470,000 ohms)	33-447339
29.	Condenser (.05 mfd., 400 volts)	30-4518
30.	Crystal Pickup Complete	35-2515
	Pickup Bumper	54-4070
	Cable (Chassis to Pickup)	41-3571
	Needle	40-6458
	Rubber Washer	54-4096
	Rubber Washer	54-4095
	Washer	W-894FA4

Schem. No.	Description	Part No.
31.	Filter Choke	32-8168
32.	Resistor (15 ohms)	33-015339
33.	Electrocond (10 mfd.)	30-2396
34.	Pilot Lamp	34-2477
35.	Phone Motor	35-1265-2
	Turntable	35-3047-2
	Screw (Mtg.)	W-333
	Washer	W-151
	Rubber Grommet	27-4596
	Sleeve	28-5365
36.	Motor Switch	42-1651
	Switch Insulator	27-9705
	Nut	W-684
	Switch Cover	56-2109
	Switch Plate	56-1793
	Screw	W-560
37.	Condenser (.04 mfd.)	30-4119
38.	Speaker field coil (Replace speaker 36-1570)	
	Cabinet	10535A
	Cable (Power)	L-3199
	Dial	27-5679
	Strap (Mtg.)	56-2064
	Screw	W-2150
	Dial Pointer	56-2076
	Knob (Tuning-Volume)	54-4052

Description	Part No.
Speaker	36-1570
Screw	W-2150
Socket (Loktal)	27-6177
Rivet	W-239
Socket (50L6GT Tube)	27-6174
Socket Assembly (Pilot Lamp)	76-1282
Washer (Chassis Mtg.)	W-410
Screw (Chassis Mtg.)	W-2065



Compensator Locations



Locations of Parts—Under Chassis

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PHILCO RADIO & TELEVISION CORP. MODEL 42-1002(121,122)

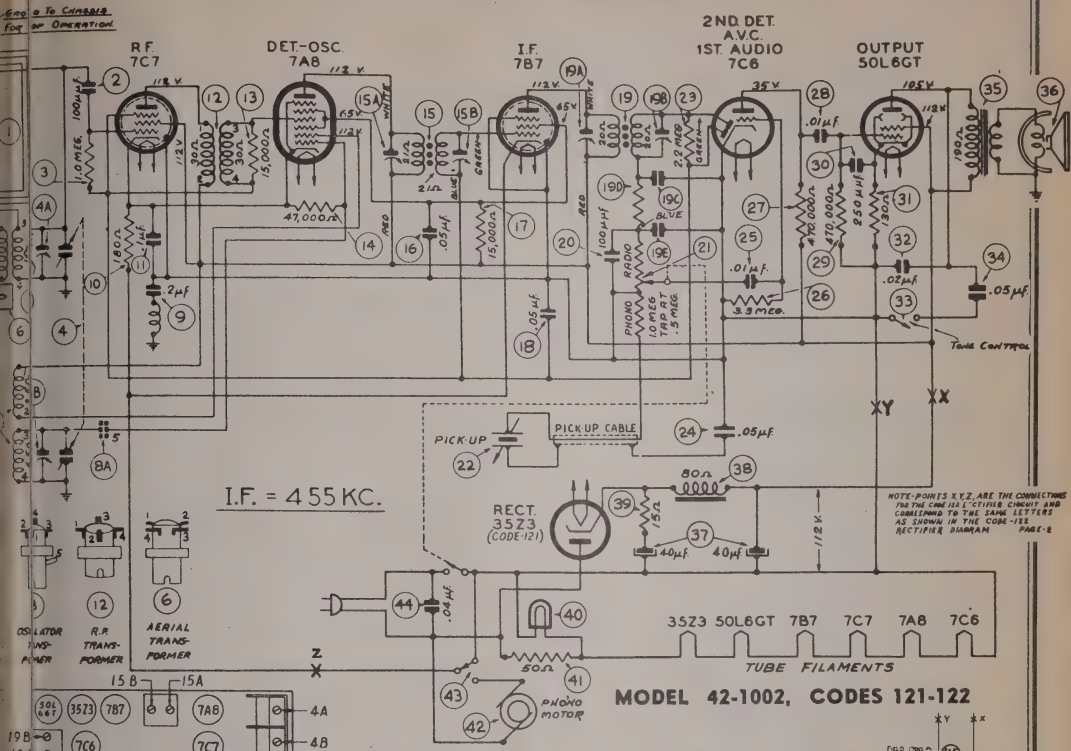
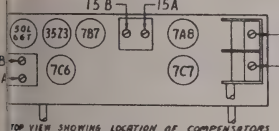

R.F. 7C7
DET-OSC. 7A8
I.F. 7B7
2ND DET. A.V.C. 1ST. AUDIO 7C6
OUTPUT 50L6GT
I.F. = 455 KC.
RECT. 35Z3 (CODE-121)
PICK-UP
PICK-UP CABLE
TONE CONTROL
PHONO MOTOR
35Z3 50L6GT 7B7 7C7 7A8 7C6
TUBE FILAMENTS
MODEL 42-1002, CODES 121-122
NOTE-POINTS X,Y,Z, ARE THE CONNECTIONS FOR THE CODE 121 RECTIFIER CIRCUIT AND CORRESPOND TO THE SAME LETTERS AS SHOWN IN THE CODE-122 RECTIFIER DIAGRAM PAGE-2

FIG. 3.



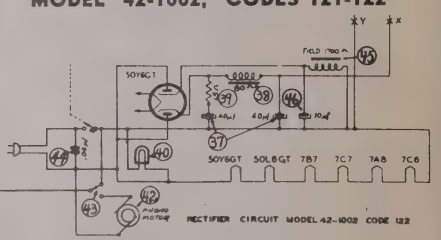
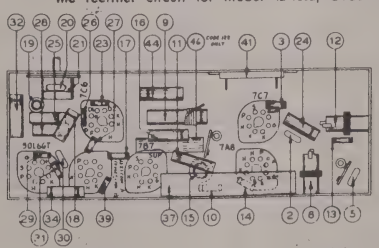
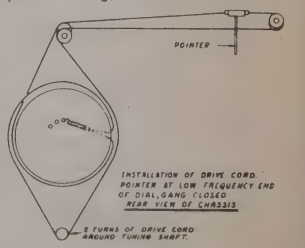


FIG. 1. RECTIFIER CIRCUIT—MODEL 42-1002, CODE 122

Points "X", "Y", "Z" correspond to the connections with the same letters in the rectifier circuit for Model 42-1002, Code 121, shown in Fig. 3.




POINTER
INSTALLATION OF DRIVE CORD. POINTER AT LOW FREQUENCY END OF DIAL, GANG CLOSED REAR VIEW OF CHASSIS
2 TURNS OF DRIVE CORD AROUND TUNING SHAFT.

REPLACEMENT PARTS

No.	Description	Part No.
1.	Loop Aerial	76-1224
	Mtg. Screw	W-333
2.	Mica Condenser (100 mmfd.)	60-110157
3.	Resistor (1 megohm)	33-510339
4.	Tuning Condenser	31-2583
4A.	Tuning Shaft	31-2584
	Nut	W-684
	Drive Cord	31-2585
	Spring (Drive Cord)	24-8954
	Pointer	56-2078
	Mtg. Grommet (Condenser)	27-4610
5.	Mica Condenser (10 mmfd.)	60-010137
6.	Aerial Transformer	32-3394
	Mtg. Clip	28-5002
7.	Condenser (.0015 mfd., 600 volts)	30-4621
8.	Oscillator Transformer	32-3613
	Mtg. Clip	28-5002
9.	Condensers (.2 mfd., & Choke)	76-1198
10.	Resistor (180 ohms)	33-118336
11.	Condenser (.1 mfd., 200 volts)	61-0104
12.	R.F. Transformer	32-3595
	Mtg. Clip	28-5002
13.	Resistor (15000 ohms)	33-315339
14.	Resistor (47000 ohms)	33-347339
	1st I. F. Transformer	32-3614
15.	Condenser (.05 mfd., 200 volts)	30-4519
15A.	Resistor (15000 ohms)	33-315339
15B.	Condenser (.05 mfd., 200 volts)	30-4519
16.	2nd I.F. Transformer	32-3604
	Mtg. Nut	W-624
17.	Mica Condenser (100 mmfd.)	60-110157
	Volume Control	33-5462
	Mtg. Nut	W-2157
18.	Crystal Pickup and Tone Arm Complete	35-2524
	Rubber Bumper	54-4070
	Rubber Mtg. Grommet	54-4095
	Rubber Mtg. Grommet	54-4096
	Lockwasher	97-0160
	Washer	W-894
	Nut	W-628
	Pickup Cable	41-3571
19.	Resistor (2.2 megohms)	33-522339
19A.	Condenser (.05 mfd., 200 volts)	30-4519
19B.	Condenser (.01 mfd., 400 volts)	30-4572
19C.	Resistor (3.3 megohms)	33-533339
19D.	Resistor (470000 ohms)	33-447339
19E.	Condenser (.01 mfd., 400 volts)	30-4572
19F.	Resistor (470000 ohms)	33-447339
20.	Mica Condenser (250 mmfd.)	60-125157
21.	Resistor (130 ohms)	33-113336
22.	Condenser (.02 mfd., 400 volts)	30-4518
23.	Tone Control Switch	42-1562-2
	Switch Plate	56-1793
	Mtg. Screw	W-560
	Mtg. Nut	W-684
	Switch Cover	56-1880
24.	Condenser (.05 mfd., 400 volts)	30-4518
25.	Output Transformer (Code 121—for Speaker 36-1547)	32-8219
	Output Transformer (Code 122—for Speaker 36-1571)	32-8219
26.	Speaker (Code 121)	36-1547
	Speaker (Code 122)	36-1571
	Cone assembly (for speaker 36-1547)	36-4211
	Cone assembly (for speaker 36-1571)	36-4221
27.	Electrolytic Condenser (40-40 mfd.)—Mtg. Clip	30-2507
28.	Filter Choke	56-1466
29.	Resistor (15 ohms)	32-8174
		33-015430
	Pilot Lamp	34-2477
	Socket Assembly (Pilot Lamp)	76-1282
41.	Filament Resistor (Code 121 only)	33-3412
42.	Phonograph motor (115 volts, 60 cycle)	35-1263-2
	Spring Collar (for 115 volts, 50 cycle operation)	28-8999
	Rubber Grommet	27-4596
	Turntable	35-3047-2
	Mtg. Sleeve	28-5665
	Mtg. Washer	W-151
	Mtg. Screw	W-333
43.	Motor Switch	42-1651
	Switch Cover	56-2109
44.	Condenser (.04 mfd., 400 volts)	30-4119
45.	Field Coil (Code 122, only—replace speaker 36-1571)	56-1466
46.	Electrolytic Condenser (Code 122 only) (10 mfd., 150 volts)	30-2396

MODEL 42-1002(121,122)
MODEL 42-1003(121,122)

PHILCO RADIO & TELEVISION CORP.

MODEL 42-1002, CODES 121-122

MODEL 42-1002, Codes 121-122 are six tube alternating current operated superheterodyne radio-phonograph combinations.

In general Codes 121 and 122 of this model are similar in design with the exception of the speakers, rectifier tubes and rectifier circuits. Code 121 contains a six-inch permanent magnet dynamic speaker and a type 35Z3 rectifier tube. The complete schematic diagram for code 121 is shown. Code 122 chassis incorporates a six-inch electrodynamic speaker and a type 50Y6GT rectifier tube. The rectifier circuit for code 122 is shown

RADIO SECTION

Features of design included in the radio are: Built-in loop aerial; automatic volume control; beam power pentode audio output; two position tone control; Philco LOKTAL tubes; and a Permanent Magnet Speaker.

TUNING RANGE FREQUENCY: 540 to 1600 K.C.

INTERMEDIATE FREQUENCIES: 455 K.C.

AUDIO OUTPUT: 1.5 watts.

POWER SUPPLY: 115 volts, 60 cycle A.C.

SIGNAL GENERATOR: When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to the antenna section of the tuning condenser. Connect the ground or low side of the generator to the chassis.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet.

PHONOGRAPH SECTION

The phonograph consists of a rim drive turntable motor and a manually operated crystal pickup which uses a jewel needle. The phonograph is operated through the audio system of the radio.

The sound output of the radio and phonograph is controlled by a special dual volume control combined in one unit. The "ON-OFF" power switch is also included in the volume control. The phonograph motor is automatically started when the pickup is lifted from its rest and is designed to operate on 115 volts, 60 cycle, or 115 volts, 50 cycle A.C. power supply. When operating on 115 volts, 50 cycle current, a special spring collar, part No. 28-8999 must be placed on the motor driveshift pulley.

OUTSIDE AERIAL: Under ordinary operating conditions, the loop aerial has sufficient pickup for reception of stations. In some locations however, such as steel reinforced buildings, and other shielded areas where signal strength is weak, an additional outside aerial should be used. The Philco Safety Aerial, Part No. 40-6370 is recommended for use with this model.

The outside aerial connection consisting of a wire and lug is located on the rear lower left corner of the chassis; remove the lug from under the screw and attach the aerial.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled.

After connecting the aligning instruments adjust the compensators as shown in the tabulation below. Locations of the compensators are shown on the schematic diagram.

If the indicating meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

PROCEDURE MODEL 42-1002, CODES 121-122

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Tuning Cond. Stator Plate Lug	455 K. C.	540 K. C. Tuning Cond. Closed	Vol. Max.	19B 19A 15B 15A	Note B
2	Loop see above instructions	1500 K. C.	1500 K. C.	Vol. Max.	4B	Note A
3	Loop see above instructions	1500 K. C.	1500 K. C.	Vol. Max. Range Switch Brdcst.	4A	

PROCEDURE MODEL 42-1003, CODES 121-122

1	Tuning Cond. Stator Plate Lug	455 K. C.	540 K. C. Tuning Cond. Closed	Vol. Max. Band Switch Brdcst.	45A 41A 40B 40A	Note C
2	Loop on Generator see above instructions	1500 K. C.	1500 K. C.	Vol. Max. Band Switch Brdcst.	6B, 6A	Note A
3	Loop on Generator see above instructions	580 K. C.	580 K. C.	Vol. Max. Band Switch Brdcst.	33	Roll Tuning Condenser
4	Loop on Generator see above instructions	1500 K. C.	1500 K. C.	Vol. Max. Band Switch Brdcst.	6B	
5	Loop on Generator see above instructions	15 M.C.	15 M. C.	Band Switch "SW"	33A, 3 Note D	

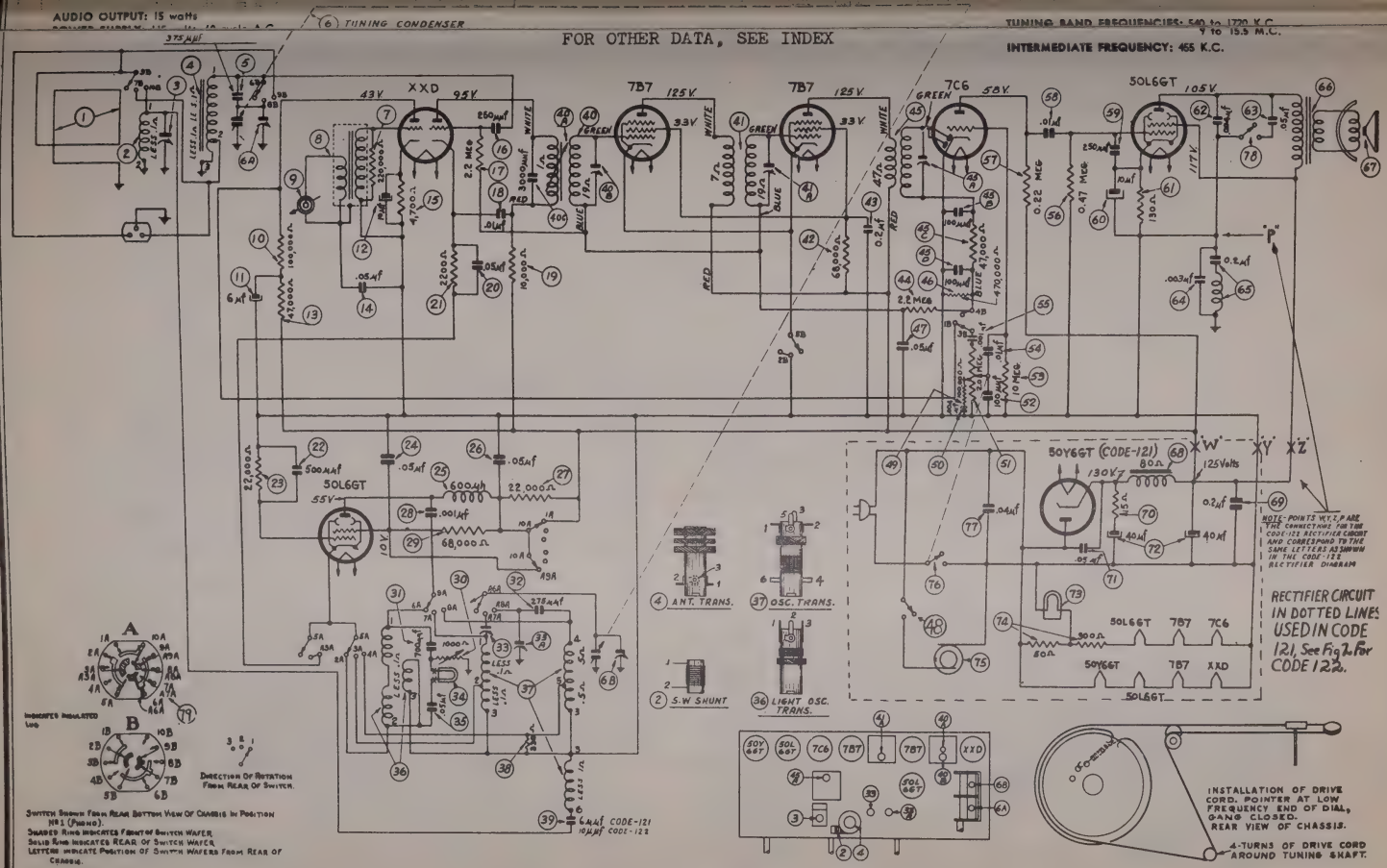
NOTE A:—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer on the small dot below 540 K. C.

NOTE B:—Before adjusting the I. F. compensators, tighten 15A compensator, then adjust compensators in the order as shown once only.

NOTE C:—Before adjusting the I. F. compensators, tighten 40B and 40A compensators, then adjust compensators in the order as shown in the adjacent column once only for maximum output.

NOTE D:—Turn tuning condenser until pointer is on 15 M. C. mark, then adjust oscillator compensator 33A to maximum on the second signal peak from the tight position (compensator closed).

Jon F. Rider


AUDIO OUTPUT: 15 watts
TUNING BAND FREQUENCIES: 540 to 1720 K.C. 9 to 15.5 M.C.
INTERMEDIATE FREQUENCY: 455 K.C.
FOR OTHER DATA, SEE INDEX
(6) TUNING CONDENSER
375 Mmf
43V
XXD
95V
7B7 125V
33V
7B7 125V
33V
7C6 58V
50L6GT 105V
117V
50L6GT
55V
50Y6GT (CODE-121)
80Ω
130V
125Volts
(4) ANT. TRANS.
(37) OSC. TRANS.
(2) S-W SHUNT
(36) LIGHT OSC. TRANS.
RECTIFIER CIRCUIT IN DOTTED LINES USED IN CODE 121, See Fig. 2 for CODE 122.
NOTE-POINTS W, X, Y, Z ARE THE CONNECTIONS FOR THE CODE-122 RECTIFIER CIRCUIT AND CORRESPOND TO THE SAME LETTERS AS SHOWN IN THE CODE-121 RECTIFIER DIAGRAM
50L6GT 7B7 7C6
50Y6GT 7B7 XXD
50L6GT
INSTALLATION OF DRIVE CORD. POINTER AT LOW FREQUENCY END OF DIAL, GANG CLOSED. REAR VIEW OF CHASSIS.
4-TURNS OF DRIVE CORD AROUND TUNING SHAFT.
INDICATES INSULATED LUG
DIRECTION OF ROTATION FROM REAR OF SWITCH.
SWITCH SHOWN FROM REAR BOTTOM VIEW OF CHASSIS IN POSITION NO. 1 (PHONO).
SHADED RING INDICATES FRONT OF SWITCH WAFER.
SOLID RING INDICATES REAR OF SWITCH WAFER.
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM REAR OF CHASSIS.

SCHEMATIC DIAGRAM—MODEL 42-1005—CODE 121-122

Model 42-1005, Code 121 and 122, is an alternating current operated superheterodyne radio-phonograph combination covering standard and shortwave broadcast frequencies. In general, Code 121 and 122 of this model are similar in design with the exception of the number of tubes, speaker types and rectified circuits. Code 121 consists of a seven-tube chassis using a 10-inch permanent magnet dynamic speaker and a single rectifier tube circuit.

Code 122 chassis contains eight tubes, a 10-inch electrodynamic speaker and two tubes in the rectifier circuit, one tube, type 50Y6GT, supplies plate voltage for the other tubes and a 50L6GT excites the field coil of the electrodynamic speaker.

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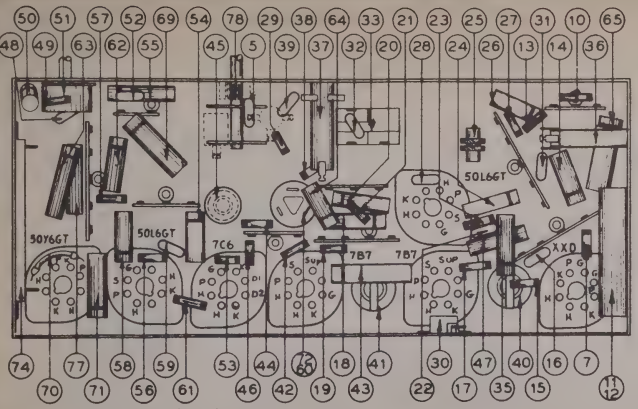
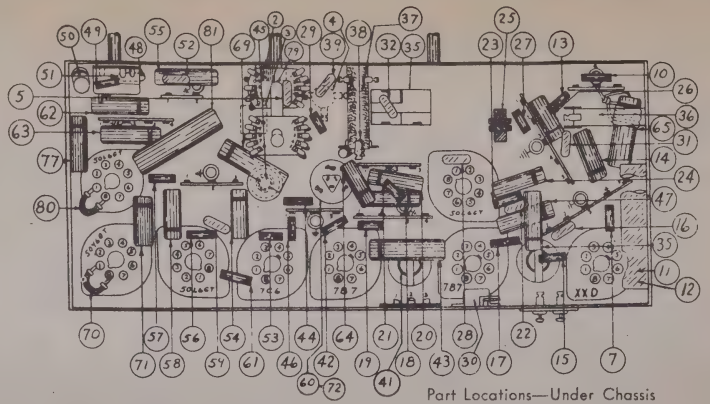


Part Locations—Under Chassis
Code 121



Part Locations—Under Chassis
Code 122

AUDIO OUTPUT METER: If this type of aligning meter is used, connect it to the voice coil terminals of the speaker or from the plate and screen of the 50L6GT tube. Adjust the meter for the 0 to 10 volt scale.

VACUUM TUBE VOLTMETER: To use the vacuum tube voltmeter as an aligning indicator, make the following connections: Attach the negative (—) terminal of the voltmeter to any point in the circuit where the A. V. C. voltage can be obtained. Connect the positive (+) terminal of the vacuum tube voltmeter to B (—) negative (electrical ground).

SIGNAL GENERATOR: When adjusting the I.F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to the antenna section of the tuning condenser. Connect the ground or low side of the generator to the chassis.

When aligning the R.F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet.

When adjusting the radio outside the cabinet the loop aerial should be placed in approximately the same position around or near the chassis as when assembled.

After connecting the aligning instruments adjust the compensators as shown in the tabulation below. Locations of the compensators are shown on the schematic diagram.

If the indicating meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

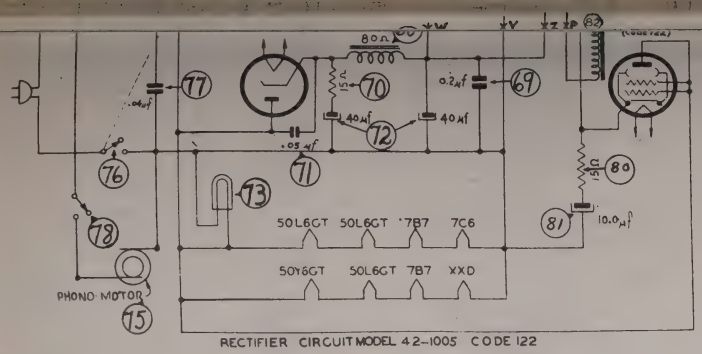
PROCEDURE MODEL 42-1005, CODES 121-122

Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1	Tuning Cond. Stator Plate Lug	455 K.C.	540 K.C. Tuning Cond. Closed	Vol. Max. Band Switch Brdcst.	45A 41A 40B 40A	Note B
2	Loop on Generator see above instructions	1500 K.C.	1500 K.C.	Vol. Max. Band Switch Brdcst.	6B, 6A	Note A
3	Loop on Generator see above instructions	580 K.C.	580 K.C.	Vol. Max. Band Switch Brdcst.	33	Roll Tuning Condenser
4	Loop on Generator see above instructions	1500 K.C.	1500 K.C.	Vol. Max. Band Switch Brdcst.	6B	
5	Loop on Generator see above instructions	15 M.C.	15 M.C.	Band Switch "SW"	33A, 3 Note C	

NOTE A:—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, set the tuning pointer

NOTE B:—Before adjusting the I.F. compensators, tighten 40B and 40A compensators, then adjust compensators in the order as shown in the adjacent column once only for maximum output.

NOTE C:—Turn tuning condenser until pointer is on 15 M.C. mark, then adjust oscillator compensator 33A to maximum on the second signal peak from the



RECTIFIER CIRCUIT MODEL 42-1005 CODE 122

PHONOGRAPH SECTION

The phonograph incorporates a self-starting rim drive turntable motor, and a manually operated Philco Photo-Electric Reproducer, which operates through the audio system of the radio. The phonograph motor is automatically started when the Photo-Electric Reproducer is lifted from its rest. The motor is designed to operate on 115 volts, 60 cycle or 115 volts, 50 cycle A.C. power supplies. When operating on 115 volt, 50 cycle current, a special spring collar, Part No. 28-8999, must be placed on the motor drive shaft pulley.

EXTERNAL AERIAL CONNECTIONS

The built-in low-impedance loop aerial system of this model is designed to operate without an outside aerial or ground, and to give exceptional receiving performance under average conditions.

To operate the radio, however, in steel reinforced buildings and other shielded locations where signal strength is weak, the Philco outdoor aerial, Part No. 45-2817, is recommended for maximum receiving performance. The outdoor aerial can be easily connected to the radio by inserting the plug attached to the transformer (supplied with the aerial) into the socket provided at the rear of the radio. This aerial can be obtained from your local Philco Distributor.

SPECIFICATIONS — MODEL 42-1005, CODE 121-122

Schem. No.	Description	Part No.
1	Loop Aerial	76-1372
	Mtg. Sleeve	28-3806
	Mtg. Screw	W-1827
	Spring Washer	28-4186
	Washer	W-151
2	Short Wave Aerial Transformer	32-3770
	Mtg. Clip	25-5003
3	Compensator (S. W. Aerial)	31-6437
4	Broadcast Aerial Transformer	32-3648
	Mtg. Clip	25-5002
5	Mica Condenser (375 mmfd)	20-037511
6	Tuning Condenser	31-2572
6A	Aerial Compensator (Part of 6)	
6B	Oscillator Compensator (Part of 6)	
	Drive Cord	31-2573
	Spring	28-8954
	Drive Shaft	31-2571
	Rubber Grommet	27-4616
	Mtg. Sleeve	28-5583
	Mtg. Nut	W-684FA3
	Pointer	96-2078
	Nut (Mtg. Condenser)	W-1543
7	Resistor (220,000 ohms)	33-422339
8	Phonograph Input Transformer	32-8196
	Input Cable	41-3622
9	Photo-Electric Pickup Complete (Code 121)	35-2531
	" " " " " (Code 122)	35-2602
	Rubber Bumper	54-4070
	Rubber Mtg. Grommet (2 required)	54-4686
	Rubber Mtg. Grommet (1 required)	54-4096
	Lockwasher	W-2282
	Nut	W-826
	Washer	W-894
10	Resistor (100,000 ohms, Code 121)	33-410339
	Resistor (220,000 ohms, Code 122)	33-422339
11	Electrolytic Condenser (6 mfd)	30-2508
	Mtg. Clamp	55-1346
12	Electrolytic Condenser (10 mfd) Part of 11	
13	Resistor (47,000 ohms)	33-347339
14	Condenser (.05 mfd, 200 volts)	30-4519
15	Resistor (4700 ohms)	33-247339
16	Mica Condenser (250 mmfd)	60-125187
17	Resistor (2.2 megohms)	33-522339
18	Condenser (.01 mfd, 400 volts)	30-4572
19	Resistor (10,000 ohms)	33-310339
20	Condenser (.05 mfd, 400 volts)	30-4515
21	Resistor (2200 ohms)	33-222339
22	Condenser (500 mmfd)	60-150187
23	Resistor (22,000 ohms)	33-322339
24	Condenser (.05 mfd, 200 volts)	30-4519
25	Oscillator Choke	32-3615
26	Condenser (.05 mfd, 200 volts)	30-4519
27	Resistor (22,000 ohms)	33-322339
28	Mica Condenser (.001 mfd, 400 volts)	60-210124
29	Resistor (68,000 ohms)	33-368339
30	Light Control (Light-Beam Reproducer)	33-5435
31	Mica Condenser (700 mmfd, Code 121)	60-170187
	" " (800 mmfd, Code 122)	60-180187
32	Mica Condenser (275 mmfd)	20-027511
33	Compensator ($80KC)	31-6432
33A	Compensator (Part of 33)	
34	Lamp (Light Beam Reproducer)	34-2478
35	Condenser (.05 mfd, 200 volts)	30-4519
36	Light Beam Osc. Transformer	32-3741
	Mtg. Clip	25-5002
37	Oscillator Transformer (Broadcast S. W.)	32-3748
	Mtg. Clip	25-5002
38	Resistor (330 ohms)	33-133339
39	Mica Condenser (10 mmfd, Code 122)	60-010137
	" " (6 mmfd, Code 121)	60-006137
40	First I. F. Transformer	32-3616
	Mtg. Nut	W-1949FA3
40A	Primary Compensator (Part of 40)	
40B	Secondary Compensator (Part of 40)	
40C	Condenser (3000 mmfd.) Part of 40	
41	Second I. F. Transformer	32-3617
	Mtg. Nut	W-1949FA3
41A	Secondary Compensator	(Part of 41)
42	Resistor (68,000 ohms)	33-368339
43	Condenser (.2 mfd, 200 volts)	30-4587
44	Resistor (2.2 megohms)	33-522339
45	Third I. F. Transformer	32-3758
	Mtg. Nut	W-1949
45A	Secondary Compensator (Part of 45)	
45B	Condenser (100 mmfd) Part of 45A	
45C	Resistor (47,000 ohms) Part of 45	
45D	Condenser (100 mmfd) Part of 45A	
46	Resistor (470,000 ohms)	33-447339
47	Condenser (.05 mfd, 200 volts)	30-4519
48	Motor Switch	42-1654
	Cover	56-2108
	Washer	W-467FA4
	Nut	W-684FA4
	Lockwasher	W-1624
49	Resistor (100,000 ohms)	33-410339
50	Condenser (.004 mfd, 600 volts)	30-4623
51	Volume Control	33-5457
	Mtg. Nut	W-2157
52	Mica Condenser (100 mmfd.)	60-110187
53	Resistor (10 megohms)	33-610339
54	Condenser (.01 mfd., 400 volts)	30-4572
55	Condenser (.001 mfd., 600 volts)	30-4620
56	Resistor (470,000 ohms)	33-447339
57	Resistor (220,000 ohms)	33-422339
58	Condenser (.01 mfd., 400 volts)	30-4572
59	Mica Condenser (250 mmfd.)	60-125187
60	Electrolytic Condenser (10 mfd., 25 volts)	30-2509
61	Resistor (130 ohms) Code 121	33-113336
	" (100 ohms) Code 122	33-110336
62	Condenser (.004 mfd., 600 volts)	30-4623
63	Condenser (.05 mfd., 400 volts)	30-4518
64	Condenser (.003 mfd., 600 volts)	30-4582
65	Condenser (.2 mfd.) and Choke Assembly	76-1161
66	Output Transformer (Code 121)	32-8127
	Output Transformer (Code 122)	32-8267
67	Speaker (Code 121)	36-1518-4
	Speaker (Code 122)	36-1569
	Cone Assembly (For Speaker 36-1518-4)	36-4171
	Cone Assembly (For Speaker 36-1569)	36-4169
	Speaker Cable (Code 121)	41-3846
	Speaker Cable (Code 122)	41-3857
	Mtg. Nut	W-124FA3
	Mtg. Washer	28-3320
	Mtg. Sleeve	56-2044FA3
	Mtg. Grommet	27-4596
68	Filter Choke	32-8155
69	Condenser (.2 mfd., 400 volts)	30-4594
70	Resistor (15 ohms)	33-015430
71	Condenser (.05 mfd., 200 volts)	30-4519
72	Electrolytic Condenser (40-40 mfd., 150 volts)	30-2509
	Mtg. Panel	27-9506
	Insulating Tube	27-9902
73	Pilot Lamp	34-2477
	Socket Assembly	76-1282
74	Filament Resistor	
	(50-300 ohms, Code 121 only)	33-3413
75	Phonograph Motor (115 volts, 60 cycles)	35-1265-2
	Sring Collar (For 115 volts, 50 cycle A. C. Operation)	28-8999
	Rubber Grommet	27-4686
	Mtg. Sleeve	28-5685
	Mtg. Washer	W-151FA3
	Mtg. Screw	W-333FE11
	Plug	54-4142
	Plug Shell	56-2071
	Turntable	35-3047-2
76	ON-OFF Switch (Part of 53)	
77	Condenser (.04 mfd., 400 volts)	30-4119
78	Tone Control Switch	42-1562-2
	Switch Plate	56-1783
	Screw	W-560FA9
79	Band Switch	42-1678
	Mtg. Nut	W-2157

FOLLOWING PARTS

Used in Code 122 Rectifier Circuit Only

80	Resistor (15 ohms)	33-015436
81	Electrolytic Condenser (10 mfd.)	30-2396
82	Field Coil (Replace Speaker 36-1518-4, Code 121 or 36-1569, Code 122)	

MISCELLANEOUS PARTS

Model 42-1005, Code 121

Bezel	54-4093
Screw	W-2073
Cabinet	10584-B
Dial Scale	27-5798
Rubber Grommet	4169
Speed Clip	56-1876
Knob (Vol-Tuning Band)	54-4105
Rubber Grommet (Chassis Mtg.)	3915
Rubber Grommet (Chassis Mtg.)	27-4307
Screw (Chassis Mtg.)	W-443

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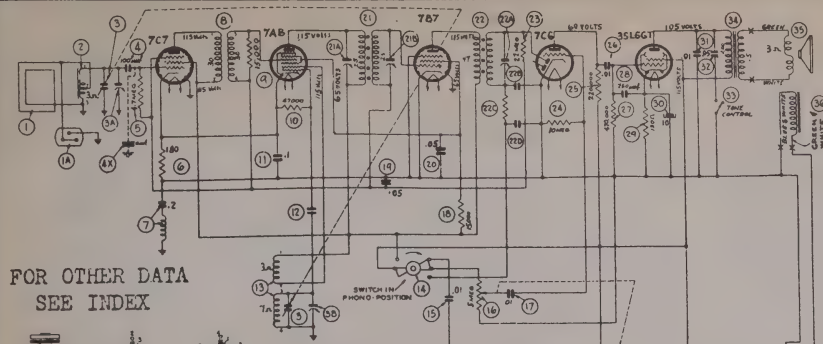
7C7
7A8
7B7
7C6
35L6GT
105 VOLTS
50Y6GT
180
FOR OTHER DATA
SEE INDEX
SWITCH IN
PHONO POSITION
PICKUP
TONE CONTROL
VOLUME CONTROL
BLACK
WHITE
GREEN
330,000
47000
220,000
500 mmf
.05
.01
.04
.1
.2
.5
.15
.25
.3
.6
.8
.9
.7
.4
.3
.2
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.02
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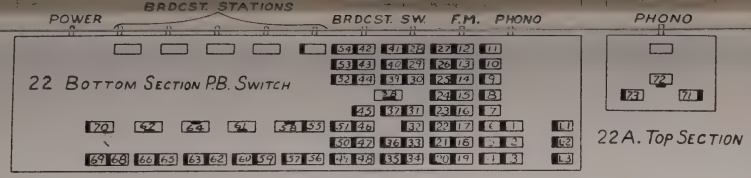

FIG. 1—P. B. SWITCH, TOP AND BOTTOM SECTIONS
Contact numbers correspond to contact numbers shown on the Schematic Diagram

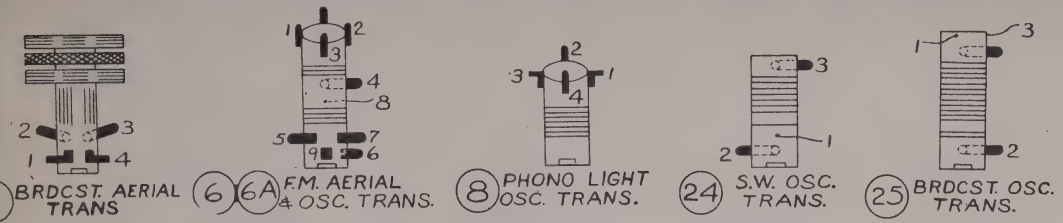

FIG. 2—PHYSICAL LOCATIONS OF CONNECTIONS ON R. F. TRANSFORMERS
Numbers at lugs correspond to numbers on Schematic Diagram at the transformer symbols

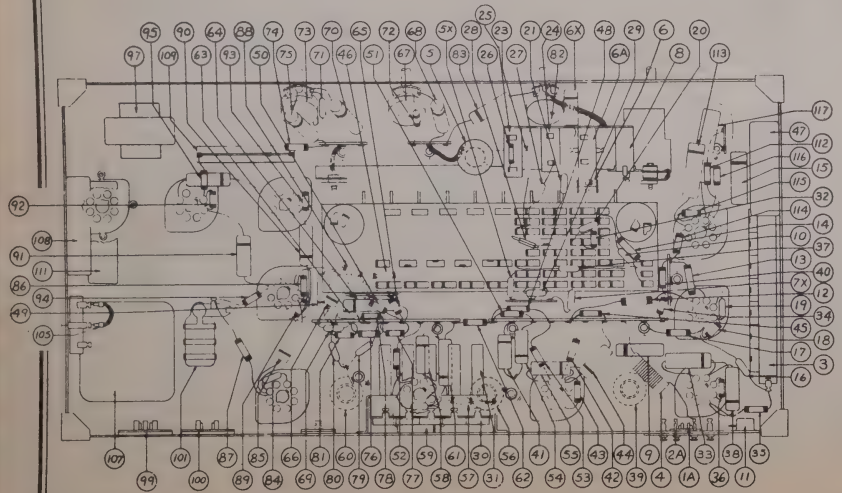

FIG. 3—LOCATIONS OF PARTS—UNDER CHASSIS

PHONOGRAPH REPRODUCER ADJUSTMENTS

To reproduce the sound from a record, the light beam of the reproducer must be carefully positioned on the light sensitive cell. If the light beam is not carefully set, the sound reproduction will be distorted, weak or, if the light beam is completely on or off the cell, the phonograph will be silent.

If any of these conditions exist, the following adjustment procedure should be made:

NOTE—These adjustments should be made with the power line voltage at 117 volts A. C.

A. ADJUSTING WIDTH OF LIGHT BEAM

To make this adjustment push the lamp socket assembly into its holder until a clear image of the lamp filament appears on the light cell. The socket should then be slightly pushed in beyond this point until the rectangular spot of light is 5/32" in width. The socket assembly is now rotated so that the spotlight is vertical.

B. POSITIONING THE LIGHT BEAM

To position the light beam on the light cell, turn the adjusting screw at the lower left side of the reproducer until the spot is half on the cell and half on the metal frame surrounding the cell.

C. ADJUSTING INTENSITY OF LAMP

When shipped from the factory, the lamp of the reproducer is adjusted for best operating efficiency. The intensity of the light from the lamp is adjusted by Compensator No. 11 located on the radio chassis. Under ordinary circumstances, an adjustment will not be necessary. When replacing the reproducer or lamp, however, it may be necessary to readjust the light intensity. In this case the compensator is adjusted as follows:

1. Turn volume control on full and play a record.
2. While the record is playing, turn Compensator 11 in the direction necessary to obtain the best operating point without distortion. By turning the compensator the strength of the pick up output is increased or decreased.

D. INSTALLING NEW LAMP

When installing a new lamp in the socket, there are two positions in which the lamp can be inserted. Ordinarily, either of these positions can be used. In some cases, however, due to the lamp filament being off center, the lamp must be inserted in the position that gives the best centering of the spot of light on the vibrating mirror.

ELECTRIC PUSH-BUTTON ADJUSTMENTS

The electric push-button tuning mechanism consists of twelve push-buttons. Six push-buttons control and select power supply, broadcast, shortwave 1, shortwave 2, and frequency modulation bands, and Phonograph Operation. The remaining six push-buttons are used for automatically selecting six standard broadcast stations.

Select six of the most popular stations received in the locality. Insert the station call letters into the spaces above the buttons. The station with the lowest frequency is placed in the second button from the left and the highest frequency is placed in the seventh push-button from the left. Each push-button is adjusted by two adjusting screws located on the rear of the chassis. Each set of screws is numbered and labeled "Ant.", "Osc." and covers a frequency range as shown in Fig. 1.

Looking at the front of the cabinet, the second button from the left is adjusted by adjusting screws No. 1. The next push-button by adjusting screws No. 2, and the remaining push-buttons in order.

To adjust the electric push-buttons accurately for reception of broadcast stations, a vacuum tube voltmeter such as Philco Models 027 and 028 should be used. In addition, an insulated padding screw driver, Part No. 45-2610, and a PHILCO Model 070 Signal Generator are required. With this equipment at hand proceed as follows:

1. Press in "Broadcast" push-button.

2. Set up a Model 070 Signal Generator near the receiver and connect a loop aerial (made from a few turns of wire 12 inches in diameter) to the high and ground output jacks of the signal generator. Turn the output controls to maximum and set the modulation control to "MOD. ON."

Connect the negative (—) terminal of the vacuum tube voltmeter to the aligning test socket on the top centre of the chassis. Attach the positive (+) terminal of the voltmeter to the chassis.

3. Manually tune in the station to be set up on the first station push-button. After doing this set the indicator of the 070 Signal Generator to the frequency of the station being received. As the indicator approaches the frequency of the station a whistle will be heard; leave the indicator at this point.

4. Press "in" the second push-button from the left of cabinet. Using the insulated screw driver, turn the No. 1 "Osc." screw until the broadcast station identified by the signal generator is heard; at this point, turn the indicator of the signal generator away from the frequency of the station. Readjust No. 1 "Osc." and "Ant." screws for maximum deflection of the vacuum tube voltmeter pointer.

After setting up the first station the same procedure as outlined above is used for the remaining stations. When these models are set up to receive the sound of a television program tuned in by the special type Philco Television Sets or if it is to be used in conjunction with a Philco Record Player, the lowest frequency push-button should be used. To tune in these programs, the same procedure as given for broadcast stations above is used.

Further details for setting up these Radios for operation with Philco Television Sets or Record Players are supplied with the instruments.

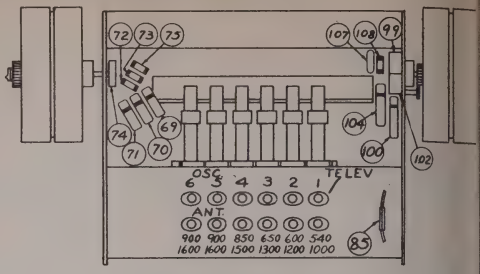

FIG. 1—LOCATIONS OF PARTS AND PUSH BUTTON COMPENSATORS ON TUNING UNIT

PHONO REPRODUCER ADJUSTMENTS

MODELS 42-1003, 42-1013

To reproduce the sound from a record, the light beam of the reproducer must be carefully positioned on the light sensitive cell. If the light beam is not carefully set, the sound reproduction will be distorted, weak or, if the light beam is completely on or off the cell, the phonograph will be silent.

If any of these conditions exist, the following adjustment procedure should be made:—

NOTE—These adjustments should be made with the power line voltage at 118 volts AC.

A. ADJUSTING WIDTH OF LIGHT BEAM

To make this adjustment push the lamp socket assembly into its holder until a clear image of the lamp filament appears on the light cell. The socket should then be slightly pushed in beyond this point until the rectangular spot of light is 5/32" in width. The socket assembly is now rotated so that the spot of light is vertical.

B. POSITIONING THE LIGHT BEAM

To position the light beam on the light cell, turn the adjusting screw at the lower left side of the reproducer until the spot is half on the cell and half on the metal frame surrounding the cell.

C. ADJUSTING INTENSITY OF LAMP

When shipped from the factory, the lamp of the reproducer is adjusted for best operating efficiency. The intensity of the light from the lamp is adjusted by Compensator No. 117 located on the rear of the radio chassis. Under ordinary circumstances, an adjustment will not be necessary. When replacing the reproducer or lamp, however, there may be a tendency towards microphonic feedback. In this case the compensator is adjusted as follows:

1. Turn volume control on full and play a record.

2. While the record is playing, turn compensator 117 in the direction necessary to eliminate microphonic feedback. By turning the compensator the strength of the pick-up output is increased or decreased.

D. INSTALLING NEW LAMP

When installing a new lamp in the socket, there are two positions in which the lamp can be inserted. Ordinarily, either of these positions can be used. In some cases, however, due to the lamp filament being off center, the lamp must be inserted in the position that gives the best centering of the spot of light on the vibrating mirror.

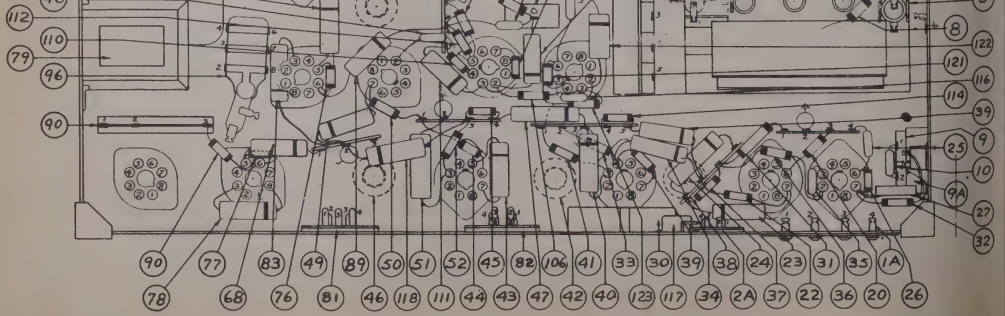

FIG. 3—LOCATIONS OF PARTS—UNDER CHASSIS MODEL 42-1015, CODE 121

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PHILCO RADIO & TELEVISION CORP.

MODEL 42-1016

PUSH-BUTTON AND WIRELESS REMOTE CONTROL ADJUSTMENTS

WIRELESS REMOTE CONTROL AND ELECTRIC PUSH-BUTTON TUNING: The wireless remote control automatically tunes six broadcast stations; increases and decreases sound volume; starts and stops record changer; rejects records; changes from radio to phonograph or phonograph to radio; turns the power supply of the radio and phonograph OFF and has a "Silent" position which silences the sound output without operating volume control. These operations are all controlled from the remote control unit without any connections with the radio.

The control positions on the remote control dial reading right to left around the control are as follows:—"LOUD," "SOFT," SILENT, Station No. 1, Station No. 2, Station No. 3, Station No. 4, Station No. 5, Station No. 6, "PHONO."

The twelve electric push-buttons on the chassis dial operate independently of the wireless remote control. Six of the push-buttons select stations, and six operate the wireless remote control, phonograph, and the standard, shortwave 1, shortwave 2 and FM bands. Viewing the push-buttons from the front of the radio, proceeding left to right: No. 1 button controls "Remote," Nos. 1-2-3-4-5-6 and 7 broadcast stations, No. 8 "Brdcst" band, No. 9 "SW-1" band, No. 10 "SW-2" band, No. 11, "FM" band and No. 12 phonograph.

The selected broadcast stations can be set up for push-button and remote tuning control operation by adjusting the padders and coils located in back of the push-button assembly. Three adjustments must be made for each broadcast station selected.

The bottom row marked "ANT" is for the antenna padder for remote control operation; the middle row of adjusting screws is for the oscillator coils used in remote control; the top row of adjusting screws is for the oscillator adjustment for push-button tuning. Each set of three padders is numbered from "1 to 6" corresponding to the numbers shown on the push-buttons in figure above.

To set up stations on these models for best reception, a Signal Generator PHILCO Model 070; Vacuum Tube Voltmeter and PHILCO Model 027 or 028 should be used. With this equipment proceed as follows:

1. Select and remove the desired six (6) station call letters from the receiver station tab card. Insert the station tabs in the windows of the bezel on the receiver. Place the lowest frequency station in the second window (No. 1 in diagram) on the left of the bezel, and the remaining station tabs in the windows in the order of increasing broadcast frequency.

2. Remove the tabs of the corresponding six stations from the wireless control call letter card. Insert the LOUD, SOFT and SILENT tabs in the first, second and third spaces, respectively, on the right hand side of the bezel. Insert the tab of the lowest frequency station in the fourth space on the right side of the bezel on the remote control unit dial. Transparent tabs are also supplied. These should be placed over each call letter. Place the remaining call letter tabs around the bezel from right to left (counter-clockwise) in the order of increasing frequency.

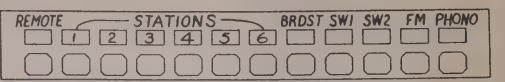

FIG. 1—TAB LOCATIONS

3. Insert the negative (—) terminal of the vacuum tube voltmeter into the Test socket on the rear of the chassis. Attach the positive (+) terminal to the chassis.

4. Turn volume control and power switch to the "ON" position, and allow the receiver to heat up. Attach a loop consisting of a few turns of wire to the output terminals of the Model 077 Signal Generator. Turn the signal generator power switch to "MOD ON". Press in the "Brdcst" push-button and manually tune in the lowest frequency station desired. This station should be between 540 to 950 K. C. Then tune the signal generator to the frequency of the same station and a beat note will be heard. Leave the signal generator pointer set at this frequency.

5. Press in the "Remote" push-button. Dial the first low frequency station on the remote control unit.

6. Using a padding screw driver adjust No. 1 "OSC Remote" (middle row) until the station identified by the modulated signal of the Signal Generator is tuned to maximum reading on the voltmeter. Next adjust the "No. 1 ANT" padder (bottom row) for maximum indication on the voltmeter.

Press in the No. 1 station push-button on the radio and adjust No. 1 "P.BUTTON OSC" padder (top row) for maximum output on the same station.

7. Turn the Signal Generator off the station frequency and readjust the No. 1 "OSC P.BUTTON" padder for maximum; then press REMOTE push-button, dial station on Remote Unit and readjust No. 1 "Remote OSC" and No. 1 "ANT" padders for maximum reading with the station signal. This should be done with the volume control of the receiver at low volume.

Repeat this procedure for each of the remaining stations to be set up. They should be set up in the order of their increasing frequency.

8. After all stations have been set up for push-button and remote control operation, press in the fifth (5) push-button and adjust the "ANT" compensator (36). See Fig. 4.

ADJUSTING CONTROL FREQUENCY AMPLIFIER

The wireless remote control models are shipped with 5 different control frequencies which range from 350 to 400 K. C. These frequencies are identified by the code number appearing on the serial number ticket and on the rear of the chassis. The code numbers and frequencies are as follows:

Code 5.....355 K. C.	Code 7.....375 K. C.
Code 6.....367 K. C.	Code 8.....383 K. C.
Code 9.....395 K. C.	

The purpose of the different control frequencies is to prevent interaction between two or more wireless remote control models which are on the same floor or exceptionally close together. When several wireless remote control models are to be located close together, it will be necessary to use different control frequencies. These frequencies should be 20 KC apart. For example, if three models are to be operated at the same time and are closely situated, it will be advisable to adjust the control frequency of the first set to 355 KC, the second set to 375 KC, and the third set to 395 KC.

In order to realign or change the control frequency of these models, the following equipment is required:

1. Philco Model 070 signal generator with a loop attached to the output terminal. (A few turns of wire 12 inches in diameter).
Vacuum tube voltmeter, Philco Model 027.

2. Philco wireless remote control aligning adapter. Part No. 45-2769.

3. Philco aligning screw driver, Part No. 45-2610.

With this apparatus the control frequency is adjusted as follows:

1. Remove the 2A4G control tube from its socket and replace with the aligning adapter. Connect the red lead of the aligning adapter to the positive terminal of the vacuum tube voltmeter. The black lead of the adapter is connected to the negative terminal of the vacuum tube voltmeter.

2. Connect the high side of the signal generator through a 100-ohm resistor to the "Red" terminal of the remote control secondary inductor loop panel. Connect the "grd" of the signal generator to the "Blk" terminal.

3. Apply power to the set and press in the "remote" push button. Turn the generator modulation control to "Mod ON" and turn the attenuator control about one fourth on.

4. The control frequency to which the control amplifier is tuned can now be determined by tuning the signal generator between 350 and 400 KC. When the signal generator is tuned to the control frequency, the vacuum tube voltmeter will show maximum deflection. If this frequency is to be used, leave the signal generator at this point or turn the indicator to any other frequency desired between 350 and 400 KC.

5. After the control frequency has been found or changed, compensators (149A) (149C) are adjusted for maximum indication on the vacuum tube voltmeter.

6. Remove the signal generator output leads and 100-ohm resistor from the terminal panel. Connect the remote secondary inductor loop to the terminal panel.

7. Place the small loop mentioned above into the "high" and "ground" terminals of the signal generator output and place the signal generator near the secondary inductor loop in the bottom of the cabinet. When doing this, do not disturb the setting of the signal generator indicator. The compensators (157A) and (163A) are now adjusted for maximum reading on the vacuum tube voltmeter.

8. Next adjust the secondary inductor loop compensator (165) located in the bottom of the cabinet. This compensator is encased in a cardboard container that is attached to one corner of the loop. Extreme care should be used in adjusting the compensator to the exact point of resonance as the secondary inductor is a very sharply tuned circuit.

9. If the vacuum tube voltmeter pointer goes off scale when adjusting the compensators, turn the attenuator control of the signal generator toward the "off" position.

ADJUSTING WIRELESS REMOTE CONTROL UNIT

The wireless remote control unit is now adjusted to the control frequency of the amplifier as follows:

1. Turn off the signal generator, then dial any one of the stations indicated on the remote control unit by pulling the selector to the stop position; release the selector and at the same time press the stop down and hold it in this position.

2. Now bring the wireless remote control unit close to the receiver. Using a padding wrench, Philco Part No. 3164, tune the compensator (169), Fig. 3, located on the bottom of the remote control unit until a maximum voltage reading is indicated on the vacuum tube voltmeter. When tuning this compensator, it should be done very slowly so as not to pass over the frequency to which the control amplifier is tuned.

3. The remote control unit is now moved a short distance from the radio (several feet). Compensator (169) is then readjusted for maximum voltage reading.

4. After making these adjustments, remove the aligning adapter from the socket and replace the 2A4G tube. The wireless remote control unit should now be adjusted to the same frequency as the control frequency in the receiver.

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MODEL 42-1016

PHILCO RADIO & TELEVISION CORP.

Audio Output: 20 watts.

Power Supply: 115 volts, 60 cycle A. C.

This model can also be operated on 115 volts, 50 cycle current by changing the phonograph motor parts as given in the parts list.

Power Consumption: 175 watts.

Tuning Band Frequencies: Brdcst, 540 to 1720 KC; SW-1, 9 to 12 MC; SW-2, 14.4 to 18 MC; FM, 42 to 50 MC.

Push-Button and Remote Control Frequencies: 540 to 950 KC; 590 to 1050 KC; 650 to 1250 KC; 700 to 1350 KC; 850 to 1500 KC; 950 to 1600 KC.

OPERATING DISTANCE

When shipped from the factory the wireless remote control circuit is adjusted to control the radio from an average distance that has been found to be satisfactory in most installations. In some special cases, however, where the radio and control are situated near large metal objects or installed in metal shielded areas, it may be necessary to change the control circuit to get adequate remote control (increase sensitivity) from certain distances. In these cases, the value of resistor (160), 15,000 ohms, located underneath the radio chassis, should be changed to a lower value that will give the desired range of control. The resistor, however, should not be lowered in value more than is found necessary for the special installation. If the control range is too sensitive, the resistor should be changed to a higher value (more resistance).

PHONO REPRODUCER ADJUSTMENTS

To reproduce the sound from a record, the light beam of the reproducer must be carefully positioned on the light sensitive cell. If the light beam is not carefully set, the sound reproduction will be distorted, weak or, if the light beam is completely on or off the cell, the phonograph will be silent.

If any of these conditions exist, the following adjustment procedure should be made:—

NOTE—These adjustments should be made with the power line voltage at 118 volts A. C.

A. ADJUSTING WIDTH OF LIGHT BEAM

To make this adjustment push the lamp socket assembly into its holder until a clear image of the lamp filament appears on the light cell. The socket should then be slightly pushed in beyond this point until the rectangular spot of light is 5/32" in width. The socket assembly is now rotated so that the spot of light is vertical.

B. POSITIONING THE LIGHT BEAM

To position the light beam on the light cell, turn the adjusting screw at the lower left side of the reproducer until the spot is half on the cell and half on the metal frame surrounding the cell.

C. ADJUSTING INTENSITY OF LAMP

When shipped from the factory, the lamp of the reproducer is adjusted for best operating efficiency. The intensity of the light from the lamp is adjusted by Compensator No. 23 located on the radio chassis. Under ordinary circumstances, an adjustment will not be necessary. When replacing the reproducer or lamp, however, there may be a tendency towards microphonic feedback. In this case the compensator is adjusted as follows:

1. Turn volume control on full and play a record.

2. While the record is playing, turn compensator 110 in the direction necessary to eliminate microphonic feedback. By turning the compensator the strength of the pick-up output is increased or decreased.

D. INSTALLING NEW LAMP

When installing a new lamp in the socket, there are two positions in which the lamp can be inserted. Ordinarily, either of these positions can be used. In some cases, however, due to the lamp filament being off center, the lamp must be inserted in the position that gives the best centering of the spot of light on the vibrating mirror.

REPRODUCER JEWEL AND ARM ADJUSTMENTS

Three different tone arms have been used:

1—An aluminum arm (Part No. 35-2519).
2—A zinc arm (Part No. 35-2519).
3—A moulded bakelite arm (Part No. 35-2540).

Since the weight of each kind of arm is different, three counterbalance weights are required. The aluminum arm requires a 1¼-ounce weight, the zinc arm a 5-ounce weight and the bakelite a 3-ounce weight. The zinc arm has a yellow paint mark under the tone arm.

Regardless of which tone arm is used, the weight of the tone arm on the record should be 1¼ ounces. The correct counterbalance weight must be used and the final adjustment made with the screw on the side of the tone arm swivel assembly. Do not use the incorrect counter balance weight and then adjust for the balance with the spring in the tone arm swivel, since this puts a side thrust on the tone arm spindle and will very likely cause tone arm drag.

Use only a 20 SAE grade oil mixed with 1/3 special Shaler Rislone oil for lubricating the spindle. Other lubricants will cause the spindle assembly to stick, resulting in tone arm drag. Tone arm drag may also be caused by the dress of the leads at the back of the tone arm. They should be dressed towards the turntable spindle at the end of the tone arm.

The tone arm spindle must be absolutely free. Any binding in either direction will cause the light beam to pull off the cell and produce WOW's and distortion. The drag should not exceed ⅛ ounce.

Do not, under any circumstances, try to adjust the angle of the jewel. The jewel normally extends 1/32" below the guard. It should be vertical with respect to the surface of the record when viewed from in front of the pick-up head. When viewed from the side, the jewel is at quite an angle to the surface of the record. On 1/3 stack of records, the jewel should be at an angle of approximately 20°. When playing the bottom record, the jewel will be at an angle of approximately 13° Do not attempt to change this angle. It permits the jewel to track in the groove with a minimum surface noise. Any change from the original setting will affect the frequency response, and if the angle of the jewel is less than given above, it will cause record wear.

Flutter, mistracking and distortion can all be caused by a stiff mirror and jewel assembly. Check the flexibility of this assembly. With the record changer stopped, put a record on the turntable and place the tone arm on the record. Open the peep-hole in the pick-up cover—the light beam should be 5/32" wide and should be half "on" and half "off" the photo-electric cell. Hook the Philco Scale, Part No. 45-2851, under the cover at the nose and pull laterally, first toward the spindle and then away from the spindle. The jewel assembly should be sufficiently flexible to allow the light beam to be pulled completely off the cell and completely on the cell with less than 1 ounce of lateral pull—from ½ ounce to ¾ ounce is the most desirable. Replace the mirror and jewel assembly if more than 1 ounce pull is required.

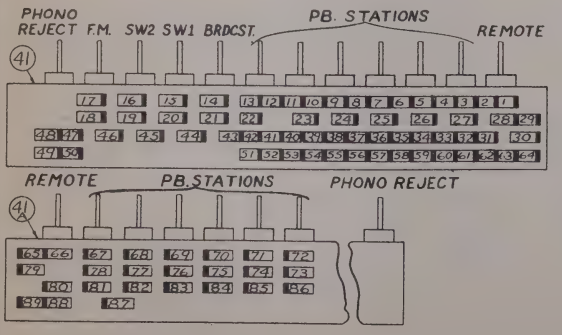

FIG. 5—CONTACT LOCATIONS OF STATIONS AND LIGHTS, P. B. SWITCH—TOP 41, BOTTOM 41A

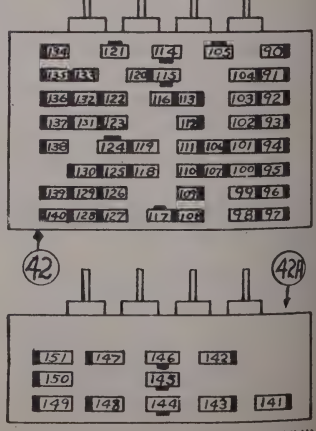

FIG. 6—CONTACT LOCATIONS OF TUNING BAND, P. B. SWITCH—42, BOTTOM; 42A, TOP SECTION

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PHILCO RADIO & TELEVISION CORP. MODEL 42-1016

Ch. No.	Description	Part No.
1.	Loop Aerial (Broadcast and S. W. Bands)	76-1351
	Mtg. Washer	W-151FA3
	Mtg. Sleeve	28-2806FA3
	Mtg. Sleeve	56-1907FA3
	Mtg. Screw	W-288-FE11
	Spring Washer	28-4156FA3
1A.	Terminal Panel	38-9942
2.	Dipole Aerial (F. M., Mounted on Cabinet)	76-1362
2A	Socket (F. M. Aerial—On Chassis)	27-6181
3.	F. M. Aerial Transformer	32-3805
3A.	F. M. Oscillator Transformer (Part of 3) Mtg. Clip	28-5002
4.	F. M. Tuning Condenser	31-2596
4A.	Broadcast and S. W. Tuning Condenser (Part of 4)	
	Mtg. Grommet	27-4771
	Drive Drum (Cable)	38-9716
	Drive Cord (Condenser)	31-2315
	Drive Cord (Pointer)	31-2316
	Springs	28-8913
	Pointer	56-2272
	Bearing (Drive Drum Mtg.)	38-9707
	Coupling (Condenser)	31-2291
5.	Compensator (F. M. Aerial)	31-6442
5A	Compensator (F. M. Oscillator), Part of 5	
5B	Compensator (S. W. 2 Aerial) Part of 5	
5C	Compensator (S. W. 2 Oscillator) Part of 5	
6	Resistor (47,000 ohms)	33-347339
7	Mica Condenser (250 mmfd)	60-125157
8	Resistor (10 ohms)	33-310339
9	Mica Condenser (250 mmfd)	60-125157
10	Resistor (47,000 ohms)	33-347339
11	Silver Mica Condenser (500 mmfd)	30-1138
12	Resistor (2,200 ohms)	33-322339
13	Silver Mica Condenser (215 mmfd)	30-1215
14	Resistor (10,000 ohms)	33-310339
15.	S.W.-1 and S.W.-2 Oscillator Transformer	32-3806
	Mtg. Clip	28-5002
16	Broadcast Oscillator Transformer	32-3809
	Mtg. Clip	28-5002
17	Compensator (Broadcast 580 KC)	31-6365
17A	Compensator (Broadcast 1500 KC), Part of 17	31-6362
18	Compensator (S.W.-2 Oscillator)	
18A	Compensator (Broadcast Aerial 1500 KC)	
18B	Compensator (S.W.-1 Aerial), Part of 18	
	Mtg. Clip	28-5002
19	Silver Mica Condenser (145 mmfd)	20-014511
20	Silver Mica Condenser (155 mmfd)	20-015511
21	S.W.-1 Aerial Transformer	32-3808
21A	S.W.-2 Aerial Transformer, Part of 21	
	Mtg. Clip	28-5002
22	Broadcast Aerial Transformer	32-3807
	Mtg. Clip	28-5002
23	Resistor (2.2 megohms)	33-522339
24	Mica Condenser (250 mmfd)	60-125157
25	Resistor (4700 ohms)	33-247339
26	Condenser (.01 mfd, 400 volts)	30-4572
27	Condenser (.01 mfd, 400 volts)	30-4572
28	Resistor (22,000 ohms)	33-322339
29	First I. F. Transformer	32-3801
	Mtg. Nut	W-1949
30A.	Primary Compensator (Iron Core—455 KC), Part of 29	
30B	Primary Compensator (4.3 KC), Part of 29	
30C	Condenser (4000 mmfd), Part of 29	
30D.	Secondary Compensator (455 KC), Part of 29	
30E.	Secondary Compensator (4.3 KC), Part of 29	
31.	Resistor (22,000 ohms)	33-322439
32.	Resistor (100,000 ohms)	33-410339
33.	Condenser (.01 mfd, 400 volts)	30-4517
34.	Condenser (.05 mfd, 400 volts)	30-4518
35.	Resistor (68 ohms)	33-068339
36.	Resistor (100 ohms)	33 110339
37.	Push-button Compensator ("Ant"—Remote)	31-6445
37A	Push-button Compensator ("Ant"—540 to 950 KC) (Part of 36)	
37B	Push-button Compensator ("Ant"—590 to 1050 KC) (Part of 36)	
37C	Push-button Compensator ("Ant"—650 to 1250 KC) (Part of 36)	
37D	Push-button Compensator ("Ant"—700 to 1350 KC) (Part of 36)	
37E	Push-button Compensator ("Ant"—850 to 1500 KC) (Part of 36)	
37F	Push-button Compensator ("Ant"—950 to 1600 KC) (Part of 36)	
38.	Resistor (33 ohms)	33-033339
39.	Resistor (10 ohms)	33-010439
40.	Pilot Lamp (Remote Push-button)	34-2064
40A	Pilot Lamp (Push-button—540 to 950 KC)	34-2064
40B	Pilot Lamp (Push-button—590 to 1050 KC)	34-2064
40C	Pilot Lamp (Push-button—650 to 1250 KC)	34-2064
40D	Pilot Lamp (Push-button—700 to 1350 KC)	34-2064
40E	Pilot Lamp (Push-button—850 to 1500 KC)	34-2064
40F	Pilot Lamp (Push-button—950 to 1600 KC)	34-2064
40G	Pilot Lamp (Push-button) (Broadcast Band)	34-2064
40H	Pilot Lamp (Push-button) (S. W. 2 Band)	34-2064
40I	Pilot Lamp (Push-button) (S. W.-2 Band)	34-2064
40J	Pilot Lamp (Push-button) (F. M.)	34-2064
40K	(Push-button) (Phono Reject)	34-2064
41.	Pilot Lamp Socket and Housing Assem.	76-1325
	Insulator	27-9925
	Mtg. Screw	W-601
41A.	P.B. Remote Oscillator Transformer (540 to 950 KC)	32-3042
41B.	P.B.-Remote Oscillator Transformer (590 to 1050 KC)	32-3042
41C.	P.B.-Remote Oscillator Transformer (650 to 1250 KC)	32-3597
41D.	P.B.-Remote Oscillator Transformer (700 to 1350 KC)	32-3597
41E.	P.B.-Remote Oscillator Transformer (850 to 1500 KC)	32-3041
41F.	P.B.-Remote Oscillator Transformer (950 to 1600 KC)	32-3041
	Iron Core	56-2273
	Cap	28-6936
	Clip	28-8910
	Transformer Ass'y Complete	32-3810
41G.	P.B.-Oscillator Compensator (540 to 950 KC)	31-6389
41H.	P.B.-Oscillator Compensator (590 to 1050 KC), Part of 49	
41I.	P.B.-Oscillator Compensator (650 to 1250 KC), Part of 49	
41J.	P.B.-Oscillator Compensator (700 to 1350 KC), Part of 40	
41K.	P.B.-Oscillator Compensator (850 to 1500 KC), Part of 40	
41L.	P.B.-Oscillator Compensator (950 to 1600 KC), Part of 40	
41M.	P.B. Switch (Stations and Lights—Top Section)	42-1689
41A.	P.B. Switch (Stations and Lights—Bottom Section), Part of 41	
	Mtg. Grommet	27-4596
	Mtg. Sleeve	28-3806
	Snap Fasteners	28-4342
42.	P.B. Switch (Tuning Bands—Under Chassis—Bottom Section)	42-1690
42A.	P.B. Switch (Tuning Bands—Under Chassis—Top Section), Part of 42	
	Mtg. Grommet	27-4596
	Mtg. Sleeve	28-3806
43.	Second I. F. Transformer	32-3802
	Mtg. Nut	W-1949
43A.	Primary Compensator (4.3 KC) (Part of 43)	
43B.	Primary Compensator (Iron Core—455 KC) (Part of 43)	
43C.	Secondary Compensator (4.3 KC) (Part of 43)	
43D.	Secondary Compensator (455 KC) (Part of 43)	
43E.	Mica Condenser (500 mmfd) (Part of 42)	
44.	Condenser (.01 mfd, 400 volts)	30-4572
45.	Condenser (.01 mfd, 400 volts)	30-4572
46.	Resistor (56,000 ohms)	33-356339
47.	Resistor (1000 ohms)	33-310339
48.	Resistor (150 ohms)	33-115339
49.	Condenser (.05 mfd, 400 volts)	30-4518
50.	Condenser (.01 mfd, 400 volts)	30-4572
51.	Resistor (39,000 ohms)	33-339339
52.	Third I. F. Transformer	32-3803
	Mtg. Nut	W1949
52A.	Primary Compensator (4.3 KC) (Part of 52)	
52B.	Primary Compensator (455 KC) (Part of 52)	
52C.	Secondary Compensator (4.3 KC) (Part of 52)	
53.	Mica Condenser (500 mmfd)	60-150137
54.	Condenser (.1 mfd, 200 volts)	30-4566
55.	Resistor (2.2 megohms)	33-522339
55A	Resistor (2.2 megohms)	33-522339
56.	Condenser (.05 mfd, 200 volts)	30-4519
57.	Resistor (2.2 megohms)	33-522339
58.	Mica Condenser (100 mmfd)	60-110157
59.	Resistor (100,000 ohms)	33-410339
60.	Resistor (100,000 ohms)	33-410339
61.	Phono-Radio Relay	42-1691-6
61A	Changeover Switch (Wafer A)	42-1720
61B.	Changeover Switch (Wafer B) (Part of 61A)	
62.	Condenser (.1 mfd, 200 v d.c.)	30-4566
63.	Resistor (3300 ohms)	33-333339
64.	Phono Input Cable	41-3632
65.	Resistor (220,000 ohms)	33-422339
66.	Condenser (.0015 mfd, 600 volts)	30-4621
67.	Tone Control (Bass—megohm)	33-5472
68.	Condenser (.003 mfd, 1000 volts)	30-4469
69.	Resistor (100,000 ohms)	33-410339
70.	Mica Condenser (.01 mmfd)	60-110157
71.	Condenser (.01 mfd, 400 volts)	30-4572
72.	Volume Control	33-5417
	Drive Pulley	56-6111
	Set Screw	W-2105
73.	Condenser (4.02 mfd, 200 volts)	30-4584
74.	Resistor (220,000 ohms)	33-422339
75.	Mica Condenser (150 mmfd)	60-115157
76.	Mica Condenser (150 mmfd)	60-115157
77.	Resistor (470,000 ohms)	33-447339
78.	Resistor (1 megohm)	33-510339
79.	Resistor (470,000 ohms)	33-447339
80.	Resistor (10 megohms)	33-610339
81.	Condenser (.01 mfd, 400 volts)	30-4572
82.	Mica Condenser (100 mmfd)	60-110157
83.	Resistor (330,000 ohms)	33-433339
84.	Condenser (.05 mfd, 400 volts)	30-4518
84X	Condenser (.05 mfd, 400 volts)	30-4518
85.	Resistor (470,000 ohms)	33-447339
86.	Resistor (47,000 ohms)	33-347339
87.	Resistor (4700 ohms)	33-247339
88.	Condenser (.01 mfd, 400 volts)	30-4572
89.	Resistor (47,000 ohms)	33-347339
90.	Resistor (470,000 ohms)	33-427339
91.	Resistor (470,000 ohms)	33-447339
92.	Condenser (.1 mfd, 200 volts)	30-4586
93.	Resistor (470,000 ohms)	33-447339
94.	Condenser (.01 mfd, 400 volts)	30-4572
95.	Tone Control Switch (Treble Audio)	42-1700
	Mtg. Nut	W-2157FA3
96.	Condenser (.006 mfd, 400 volts)	30-4581
96A	Condenser (.01 mfd, 400 volts)	30-4572
97.	Condenser (.002 mfd)	30-4582
98.	Resistor (2.2 megohms)	33-522339
99.	Resistor (2.2 megohms)	33-522339
100.	Resistor (2.2 megohms)	33-522339
101.	Condenser (.006 mfd, 1000 volts)	30-4024
102.	Output Transformer	32-3184
103.	Condenser (.006 mfd, 1000 volts)	30-4024
104.	Speaker	36-1553-4
	Cone Assembly	36-4181
	Cable	41-3662
	Mtg. Grommet	27-4596
	Mtg. Sleeve	56-2044FA3
	Mtg. Nut	W-124FA3
105.	Home Recording Socket (Mounted on Chassis)	27-6179
106.	Resistor (22,000 ohms)	33-322339
107.	Mica Condenser (250 mmfd)	60-125157
108.	Oscillator Transformer (Phono Reproducer Light)	32-3804
109.	Mica Condenser (500 mmfd)	60-150137
110.	Light Control (Phono Reproducer)	33-5435
111.	Record Changer Power Socket (Mounted in Chassis)	27-6182
112.	Record Compartment Lamp Cable Assembly	34-2484
113.	Switch and Cable Assembly (Record Compartment Light)	41-3634
114.	Record Changer Power Plug and Cable (Mounted on Changer)	76-1364
115.	Motor (Record Changer—115 volts, 60 cycle)	35-2553
	Pulley (60 cycle)	218-1448
	Pulley (50 cycle)	56-6173
	Screw	218-1450
	Turntable (60 cycle)	35-2554
	Turntable (50 cycle)	35-3059
116.	Neon Lamp (Turntable Speed)	34-2483
117.	Changeover Switch (Record Changer)	35-2547
118.	Reject Solenoid (Record Changer)	318-2675
119.	Trip Switch Assembly (See Parts 39 and 48 in Radio Service Bulletin 402)	
119A	Reject Switch (Record Changer)	35-2555
120.	Phono Reproducer Plug (Part of 64)	
121.	Phono Reproducer Socket (Record Changer)	217-1396
122.	Photo Electric Reproducer (See Bulletin 402 for Mounting Parts)	35-2519
122A	Photo Electric Lamp	34-2478
122B	Photo Electric Cell	318-2676
123.	Phono Input Transformer	32-8196
123A	Microphone Input (Part of 123)	
124.	Resistor (10 ohms) (Mounted on Tuning Unit)	33-010439
125.	Electrolytic Condenser (25 mfd, 300 volts)	30-2532
126.	Field Coil (Replace Speaker)	36-1553-4
127.	Electrolytic Condenser (18 mfd, 475 volts)	30-2519
128.	Bias Resistor (140 ohms)	33-3415
128A	Bias Resistor (5 ohms) (Part of 128)	
129.	Power Transformer (115 volts, 6 cycles)	32-8186
130	Resistor (10 ohms—Cabinet Pilot Lamp)	33-010439
131.	Dial Lamps	34-2064
	Cabinet Pilot Lamp	34-2210
	Socket Assembly (Dial Lamp)	38-9494
	Socket Assembly (Dial Lamp)	38-9695
	Socket Assembly (Cab. Pilot Lamp)	76-1335
132.	Condenser (.05-.05 mfd, 400 volts)	3615-08G
132A.	Condenser (.05 mfd) (Part of Power Cord)	L-3176
133.	Volume Control Motor and Gears Complete	35-1227
	Drive Belt	27-9770
134	Electrolytic Condenser (45 mfd)	30-2499
135	Remote Control Stepper Unit Complete	76-1344
	Mtg. Grommet	27-4596
	Rubber Cushion (Bottom)	27-4789
	Rubber Liner (end-stepper cover)	27-4800
	Rubber Liner (top-stepper cover)	27-4801
	Rubber Liner (side-stepper cover)	54-6041
	Mtg. Sleeve	38-3806
	Cover Assembly	76-1160
135A.	R. F. Choke	32-3276
135B.	R. F. Choke	32-3276
135C	Resistor (100 ohms)	33-110339
135D.	Condenser (.05 mfd)	30-4444
135E.	Condenser (.05 mfd)	30-4444
135F	Contact Wafer	39-9761
135G	Stepper Relay Coil (Holding Coil)	38-9821
135G.	Stepper Relay Coil (Stepping Coil)	38-9823
135H.	Stepper Rotary Switch	42-1620
	Insulating Washer	27-7397
	Insulating Washer	27-8040
	Mtg. Stud	28-6992
	Mtg. Screw	W-153FA3
	Contact Arm	38-9764
	Drive Arm	38-9763
135J	Stepper Muting Switch	38-9760
	Spark Filter Complete, Consisting of 135A, 135C, 135D, 135E	38-9898
136	Resistor (150 ohms)	33-3362
137	Electrolytic Condenser (16 mfd, 150 volts)	30-2387
	Mtg. Nut	W-1743
138	Condenser (.05 mfd, 400 volts)	30-4518
139	Condenser (.05 mfd, 400 volts)	30-4518
140	Condenser (.05 mfd, 400 volts)	30-4518
141.	Condenser (.5 mfd, 200 volts)	30-4580
142	Resistor (3900 ohms)	33-239339
143	Resistor (10,000 ohms)	33-412339
144	Resistor (47000 ohms)	33-347339
145	Condenser (.1 mfd, 200 volts)	30-4586
146	Resistor (680,000 ohms)	33-468339
147	Condenser (.02 mfd, 400 volts)	30-4516
148	Spark Filter Choke Coil	38-9281
149.	Third Control Amplifier Transformer	32-3275
	Mtg. Nut	W-1949
149A	Secondary Compensator (Iron Core) (Part of 149)	
149B	Condenser (Part of 149)	
149C	Primary Compensator (Iron Core) (Part of 149)	
149J	Condenser (Part of 149)	
150	Condenser (.05 mfd, 400 volts)	30-4518
151	Resistor (2700 ohms)	33-227339
152	Resistor (150,000 ohms)	33-415339
153	Resistor (1 megohm)	33-510339
154	Condenser (.05 mfd, 400 volts)	30-4518
155	Condenser (.05 mfd, 200 volts)	30-4519
156.	Resistor (1.5 megohms)	33-515339
157	Second Control Amplifier Transformer	32-3800
	Mtg. Nut	W-1949
157A	Secondary Compensator (Iron Core)	
157B	Condenser (Part of 157)	
158	Condenser (.05 mfd, 400 volts)	30-4518
159	Electrolytic Condenser (3 mfd, 400 volts)	30-2522
160	Resistor (15,000 ohms)	33-315339
161	Resistor (330 ohms)	33-133339
162	Condenser (.05 mfd, 200 volts)	30-4519
163.	First Control Amplifier Transformer	32-3799
	Mtg. Nut	W-1949
163A	Secondary Compensator (Iron Core) (Part of 163)	
163H	Condenser (Part of 163)	
164	Second Inductor Loop	76-1159
	Mtg. Screw	W-2087
164A	Terminal Panel	38-6533
165	Compensator (Secondary Inductor)	
166	Mica Condenser (172 mmfd—Secondary Inductor)	
167	Primary Inductor	32-3097
168	Mica Condenser (200 mmfd)	30-1115
169	Compensator	31-6266
170	Pulser Unit Complete	39-9704
171	Condenser (.05 mfd)	30-4519
172	Resistor (500 ohms)	33-150339
173	Remote Control Battery Pack	41-8023
	Bezel	56-1240
	Dial Tuning Disc	27-4792
	Dial Cap	27-4793
	Finger Stop	27-4794
	Screw	W-2139
	Spacer	27-4795
	Socket (Tube)	27-6179
	Cable (Battery)	41-3447
	Miscellaneous Parts—Model 42-1016, Code 121	
	Automatic Record Changer and Tone Arm (See Bulletin 402 for Complete Replacement Parts on this Record Changer)	35-1286
	Bezel (Cabinet)	40-8682
	Mtg. Screw	W-2073FA9
	Cabinet	10516-C
	Jewel (Pilot Light)	27-4777
	Cable (Shielded—7C6 to Phono Switch)	L-3269
	Cable (Shielded—Vol. Cont. to 7C6 Tube)	L-3270
	Cable (Shielded—Vol. Cont. to Phono Switch)	L-3271
	Cable (Shielded—I.F. to Phono Switch	L-3272
	Control Drum (Tuning)	54-4119
	Control Drum (Volume)	54-4151
	Control Drum (Base and Treble)	54-4149
	Washer (Between Controls)	54-3976
	Key Washer (Between Controls)	56-1029FA3
	Spring Washer (Volume Drum)	56-1385
	Spring Washer (Tuning Drum)	56-1659
	Dial Scale	27-5760
	Clamp	56-1034FA3
	Knob (Push-buttons)	54-4144
	Remote Control Unit	45-2910
	Rubber Grommet (Chassis Mtg.)	27-4571
	Rubber Grommet (Tuning Unit Mtg.)	3915
	Rubber Grommet (Tuning Unit Mtg.)	3914
	Rubber Corner (Chassis)	54-4040
	Screw (Chassis Mtg.)	W-1345FA3
	Spring (Bin Light)	28-3991
	Sleeve (Tuning Unit Mtg.)	28-2257
	Shield (2A4G)	28-2726
	Shield Base (2A4G)	28-2725
	Socket (Loktal Tubes—Control Amp.)	27-6158
	Mtg. Eyelet	W-1489
	Socket (Loktal Tubes—Radio)	27-6177
	Socket (37 Tube)	27-6167
	Socket (Output and Rectifier Tubes)	27-6172
	Socket (Test)	27-6180
	Tab Kit (Stations)	40-6674
	Tab Cover	27-5771
	Tab (Remote)	27-5772
	Tab (Broadcast)	27-5773
	Tab (SW-1)	27-5774
	Tab (SW-2)	27-5775
	Tab (FM)	27-5776
	Tab (Television)	27-5730
	Washer Chassis Mtg.	28-5114FA3

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MODELS 42-1012, 42-1013, CODE 121

Condenser (5X) 15 mmfd. shown on diagram and not indicated in the parts list is Part No. 60-015157.

Condenser (7X) 10 mmfd. shown on diagram and not indicated in the parts list is Part No. 60-010157.

If the loop aerial (Brdcst & S.W.) 3 is removed from the cabinet for replacement or repairs, it should be remounted with the side of the loop having the red or red and white lead toward the rear of the cabinet. This is necessary to increase the stability at the low frequency end of the broadcast band and to reduce whistles.

Beginning with chassis marked run 2, the power transformer (107) was changed from Part No. 32-8204 to 32-8226.

MODEL 42-1015, CODE 121

Beginning with chassis marked run 2, a filter circuit was added to the 6L6G output tubes to reduce hum. This circuit consists of condenser (89) .1 mfd., 200 volts, Part No. 30-4586, and resistor (90), 100,000 ohms, Part No. 33-410154. This change is shown on the schematic diagram in the Service Bulletin. A few early production models do not have this change.

Beginning with run 3 condenser (62) was changed from a .006 mfd., 400 volts, Part No. 30-4591 to .05 mfd., 400 volts, Part No. 40-4518. A few early production models do not have this change.

To avoid coupling the broadcast loop and the set wiring on Model 42-1015, it is necessary that the loop be mounted in the cabinet with the terminal having the red, or red-white lead towards the rear of the cabinet. The loop lead mentioned is connected to #2 terminal on the loop terminal on the rear of the chassis.

MODEL 42-1016, CODE 121

To obtain additional audio bass frequency response the condensers in the treble tone control circuit were changed and parts added. These changes were made on two different production run numbers, Run 3 and Run 4. Chassis with Run 4 change is final. These changes are as follows:

RUN 3 TONE CONTROL CHANGE

Schematic No.	Description	Original Part No.	Run 3 Part No.
(96)	Condenser	(30-4623) (.004 mfd.)	(30-4591) (.006 mfd.)
(96A)	Condenser	(30-4591) (006 mfd.)	(30-4572) (.01 mfd.)
(97)	Condenser	(30-4622) (.002 mfd.)	(30-4582) (.003 mfd.)

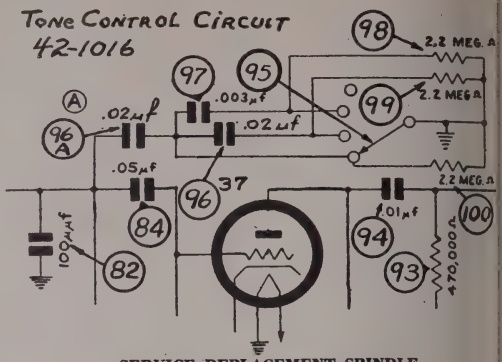
RUN 4 TONE CONTROL CHANGE

See diagram

Remove (96) condenser, Part No. 30-4591, and replace with a .02 mfd. 400 volt, Part No. 30-4516 condenser.

Remove condenser (96A) .01 mfd., Part No. 30-4572, from its present location and connect a wire from switch contact to terminal panel lug. Change value of 96A to a .02 mfd., 400 volt Part No. 30-4516 condenser and reconnect from the plate contact of the XXFM tube socket to the No. 6 contact of 6L6G tube (Dummy Lug).

Remove the wire from the grid contact of the 37 tube socket which comes from the treble tone control wiring panel. Reconnect this wire to No. 6 contact (Dummy Lug) of the 6L6G tube socket next to the XXFM tube. Connect a 10 mfd., 25 volt condenser Part No. 30-2500 from the cathode of the 7C6 tube to ground.



SERVICE REPLACEMENT SPINDLE KIT FOR 1942 RECORD CHANGERS

Because of material shortage it is not possible to supply the early type spindle with the large bushing as used on record changer 35-1258. A replacement kit is available making it possible to substitute the spindle and other associated parts as used in the later changers. The following is the installation procedure.

Remove positioning bracket from cam gear mounting bracket No. 32A and replace screw.

Remove old spindle assembly.

Remove two screws that hold No. 32A to U bracket.

Unhook spring from U bracket to cam lever.

Remove solenoid bracket and solenoid plunger bracket mounting screws.

Remove U bracket by drilling out the four rivets that hold it in place at base plate.

Mount new U bracket to base plate.

Screw eccentric washer on U bracket.

Replace screws holding No. 32A to U bracket.

Replace spring to U bracket and cam lever.

Mount new spindle assembly, Part No. 318-2839, with pin in slot in U bracket.

Locate clutch lever fork between washers on spindle assembly.

Replace solenoid bracket and solenoid core bracket screws.

Adjust changer for correct performance.

Spindle Kit for Standard Changers (Kit Part No. 45-2963)

1 part 318-1400 U Bracket
1 part 318-2839 Spindle Assembly
1 part 318-2838 Turntable
4 part W-136 Rd. Hd. Steel Mach. Screws
4 part W-661 Steel Hex. Nuts
4 part W-223 Shakeproof Lockwashers
1 part 217-1406 Fibre Washer
1 part 217-1407 Curved Washer
1 part 218-1525 Lockwasher
1 part 218-1504 Nut

Spindle Kit for Deluxe Changers (Kit Part No. 45-2964)

1 part 218-1400 U Bracket
1 part 35-2606 Spindle
1 part 35-2611 Turntable
1 part 218-1403 Spring
1 part 218-1406 Washer
1 part 218-1405 Washer
1 part 218-1401 Clutch
1 part 218-1500 Sleeve
1 part 218-1501 Pin
4 part W-136 Rd. Hd. Steel Mach. Screws
4 part W-661 Steel Hex Nuts
4 part W-223 Shakeproof Lockwashers
1 part 217-1406 Fibre Washer
1 part 217-1407 Curved Washer
1 part 218-1525 Lockwasher
1 part 218-1504 Nut

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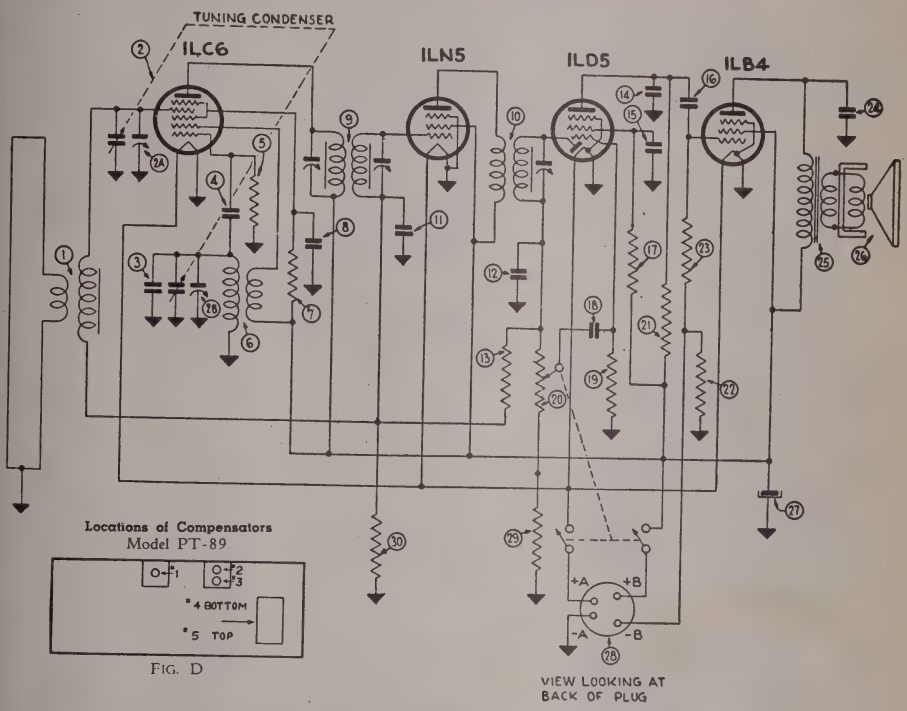
INTERMEDIATE FREQUENCY: 455 K. C.

BATTERY: Model PT-89 requires one Philco Portable "A" and "B" Pack P-89. To install the battery, slide the latch on the end of the cabinet and open the cabinet.

Observe the arrangement of the pins on the plug of the battery cable and the corresponding holes in the socket of the battery, so you will be sure to insert them correctly. Insert the plug into the battery socket facing the chassis. Place carboard spacer between battery and chassis. Close cabinet and lock latch.

PHILCO TUBES USED: 1-1LC6, 1st Detector and Oscillator; 1-1LN5, I. F. Amplifier; 1-LD6, 2nd Detector, A. F. Amplifier and Automatic Volume Control; and 1-1LB4, Power Output.



Locations of Compensators
Model PT-89

FIG. D

VIEW LOOKING AT BACK OF PLUG

Replacement Parts — Philco Transitone Model PT-89

SCHEM. No.	DESCRIPTION	PART No.
	Antenna Transformer	32-3458
	Tuning Condenser	31-2476
	Mica Condenser (10 mmf.)	60-010157
	Mica Condenser (100 mmf.)	60-110157
	Resistor (220,000 ohms, ¼ watt)	33-422154
	Oscillator Transformer	32-3518
	Resistor (33,000 ohms, ¼ watt)	33-333154
	Tubular Condenser (.01 mf., 400 v.)	30-4572
	1st I. F. Transformer	32-3472
	2nd I. F. Transformer	32-3473
	Tubular Condenser (.05 mf., 200 v.)	30-4519
	Mica Condenser (250 mmf.)	60-125157
	Resistor (10 megs., ¼ watt)	33-610154
	Mica Condenser (100 mmf.)	60-110157
	Tubular Condenser (.05 mf. 200 v.)	30-4519
16	Tubular Condenser (.004 mf., 400 v.)	30-4578
17	Resistor (2.2 megs., ¼ watt)	33-522154
18	Tubular Condenser (.004 mf., 400 v.)	30-4578
19	Resistor (4.7 megs., ¼ watt)	33-547154
20	Volume Control (1 meg.)	33-5410
21	Resistor (1 meg., ¼ watt)	33-510154
22	Resistor (470 ohms, ½ watt)	33-147336
23	Resistor (4.7 megs., ¼ watt)	33-547154
24	Mica Condenser (2200 mmf.)	60-222154
25	Output Transformer	32-3114
26	Speaker	36-1517
	Cone Assem. (for Spkr. 36-1517-2)	36-4132
27	Electrolytic Cond. (10mf., 150v.)	30-2396
28	Battery Cable	41-3545
29	Resistor 6800 ohms, ½ watt)	33-268344
30	Resistor (4.7 megs., ¼ watt)	33-547154

MISCELLANEOUS PARTS

DESCRIPTION	PART No.
Cabinet	10482A
Clip (Coil Mtg.)	28-5002
Clamp (Loop)	56-1809
Knob	27-4997
Knob	27-4999
Spring (Battery)	56-1807
Socket	27-6138
Washer (Chassis Mtg.)	W-152
Screw (Chassis Mtg.)	W-881

Operations in Order	Signal Generator: Output Connections to Receiver	Signal Generator: Dial Setting	Receiver: Dial Setting	Receiver: Control Setting	Receiver: Adjust Compensators	Special Instruction
1.	See Paragraph on Signal Generator above	455 K.C.	540 K.C.	Vol. Max.	#1, #2, #3	
2.	Use Loop on Generator as above	1500 K.C.	1500 K.C.	Vol. Max.	#4 Osc. #5 Aerial	Note A

NOTE A: DIAL CALIBRATION: Before adjusting the R.F. padders the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the tuning condenser in the closed position (maximum capacity) set the dial pointer on the small dot below 550 K.C.

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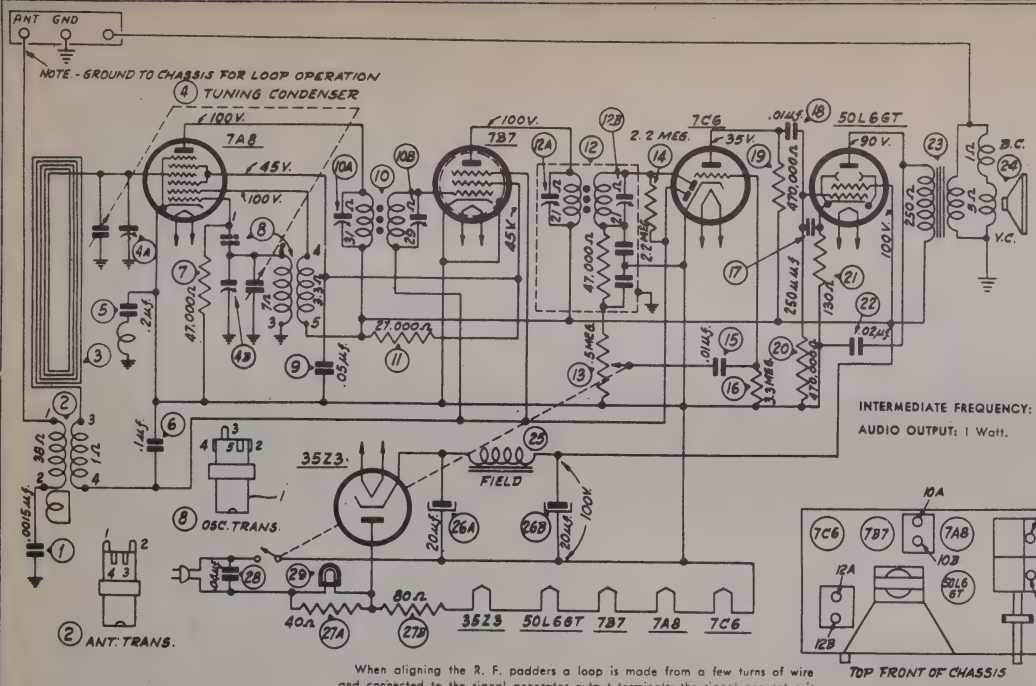
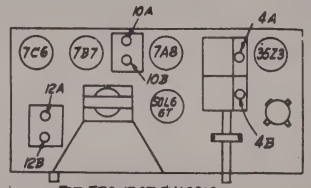


INTERMEDIATE FREQUENCY: 455 K.C.

AUDIO OUTPUT: 1 Watt.



TOP FRONT OF CHASSIS

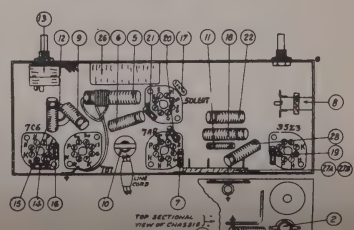
SCHEM. No.	DESCRIPTION	PART No.
1.	Condenser (.0015 mfd., 200 volts)	30-4621
2.	Aerial Transformer	32-3394
	Mtg. Clip	28-5002
3.	Loop Aerial (PT-91 part of Cabinet)	
	Loop Aerial (PT-92 part of Cabinet)	
	Loop Aerial (PT-93)	32-3835
	Loop Aerial (PT-94, PT-95)	32-3855
4.	Tuning Cond.	31-2539
	Dial Pointer	54-4043
	Mtg. Grommet	27-4610
	Spring (Drive cord)	28-8954
	Tuning Shaft	31-2518
	Mtg. Nut	W-2157
	Drive Cord	31-2541
5.	Condenser & Choke Assembly	76-1161
6.	Condenser (.1 mfd., 200 volts)	30-4586
7.	Resistor (47,000 ohms)	33-347339
8.	Oscillator Transformer	32-3686
	Mtg. Clip	28-5002
9.	Condenser (.05 mfd., 200 volts)	30-4519
10.	1st I. F. Transformer	32-3673
	Mtg. Nut	W-624
11.	Resistor (27,000 ohms)	33-327339
12.	2nd I. F. Transformer	32-3674
	Mtg. Nut	W-624
13.	Volume Control	33-5429
	Nut	W-1949
14.	Resistor (2.2 megohms)	33-522339
15.	Cond. (.01 mfd., 400 volts)	30-4572
16.	Resistor (3.3 megohms)	33-533339
17.	Mica Cond. (250 mmfd.)	60-125157
18.	Cond. (.01 mfd., 400 volts)	30-4572
19.	Resistor (470,000 ohms)	33-447339
20.	Resistor (470,000 ohms)	33-447339
21.	Resistor (130 ohms)	33-113336
22.	Condenser (.02 mfd., 400 volts)	30-4516
23.	Output Transformer	32-8164
24.	Cone Assembly (for Speaker 36-1542-9)	36-4204
25.	Field Coil (Replace Speaker 36-1542)	
26A.	Electrolytic Condenser (20-20 mfd.)	30-2382
26B.	Electrolytic Condenser (20 mfd.) part of 26A	
	Clamp	56-1346
27.	Resistor (40-80 ohms)	33-3408
28.	Cond. (.04 mfd., 400 volts)	30-4119
29.	Pilot Lamp	34-2068
	Socket Assembly	76-1280

POWER SUPPLY: 115 Volts, A.C. or D.C.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the signal generator is then placed close to the loop of the radio.

The receiver can be adjusted in the cabinet or removed from the cabinet.

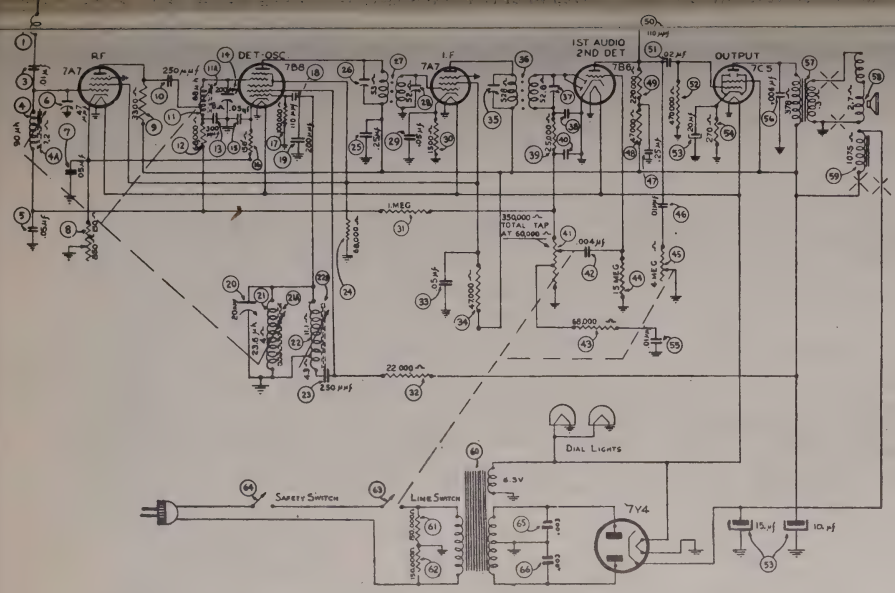
Operations in Order	SIGNAL GENERATOR		RECEIVER			SPECIAL INSTRUCTIONS
	Output Connections to Receiver	Dial Setting	Dial Setting	Control Setting	Adjust Compensators in Order	
1.	Ant. Section of tuning	455 K.C.	540 K.C. Tuning Cond. Closed	Vol. Max.	12A, 12B, 10A, 10B	Note B
2.	Loop see above instructions	1500 K.C.	1500 K.C.	Vol. Max.	4B	Note A
3.	Loop see above instructions	1500 K.C.	1500 K.C.	Vol. Max.	4A	

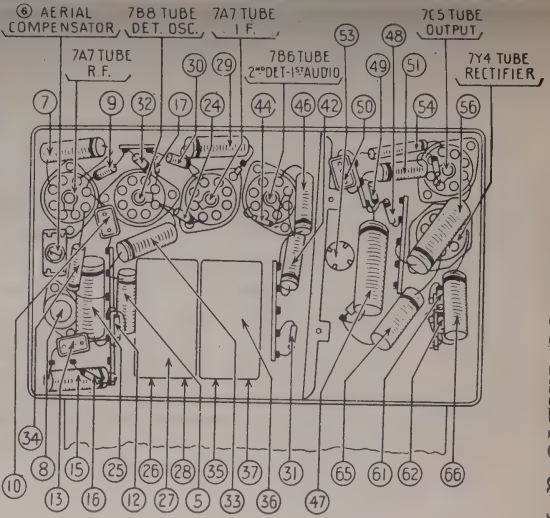


NOTE A: DIAL POINTER CALIBRATION — In order to adjust the receiver correctly, the pointer must be adjusted to track properly with the tuning condenser. To do this, turn the tuning condenser to the maximum capacity (plates fully meshed). With the condenser in this position, set the tuning pointer on the small dot below 550 K.C.

Note B — Before adjusting compensators, turn down (10B) to tight position. Then adjust the compensators for maximum output in the following order: 12A, 12B, 10A and 10B.

LOCATIONS OF PARTS UNDERSIDE OF CHASSIS





PARTS LIST MODEL A361

No.	Description	Part No.
(1)	Antenna Choke	65-0168
(3)	Condenser (.01 mfd.)	61-0114
(4)	Antenna Transformer	65-0443
(4a)	Antenna Transformer Core	57-2334
(5)	Condenser (.05 mfd.)	61-0111
(6)	Antenna Padder	63-0079
(7)	Condenser (.05 mfd.)	61-0111
(8)	Sensitivity Control	67-0025
(9)	Resistor (3300 ohms)	33-233334
(10)	Condenser (250 mmfd.)	60-125157
(11)	R. F. Transformer	65-0444
(11a)	R. F. Transformer Core	57-2334
(12)	Resistor (68,000 ohms)	33-368154
(13)	Condenser (300 mmfd.)	60-130127
(14)	R. F. Padder	63-0080
(15)	Condenser (.05 mfd.)	61-0111
(16)	Resistor (150 ohms)	33-115336
(17)	Resistor (100,000 ohms)	33-410154
(18)	Condenser (110 mmfd.)	60-110157
(19)	Condenser (280 mmfd.)	61-0043
(20)	Oscillator Padder	63-0082
(21)	Oscillator Transformer	65-0463
(21a)	Oscillator Trans. Core	57-2633
(22)	Oscillator Tracking Trans.	65-0441
(22a)	Osc. Tracking Trans. Core	57-2325
(23)	Condenser (250 mmfd.)	60-125157
(24)	Resistor (68,000 ohms)	33-368334
(25)	Condenser (.25 mfd.)	61-0125
(26)	Padder (Pri. 1st I. F. Trans.)	
(27)	First I. F. Transformer	65-0460
(28)	Padder (Sec. 1st I. F. Trans.)	
(29)	Condenser (.05 mfd.)	61-0101
(30)	Resistor (1500 ohms)	33-215334
(31)	Resistor (1 megohm)	33-510154
(32)	Resistor (22,000 ohms)	33-322339
(33)	Condenser (.05 mfd.)	61-0101
(34)	Resistor (47,000 ohms)	33-347434
(35)	Padder (Pri. 2nd I. F. Trans.)	
(36)	Second I. F. Transformer	65-0461
(37)	Padder (Sec. 2nd I. F. Trans.)	
(38)	Condenser	Part of (36)
(39)	Resistor (25,000 ohms)	33-325154
(40)	Condenser	Part of (36)
(41)	Volume Control (350,000 ohms)	67-0060
(42)	Condenser (.004 mfd.)	61-0179
(43)	Resistor (68,000 ohms)	33-368154
(44)	Resistor (15 megohms)	33-615154
(45)	Tone Control (4 megohms)	67-0066
(46)	Condenser (.01 mfd.)	61-0176
(47)	Condenser (.25 mfd.)	61-0125
(48)	Resistor (47,000 ohms)	33-347334
(49)	Resistor (220,000 ohms)	33-422334
(50)	Condenser (110 mmfd.)	60-110157
(51)	Condenser (.02 mfd.)	61-0116
(52)	Resistor (470,000 ohms)	33-447154
(53)	Filter Condenser (10-15-20 mfd.)	61-0089
(54)	Resistor (270 ohms)	33-127436
(55)	Condenser (.01 mfd.)	61-0114
(56)	Condenser (.006 mfd.)	61-0115
(57)	Output Transformer	65-0454
(58)	Cone & Voice Coil	91-0240
(59)	Field Coil	Not Replaceable
(60)	Power Transformer	32-8055
(61)	Resistor (150,000 ohms)	33-415154
(62)	Resistor (150,000 ohms)	33-415154
(63)	On-Off Switch	Part of (41)
(64)	Safety Switch	85-0152
(65)	Condenser (.003)	61-0115
(66)	Condenser (.003)	61-0115
	Speaker	73-0074
	Speaker Cable	41-3610
	Tube Socket	27-6151
	Tuning & Volume Knob	77-1081
	Tone Knob	57-2812FC83
	Knob Backing Ring	57-2813FC83
	Pointer	56-2076
	Pointer Drive Cord	55-1590
	Pointer Drive Cord Spring	28-8953
	Tuning Unit Drive Cord	55-1589
	Pulley	54-4045
	Pulley Stud (Single)	28-6886FA3
	Pulley Stud (Double)	56-6120FA3
	Safety Switch Cover	56-2532
	On-Off Switch Cover	56-2351FA3
	Power Cord	L-3199
	Antenna Lead Assembly	77-1265
	Pilot Lamp	34-2064
	Diffusion Screen	55-1591
	Diffusion Screen Springs	57-2783
	Tuning Unit Complete	77-1247
	Nut (Speaker Mtg.)	W-124FA3
	Fibre Washers (Speaker Mtg.)	27-7467
	Screw (Set Mtg.)	W-1345FA3
	Washer (Set Mtg.)	28-5114FA3
	Nut (Vol. Control Mtg.)	W-684FA3
	Lockwasher (Vol. Control Mtg.)	W-1624FE7

IF PEAK 265 KC

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EQUIPMENT — 077 or 070 Philco Signal generator, 027 Philco Vacuum tube voltmeter and set tester or audio output meter, 45-2610 Padding screw driver.

GENERAL — VACUUM TUBE VOLTMETER. The model 027 Vacuum tube voltmeter is an extremely sensitive and accurate test instrument and is recommended for use when aligning and adjusting radios. Connect the negative (—) terminal of the Vacuum Tube Voltmeter to the high side (ungrounded side) of the volume control. Connect the positive (+) terminal to the radio housing. Connect the "AC" cord to a 110 volt AC socket. Press the VTVM button and the 10 volt button. Turn the "Set Zero Ohms — VTVM" control clockwise until a click is heard. Allow the tubes to heat up for a few minutes. Short the 150 meg. VTVM terminals and adjust the "Set Zero Ohms VTVM" control until the meter reads zero on the 0-10 range scale (green scale). The needle will deflect from right to left.

AUDIO OUTPUT METER. If an audio output meter is used, connect the leads across the voice coil of the speaker. Use the 0-10 volt scale.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the meter. The signal in the speaker should be audible but not loud.

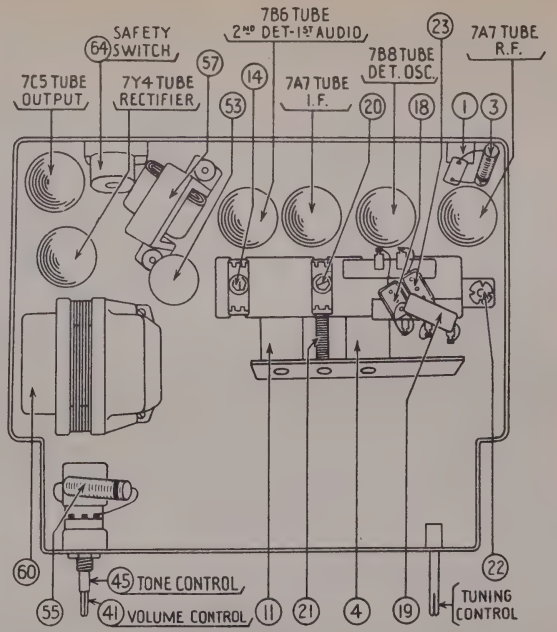
The shielding on the generator output lead must be connected to the Radio housing.

Make all adjustments for maximum reading on the meter.

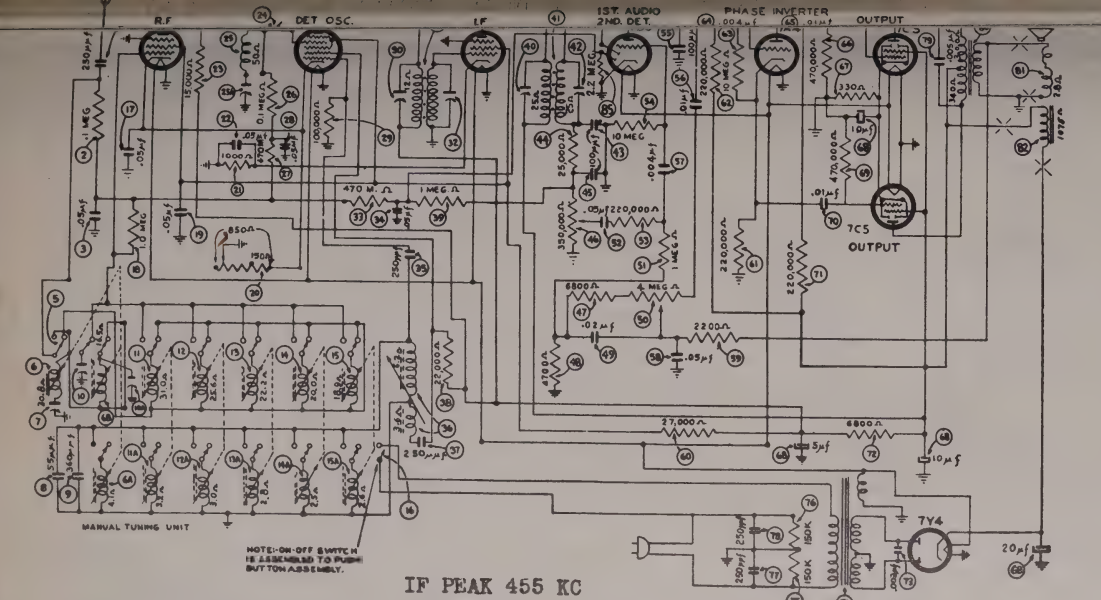
NOTE 1 — Connect a 15 mmfd. condenser across the output terminals of the signal generator and a 30 mmfd. condenser in series between the signal generator and the output lead.

NOTE 2 — Turn the tuning control clockwise as far as it will go.

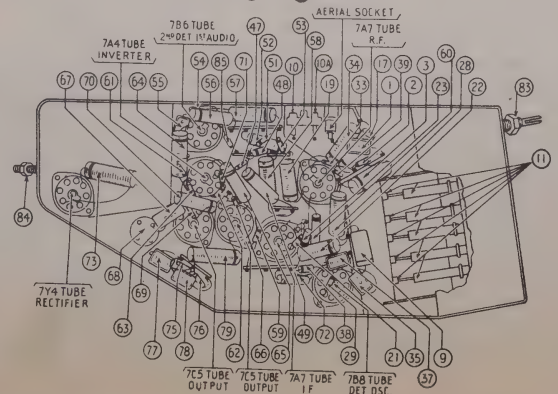
NOTE 3 — Rock the tuning control while adjusting the low frequency screw. Tune the control to the signal and adjust the screw for maximum output. Rotate the tuning control back and forth slightly for maximum output. Then readjust the screw for maximum output. Repeat this procedure until no further improvement can be obtained.



	SIGNAL GENERATOR		RECEIVER		
	FREQUENCY	CONNECTION	DIAL SETTING	DUMMY CAPACITY	ADJUST PADDER
1	265 K.C.	To Ant. Receptacle on Radio	Note 2	.1 Mfd.	(35) (37) (26) (28) (35) (37) (26) (28)
2	1600 K.C.	To Ant. Receptacle on Radio	1600 K.C.	See Note 1	(20)
3	1400 K.C.	To Ant. Receptacle on Radio	1400 K.C.	See Note 1	(6) (14)
4	590 K.C.	To Ant. Receptacle on Radio	590 K.C.	See Note 1	(22) Note 3
5	1600 K.C.	To Ant. Receptacle on Radio	1600 K.C.	See Note 1	(20)
6	1400 K.C.	To Ant. Receptacle on Radio			



IF PEAK 455 KC



PARTS LIST MODEL A801

No.	Description	Part No.
(1)	Condenser (250 mmfd.)	60-125157
(2)	Resistor (100,000 ohms)	...33-410154
(3)	Condenser (.05 mfd.)	...61-0111
(5)	Push Button Switch	85-0127
(6)	Inductive Tuning Unit	...77-0962
(6a)	Inductive Tuning Unit	Part of (6)
(6b)	Inductive Tuning Unit	Part of (6)
(7)	Image Padder	63-0069
(8)	Condenser (55 mmfd.)	..61-0149
(9)	Condenser (360 mmfd.)	.61-0157
(10)	Antenna Padder (P.B.)	.77-0788
(10a)	Antenna Padder (Manual)	.....Part of 10
(11)	P.B. Sw. & Coil Assy.	...77-0943
(11a)	P.B. Sw. & Coil Assy.	Part of (11)
(12)	P.B. Sw. & Coil Assy.	Part of (11)
(12a)	P.B. Sw. & Coil Assy.	Part of (11)
(13)	P.B. Sw. & Coil Assy.	Part of (11)
(13a)	P.B. Sw. & Coil Assy.	Part of (11)
(14)	P.B. Sw. & Coil Assy.	Part of (11)
(14a)	P.B. Sw. & Coil Assy.	Part of (11)
(15)	P.B. Sw. & Coil Assy.	Part of (11)
(15a)	P.B. Sw. & Coil Assy.	Part of (11)
(16)	On-Off Switch	.....Part of (5)
(17)	Condenser (.05 mfd.)	...61-0101
(18)	Resistor (1 megohm)	..33-510154
(19)	Condenser (.05 mfd.)	...61-0111
(20)	Sensitivity Control (850 ohms)	67-0025
(21)	Resistor (1000 ohms)	33-210334
(22)	Condenser (.05 mfd.)	...61-0101
(23)	Resistor(15,000 ohms)	33-315334
(24)	Padder	.....Part of (25)
(25)	R. F. Transformer Assy.	32-3881
(25a)	Padder	.....Part of (25)
(26)	Resistor	.....Part of (25)
(27)	Resistor (470,000 ohms).	33-447339
(28)	Condenser (.05 mfd.)	...61 0101
(29)	Resistor (100,000 ohms)	...33-410154
(30)	Padder (Pri. 1st I. F. Trans.)	
(31)	First I. F. Transformer	.65-0365
(32)	Padder (Sec. 1st I. F. Trans.)	
(33)	Resistor (470,000 ohms).	33-447339
(34)	Condenser (.05 mfd.)	...61-0101
(35)	Condenser (250 mmfd.)	60-125157
(36)	Oscillator Shunt Coil	...65-0440
(37)	Condenser (250 mmfd.)	60-125157
(38)	Resistor(22,000 ohms)	33-322334
(39)	Resistor (1 megohm)	.33-510154
(40)	Padder (Pri. 2nd I. F. Trans.)	
(41)	Second I. F. Transformer	65-0366
(42)	Padder (Sec. 2nd I. F. Trans.)	
(43)	Condenser (100 mmfd.)	....Part of (41)
	Condenser (350,000 ohms)	67-0040
(47)	Resistor (6800 ohms)	.33-268154
(48)	Resistor (4700 ohms)	.33-247334
(49)	Condenser (.02 mfd.)	..61-0154
(50)	Tone Control (4 megohms)	....Part of (46)
(51)	Resistor (1 megohm)	.33-510154
(52)	Condenser (.05 mfd.)	...61-0101
(53)	Resistor (250,000 ohms)	...33-422154
(54)	Resistor (10 megohms)	33-610154
(55)	Condenser (100 mmfd.)	60-110157
(56)	Condenser (.01 mfd.)	...61-0120
(57)	Condenser (.004 mfd.)	..61-0179
(58)	Condenser (.05 mfd.)	...61-0101
(59)	Resistor (2200 ohms)	33-222154
(60)	Resistor(27,000 ohms)	33-327434
(61)	Resistor (220,000 ohms)	...33-422154
(62)	Resistor (220,000 ohms)	...33-422154
(63)	Resistor (10 megohms)	33-610154
(64)	Condenser (.004 mfd.)	..61-0179
(65)	Condenser (.01 mfd.)	...61-0120
(66)	Resistor (470,000 ohms)	...33-447154
(67)	Resistor (330 ohms)	. 33-133431
(68)	Filter Condenser (5-10-10-20 mfd.)	...61-0150
(69)	Resistor (470,000 ohms)	...33-447154
(70)	Condenser (.01 mfd.)	...61-0169
(71)	Resistor (220,000 ohms)	...33-422154
(72)	Resistor (6800 ohms)	33-268434
(73)	Condenser (.003 mmfd.)	61-0115
(74)	Power Transformer	32-8231
*(75)	Resistor (150,000 ohms)	...33-415154
*(76)	Resistor (150,000 ohms)	...33-415154
*(77)	Condenser(250 mmfd.)	60-125157
*(78)	Condenser(250 mmfd.)	60-125157
(79)	Condenser (.005 mfd.)	..61-0105
(80)	Output Transformer	65-0363
(81)	Cone and Voice Coil	91-0228
(82)	Field Coil	.....Not Replaceable
(83)	Nut (Set Mtg.—Top)	97-0091FA3
(84)	Nut (Set Mtg.—Bottom)	W55FA3
(85)	Resistor (2.2 megohm)	.33-522339
	Speaker	36-1580
	Speaker Cable	41-3665
	A. C. Cord	.....L-3199
	Pointer	55-1366
	Pointer Drive Cord	55-1408
	Tone Drive Cord	55-1409
	Tuning & Volume Knob	
	White	77-0984
	Cream	77-1014
	Gray	77-0654
	Mottled	77-1015

(PARTS LIST CONTINUED)

*NOTE: On later production sets, Nos. 75 and 76 (150,000 ohms) were removed and Nos 77 and 78 were changed to 6000 mmf, Part No. 60-260159.

John F. Rider

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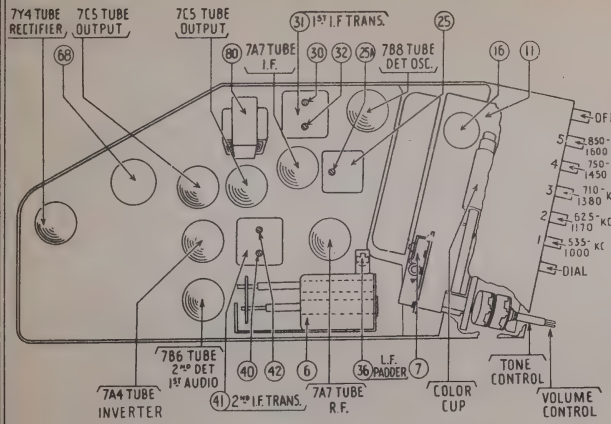


EQUIPMENT — 077, or 177 Philco Signal generator, 027 Philco Vacuum tube voltmeter and set tester or audio output meter, 45-2610 Padding screw driver.

GENERAL — VACUUM TUBE VOLTMETER. The model 027 Vacuum tube voltmeter is an extremely sensitive and accurate test instrument and is recommended for use when aligning and adjusting radios. Connect the negative (—) terminal of the Vacuum Tube Voltmeter to the high side (ungrounded side) of the volume control. Connect the positive (+) terminal to the radio housing. Connect the "AC" cord to a 110 volt AC socket. Press the VTVM button and the 10 volt button. Turn the "Set Zero Ohms — VTVM" control clockwise until a click is heard. Allow the tubes to heat up for a few minutes. Short the 150 meg. VTVM terminals and adjust the "Set Zero Ohms — VTVM" control until the meter reads zero on the 0-10 range scale (green scale). The needle will deflect from right to left.

AUDIO OUTPUT METER. If an audio output meter is used, connect the leads across the voice coil of the speaker. Use the 0-30 volt scale.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

	SIGNAL GENERATOR		RECEIVER		
	FREQUENCY	CONNECTION	DIAL SETTING	DUMMY CAPACITY	ADJUST PADDER
1			PRESS PUSH BUTTON MARKED "DIAL"		
2	455 K.C.	To Ant. Receptacle on Radio	Note 2	.1 Mfd.	⑫ ㊵ ㉜ ㉚ ㊷ ㊵ ㉜ ㉚
3	455 K.C.	To Ant. Receptacle on Radio	Note 2	.1 Mfd.	(25a) Minimum
4	1500 K.C.	To Ant. Receptacle on Radio	1500 K.C.	See Note 1	(10a)
5	580 K.C.	To Ant. Receptacle on Radio	580 K.C.	See Note 1	㊱ Note 3
6	1500 K.C.	To Ant. Receptacle on Radio	1500 K.C.	See Note 1	(10a)
7	580 K.C.	To Ant. Receptacle on Radio	580 K.C.	See Note 1	㊱ Note 3

Make all adjustments for maximum reading on the meter.

NOTE 1 — Connect a 30 mmfd. condenser in series between the signal generator and the output lead.

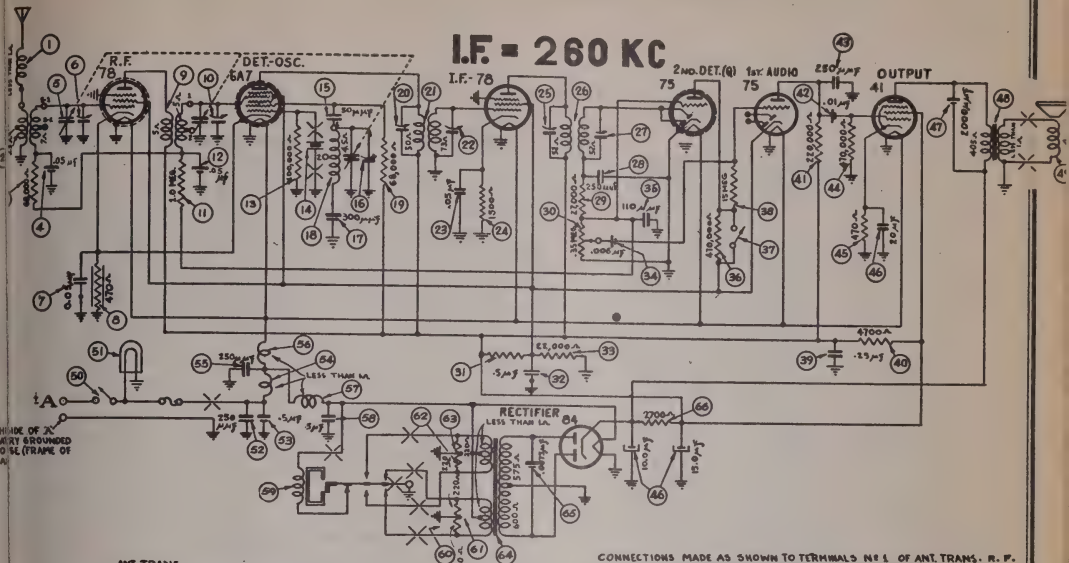
NOTE 2 — Turn the tuning control clockwise as far as

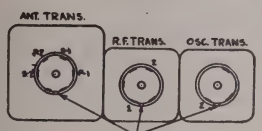
NOTE 3 — Rock the tuning control while adjusting the low frequency screw. Tune the control to the signal and adjust the screw for maximum output. Rotate the tuning control back and forth slightly for maximum output. Then readjust the screw for maximum output. Repeat this pro-

Description	Part No.
Tone Knob	
White	77-1036
Cream	77-1052
Gray	77-1011
Mottled	77-1054
Nut Cover	
White	77-1057
Cream	77-1053
Gray	77-1012
Mottled	77-1055
Push Button (Off)	
White	77-0973
Cream	77-0976
Gray	77-0924
Mottled	77-0979
Push Button (Dial)	
White	77-0974
Cream	77-0977
Gray	77-0925
Mottled	77-0980
Push Button (Plain)	
White	77-0972
Cream	77-0975
Gray	77-0926
Mottled	77-0978
Core & Key Assembly (1, 2, 3, 4, 5)	77-0916
Core & Key Assembly (Dial, Off)	77-0923
Wiring Side Cover	57-2186FC64
Tube Side Cover	318-2916
On-Off Switch Cover	76-1343FA3
Padder Cover Plate	57-1692FC64
Dial Lamp Socket	76-1295
Dial Lamp	34-2064
Washer (Set Mtg.)	W417FA3
Nut (Speaker Mtg.)	W-124FA3
Fibre Washer	27-7467
Wing Nut (Tube Side Cover Mtg.)	97-0142FA26
Antenna	77-1256
Power Transformer Mtg. Bracket	56-2533FA3
Tone Drive Cord Anchor Spring	57-1701FA38
Color Cup Spring	57-1693
Dial	55-1371
Dial Mounting Springs	57-2218FE11
Diffusion Screen	55-1428
Diffusion Screen Bracket	57-2242FA3
Housing Front	57-2211FC64
Bezel	57-2292FA8
Bezel Screws	97-0213FA40
Tuning Shaft	57-2217FA3
Loktal Socket	27-6151
Color Cup Assembly	77-0667
Tone Indicator Drum	77-0914

MODEL 822P

PHILCO RADIO & TELEVISION CORP.



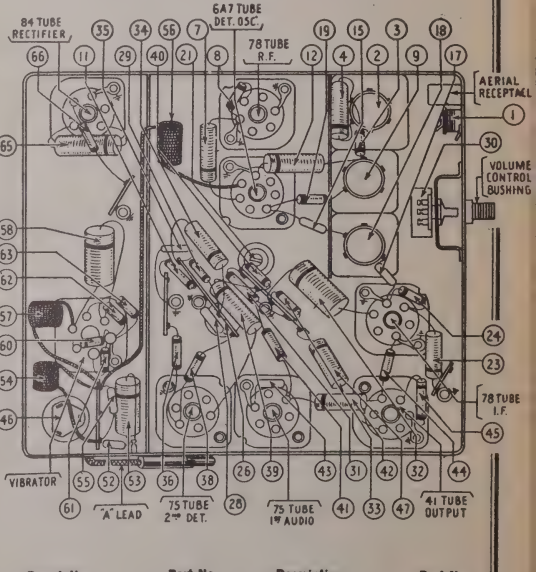


CONNECTIONS MADE AS SHOWN TO TERMINALS No 1 OF ANT. TRANS. R. F. OSC. TRANS. FOR OPERATION ON FREQUENCY BAND 1350-2550 KC. FOR OPERATION ON FREQUENCY BAND 2300-3600 KC. TRANSFER CONNECTIONS FROM TERMINALS No 1 TO No 2

MODEL 822P IS A FIXED-FREQUENCY, CRYSTAL-CONTROLLED RECEIVER COVERING 1550 TO 3600 KC.

PARTS LIST — MODEL 822P

No.	Description	Part No.
(1	Antenna Choke	38-9005
(2	Antenna Transformer	65-0348
(3	Resistor (68,000 ohms)	33-368154
(4	Condenser (.5 Mfd.)	61-0111
(5	Tuning Condenser	31-2031
(6	Antenna Padder (on Tun. Cond.)	
(7	Condenser (.05 Mfd.)	61-0101
(8	Resistor (470 ohms)	33-147336
(9	R. F. Transformer	32-2596
(10	R. F. Padder (on Tun. Cond.)	
(11	Resistor (1,000,000 ohms)	33-510154
(12	Condenser (.05 Mfd.)	61-0101
(13	Resistor (100,000 ohms)	33-410154
(14	Crystal 1875 K.C.	45-2101
	Frequencies 1596-1610-1626 K.C.	
	1908 K.C. Crystal	45-2194
	Frequencies 1630-1634-1642 1658-1666 K.C.	
	1953 K.C. Crystal	45-2195
	Frequencies 1674-1682-1690 1698-1706-1712 K.C.	
	2658 K.C. Crystal	45-2196
	Frequencies 2382-2390-2406 2414 K.C.	
	2696 K.C. Crystal	45-2197
	Frequencies 2422-2430-2442 2450 K.C.	
	2734 K.C. Crystal	45-2198
	Frequencies 2458-2466-2474 2482-2490 K.C.	
	3000 K.C. Crystal	45-2230
	Frequency 2726 K.C.	
	2618 K.C. Crystal	45-2231
	Frequencies 2342-2350-2358 2366-2374 K.C.	
	2578 K.C. Crystal	45-2251
	Frequencies 2310-2318-2326 2334 K.C.	
	2300 K.C. Crystal	45-2663
	Frequency 2238 K.C.	
(15	Condenser (50 Mmfd.)	60-050137
(16	Oscillator Padder (on Tun. Cond.)	
(17	Condenser (300 Mmfd.)	60-130337
(18	Oscillator Transformer	32-2597
(19	Resistor (68,000 ohms)	33-368334
(20	Padder (Prl. 1st I. F. Trans.)	
(21	First I. F. Transformer	32-2026
(22)	Padder (Sec. 1st I. F. Trans.)	
(23)	Condenser (.05 Mfd.)	61-0101
(24)	Resistor (1500 ohms)	33-215334
(25)	Padder (Prl. 2nd I. F. Trans.)	
(26)	Second I. F. Transformer	32-2027
(27)	Padder (Sec. 2nd I. F. Trans.)	
(28)	Condenser (250 Mmfd.)	60-125157
(29)	Resistor (27,000 ohms)	33-327154
(30)	Volume Control (350,000 ohms)	67-0055
(31)	Resistor (47,000 ohms)	33-347434
(32)	Condenser (.5 Mfd.)	61-0134
(33)	Resistor (22,000 ohms)	33-322334
(34)	Condenser (6000 Mmfd.)	61-0103
(35)	Condenser (110 Mmfd.)	60-111137
(36)	Resistor (470,000 ohms)	33-447334
(37)	"Q" Switch	42-1140
(38)	Resistor (15,000,000 ohms)	33-615154
(39)	Condenser (.25 Mfd.)	61-0125
(40)	Resistor (4700 ohms)	33-247334
(41)	Resistor (220,000 ohms)	33-422334
(42)	Condenser (.01 Mfd.)	61-0120
(43)	Condenser (250 Mmfd.)	60-125157
(44)	Resistor (470,000 ohms)	33-447154
(45)	Resistor (470 ohms)	33-147436
(46)	Filter Condenser (10-15-20 Mfd.)	61-0089
(47)	Condenser (2000 Mmfd.)	61-0123
(48)	Output Transformer	32-7831
(49)	Cone and Voice Coil	91-0218
(50)	On-Off Switch	42-1188
(51)	Pilot Lamp	34-2040
(52)	Condenser (250 Mmfd.)	60-125157
(53)	Condenser (.5 Mfd.)	61-0106
(54)	"A" Choke	32-1644
(55)	Condenser (250 Mmfd.)	60-125157
(56)	Filament Choke	32-2657
(57)	Vibrator Choke	65-0204
(58)	Condenser (.5 Mfd.)	61-0106
(59)	Vibrator	41-3300
(60)	Resistor (220 ohms)	33-122334
(61)	Resistor (220 ohms)	33-122334
(62)	Resistor (220 ohms)	33-122334
(63)	Resistor (220 ohms)	33-122334
(64)	Power Transformer	32-7820
(65)	Condenser (7500 Mmfd.)	61-0127
(66)	Resistor (2700 ohms)	33-227434
	Housing	38-8777
	Wiring Side Cover	38-8768



Description	Part No.
Volume Knob	27-4208
Mounting Plate	28-4650FA3
Aerial Lead	41-3191
Radio Housing	38-8777
Fuse	7227
Fuse Insulator	27-7729
Crystal Mtg. Clamp	38-8792
Crystal Mtg. Clamp Screw	W1974FA3
Crystal Socket	38-8790
Cover Mtg. Screw	W2212FA4

Description	Part No.
Tube Side Cover	38-8788
5 Prong Socket	27-6035
6 Prong Socket	27-6036
7 Prong Socket	27-6037
Speaker Unit	73-0063-3
Speaker Clamp	28-3131FA3
Speaker Mounting Nut	W124FA3
Speaker Mounting Screw	W1582FA4
Grille Assembly	36-3910
Control	42-5591
Volume Shaft	28-8620

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PADDING PROCEDURE — MODEL 822P

The Receivers, when used with the proper crystals, can be adjusted for any specified frequency between 1550 K. C. and 3600 K. C. Different crystals are used to obtain these frequencies. The crystal frequency, however, is no indication of the Receiver frequency adjustment.

FREQ. OF CRYSTAL	RECEIVER FREQ.	PART No. CRYSTAL
1875 K. C.	1596-1610-1626 K. C.	45-2101
1908 K. C.	1630-1634-1642	
	1650-1658-1666 K. C.	45-2194
1953 K. C.	1674-1683-1690	
	1698-1706-1712 K. C.	45-2195
2578 K. C.	2310-2318-2326-2334 K. C.	45-2251
2618 K. C.	2342-2350-2358-2366-2374 K. C.	45-2231
2658 K. C.	2382-2390-2398	
	2406-2414 K. C.	45-2196
2696 K. C.	2422-2430-2442	
	2450 K. C.	45-2197
2734 K. C.	2458-2466-2474	
	2482-2490 K. C.	45-2198
3000 K. C.	2726 K. C.	45-2230
3360 K. C.	3105 K. C.	45-2496

The I. F. stages can be tuned to any frequency between 242 K. C. and 278 K. C.

The I. F. frequency used in each Receiver is the difference between the frequency of the crystal in the Receiver and the frequency of the transmitter, i.e., the transmitter frequency is 2422 K. C., the crystal used is 2696 K. C., the difference is 274 K. C., which is the frequency to which the I. F. amplifier must be tuned.

The Receiver must be padded while warm and repadded after it has been operated for several hours.

The Receiver "Q" switch must be in the off position, cutting out the carrier relay circuit.

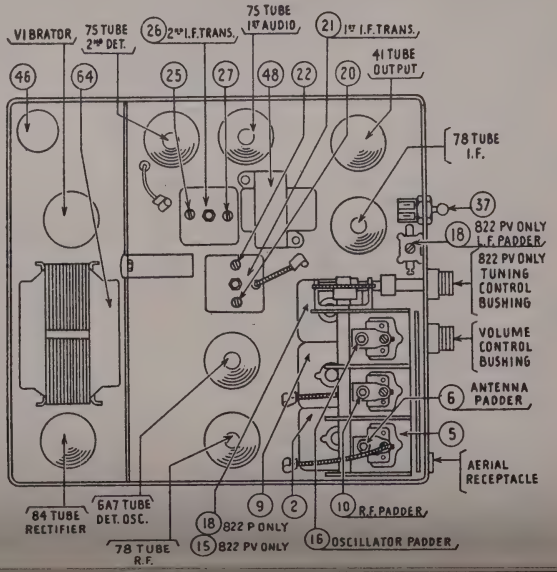
I. F. STAGES — The signal generator must be set exactly to the predetermined frequency and the generator lead connected to the grid cap of the 6A7 detector oscillator tube in series with a 0.5 mfd. condenser. Adjust padders ㉙, ㉒, ㉕ and ㉗ on the first and second I. F. transformers for maximum reading on the output meter.

R. F. STAGE — Tune the signal generator to the frequency of the transmitter and connect the output of the signal generator to the grid cap of the R. F. tube in series with a 0.5 mfd. condenser. Turn the tuning condenser to the input frequency and adjust padders ⑯ and ⑩ for maximum reading on the output meter. Notice the position of the padders. They should be out as far as possible, yet with sufficient tension to keep them firmly in place. If the padders are too tight, if the padders are too loose, turn the tuning condenser plates out of mesh slightly and repad ⑯ and ⑩. Repeat these adjustments until the correct padding settings are obtained.

Special attention must be given to the adjustment of the oscillator padder ⑯, which should be backed off the peak slightly to obtain stable crystal operation.

ANTENNA STAGE — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle on the Receiver in series with a 55 mmfd. condenser and set the signal generator to the frequency of the transmitter. Adjust padders ⑥, ㉗, ㉕, ㉒ and ⑳ for maximum reading on the output meter.

DO NOT OPEN THE CRYSTAL HOLDER. If for any reason whatever it has been opened, the crystal plates should be very carefully cleaned with carbon tetrachloride. After cleaning, the crystal must not be touched by the fingers. Use a clean cloth for handling.



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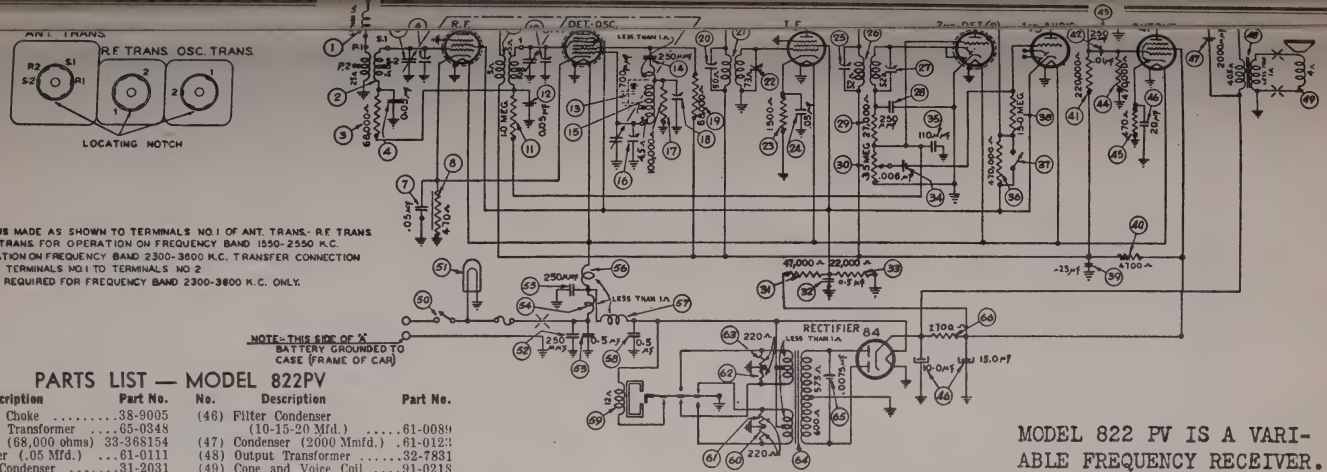
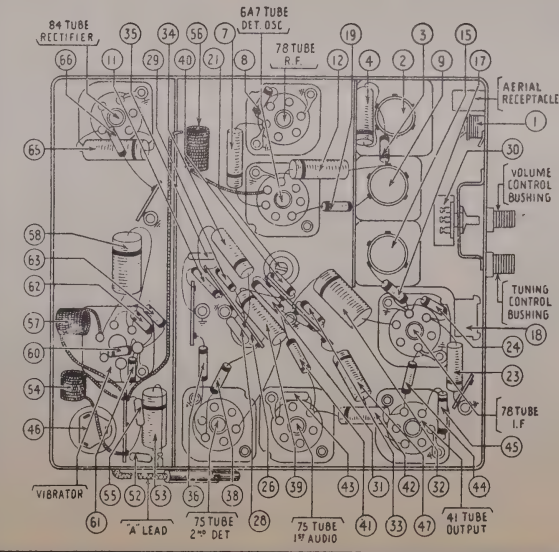

ANT. TRANS.
R.F. TRANS.
OSC. TRANS.
LOCATING NOTCH
R.F.
DET.-OSC.
I.F.
2nd DET.(6)
1st AUDIO
OUTPUT
RECTIFIER 84
CONNECTIONS MADE AS SHOWN TO TERMINALS NO.1 OF ANT. TRANS.- R.F. TRANS. OSC. TRANS. FOR OPERATION ON FREQUENCY BAND 1550-2550 K.C.
FOR OPERATION ON FREQUENCY BAND 2300-3600 K.C. TRANSFER CONNECTION FROM TERMINALS NO.1 TO TERMINALS NO.2
* THIS COND. REQUIRED FOR FREQUENCY BAND 2300-3600 K.C. ONLY.
NOTE- THIS SIDE OF "A" BATTERY GROUNDED TO CASE (FRAME OF CAR)

PARTS LIST — MODEL 822PV

No.	Description	Part No.
(1)	Antenna Choke	38-9005
(2)	Antenna Transformer	65-0348
(3)	Resistor (68,000 ohms)	33-368154
(4)	Condenser (.05 Mfd.)	61-0111
(5)	Tuning Condenser	31-2031
(6)	Antenna Padder (on Tun. Cond.)	
(7)	Condenser (.05 Mfd.)	61-0101
(8)	Resistor (470 ohms)	33-147336
(9)	R. F. Transformer	32-2596
(10)	R. F. Padder (on Tun. Cond.)	
(11)	Resistor (1,000,000 ohms)	33-510154
(12)	Condenser (.05 Mfd.)	61-0101
(13)	Condenser (700 Mmfd.)	60-170134
(14)	Condenser (250 Mmfd.)	60-125157
(15)	Oscillator Transformer	32-2598
(16)	Oscillator Padder (on Tun. Cond.)	
(17)	Resistor (100,000 ohms)	33-410154
(18)	Low Frequency Padder	
(19)	Resistor (68,000 ohms)	33-368334
(20)	Padder (Pri. 1st I. F. Trans.)	
(21)	First I. F. Transformer	32-2026
(22)	Padder (Sec. 1st I. F. Trans.)	
(23)	Resistor (1500 ohms)	33-215334
(24)	Condenser (.05 Mfd.)	61-0101
(25)	Padder (Pri. 2nd I. F. Trans.)	
(26)	Second I. F. Transformer	32-2027
(27)	Padder (Sec. 2nd I. F. Trans.)	
(28)	Condenser (250 Mmfd.)	60-125157
(29)	Resistor (27,000 ohms)	33-327154
(30)	Volume Control (350,000 ohms)	67-0033
(31)	Resistor (47,000 ohms)	33-347434
(32)	Condenser (.5 Mfd.)	61-0134
(33)	Resistor (22,000 ohms)	33-322334
(34)	Condenser (6000 Mmfd.)	61-0103
(35)	Condenser (110 Mmfd.)	60-111137
(36)	Resistor (470,000 ohms)	33-447334
(37)	"Q" Switch	42-1140
(38)	Resistor (15,000,000 ohms)	33-615154
(39)	Condenser (.25 Mfd.)	61-0125
(40)	Resistor (4700 ohms)	33-247334
(41)	Resistor (220,000 ohms)	33-422334
(42)	Condenser (.01 Mfd.)	61-0120
(43)	Condenser (250 Mmfd.)	60-125157
(44)	Resistor (470,000 ohms)	33-447154
(45)	Resistor (470 ohms)	33-147436

No.	Description	Part No.
(46)	Filter Condenser (10-15-20 Mfd.)	61-0089
(47)	Condenser (2000 Mmfd.)	61-0123
(48)	Output Transformer	32-7831
(49)	Cone and Voice Coil	91-0218
(50)	On-Off Switch	42-1318
(51)	Pilot Lamp	34-2040
(52)	Condenser (250 Mmfd.)	60-125157
(53)	Condenser (.5 Mfd.)	61-0106
(54)	"A" Choke	32-1644
(55)	Condenser (250 Mmfd.)	60-125157
(56)	Filament Choke	32-2657
(57)	Vibrator Choke	65-0204
(58)	Condenser (.5 Mfd.)	61-0106
(59)	Vibrator	41-3300
(60)	Resistor (220 ohms)	33-122334
(61)	Resistor (220 ohms)	33-122334
(62)	Resistor (220 ohms)	33-122334
(63)	Resistor (220 ohms)	33-122334
(64)	Power Transformer	32-7820
(65)	Condenser (7500 Mmfd.)	61-0127
(66)	Resistor (2700 ohms)	33-227434
	Housing	38-8777
	Wiring Side Cover	38-8768
	Tube Side Cover	38-8788
	5 Prong Socket	27-6035
	6 Prong Socket	27-6036
	7 Prong Socket	27-6037
	Speaker Unit	78-0063-3
	Speaker Clamp	28-3131FA3
	Speaker Mounting Nut	W124FA3
	Speaker Mounting Screw	W1582FA4
	Grille Assembly	36-3010
	Control (Low Frequency)	42-5739
	Control (High Frequency)	42-5751
	Dial (Low Frequency)	42-5736
	Tuning and Volume Shaft	28-8740
	Tuning and Volume Knob	27-4521
	Mounting Plate	28-4650FA3
	Aerial Lead	41-3191
	Radio Housing	38-8777
	Fuse	7227
	Fuse Insulator	27-7720
	Crystal Mtg. Clamp	38-8792
	Crystal Mtg. Clamp Screw	W1074FA3
	Crystal Socket	38-8790
	Cover Mtg. Screw	W2212FA4



MODEL 822 PV IS A VARIABLE FREQUENCY RECEIVER. IT COVERS EITHER OF TWO RANGES: 1550 TO 2550 KC OR 2300 TO 3600 KC.

IF PEAK 260 KC

MODEL 822PV

PHILCO RADIO & TELEVISION CORP.

PADDING PROCEDURE — MODEL 822PV

OPERATION	SIGNAL GENERATOR		DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
	FREQUENCY	CONNECTION			
1	*260 K. C.	To Grid of 78 Tube—I. F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser Plates out of mesh as far as they will go	25 - 27
2	*260 K. C.	To Grid of 6A7 Tube	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser Plates out of mesh as far as they will go	20 - 22 25 - 27
	FOR FREQUENCIES BETWEEN 1550 K. C. AND 2550 K. C.				
3	*2550 K. C.	To Grid of 78 Tube—R. F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser Plates out of mesh as far as they will go	16 - 10
4	*1650 K. C.	To Grid of 78 Tube—R. F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser to 1650 K. C.	18 Note 1
5	*2550 K. C.	To Grid of 78 Tube—R. F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser Plates out of mesh as far as they will go	16 - 10
6	*2400 K. C.	Note 2	55 Mmfd. Condenser Note 2	Turn Tuning Condenser to 2400 K. C.	6
	FOR FREQUENCIES BETWEEN 2550 K. C. AND 3600 K. C.				
7	*3600 K. C.	To Grid of 78 Tube—R. F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser Plates out of mesh as far as they will go	16 - 10
8	*2400 K. C.	To Grid of 78 Tube—R. F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Set Tuning Condenser at 2400 K. C.	18 Note 1
9	*3600 K. C.	To Grid of 78 Tube—R. F. Stage	.1 Mfd. Condenser in Series with Generator Lead	No Antenna Connection Turn Tuning Condenser Plates out of mesh as far as they will go	16 - 10
10	*3400 K. C.	Note 2	55 Mmfd. Condenser Note 2	Set Tuning Condenser at 3400 K. C.	6

Adjust for maximum reading on the output meter.

NOTE 1 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then re-adjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 2 — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle on the Receiver in series with a 55 mmfd. condenser.

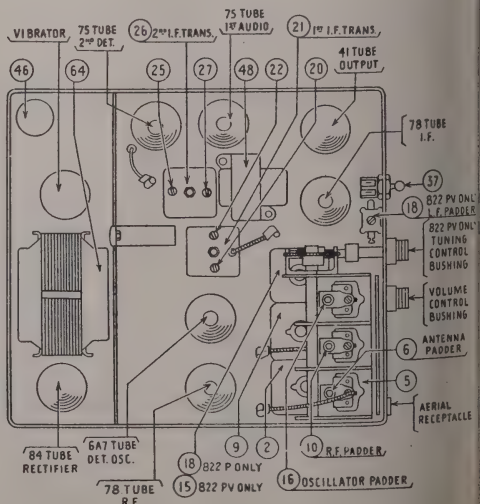
* The Receiver "Q" switch must be in the off position, cutting out the carrier relay circuit.

CONDENSER DRIVE The condenser worm drive gear ratio (Model 822PV) is 16:1. This eliminates practically all back lash and, due to the mechanism used, prevents the tuning condenser from detuning from vibration. This high gear ratio also makes accurate tuning much easier.

In the Model 822P, a self locking worm drive with a gear ratio of 48:1 permits accurate adjustment of the tuning condenser and eliminates the necessity of using any other locking device on the condenser.

CONTROL UNIT The control unit for Model 822PV is designed for installation on the bottom flange of the instrument board. It contains the "ON-OFF" switch and the volume and tuning control knobs. The calibrated scale is illuminated. The Model 822P fixed frequency Radio utilizes a single control knob, which is mounted on the instrument board. This controls the "ON-OFF" switch and the volume. No tuning device is required.

CONTROL SHAFTS, CONNECTIONS The volume control coupler and (in the case of the 822PV) the tuning control coupler, the "A" battery and the antenna connector, are located on one end of the housing. The shafts are the rapid coupling type with the locking gland nut at the Radio end. The "A" battery and the antenna connections are the quick, detachable, bayonet locking type, with the "A" fuse placed in the "A" lead.



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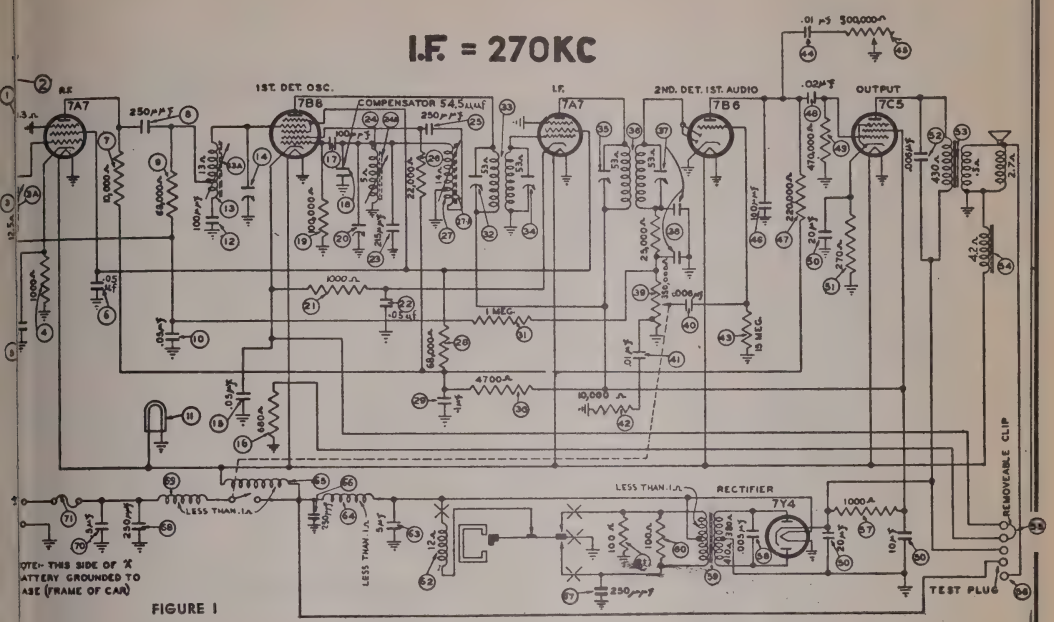
MODEL P-1830

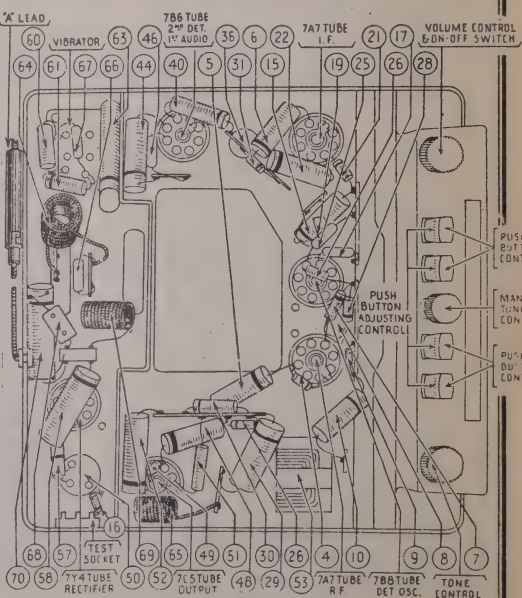
PHILCO RADIO & TELEVISION CORP.



PARTS LIST — P-1830

No.	Description	Part No.
(1	Antenna Choke	65-0378
(2	Aerial Compensator	63-0054
(3	Antenna Transformer	65-0349
(3	Antenna Transformer Adjusting Core	57-1541
(4	Resistor (1000 ohms)	33-210336
(5	Condenser (.05 Mfd.)	61-0101
(6	Condenser (.05 Mfd.)	61-0111
(7	Resistor (10,000 ohms)	33-310334
(8	Condenser (250 Mmfd.)	60-125157
(9	Resistor (68,000 ohms)	33-368154
(10	Condenser (.05 Mfd.)	61-0101
(11	Pilot Lamp	34-2064
(12	Condenser (100 Mmfd.)	60-110157
(13	R. F. Transformer	65-0359
(13	R. F. Transformer Adjusting Core	57-1541
(14	R. F. Padder	61-0055
(15	Condenser (.05 Mfd.)	61-0101
(16	Resistor (680 ohms)	33-168336
(17	Condenser (100 Mmfd.)	60-110157
(18	Condenser (54.5 Mmfd.)	61-0149
(19	Resistor (100,000 ohms)	33-410154
(20	Oscillator Padder	63-0052
(21	Resistor (1000 ohms)	33-210334
(22	Condenser (.05 Mfd.)	61-0111
(23	Condenser (215 Mmfd.)	61-0148
(24	Oscillator Transformer	65-0367
(24	Oscillator Transformer Adjusting Core	57-1542
(25	Condenser (250 Mmfd.)	60-125157
(26	Resistor (22,000 ohms)	33-322334
(27	Oscillator Tracking Transformer	65-0351
(27	Oscillator Tracking Transformer Adjusting Core	57-0996
(28	Resistor (68,000 ohms)	33-368434
(29	Condenser (.1 Mfd.)	61-0113
(30	Resistor (4700 ohms)	33-247434
(31	Resistor (1,000,000 ohms)	33-510154
(32	Padder (Pri. 1st I. F. Trans.)	
(33	First I. F. Transformer	65-0352
(34	Padder (Sec. 1st I. F. Trans.)	
(35	Padder (Pri. 2nd I. F. Trans.)	
(36	Second I. F. Transformer	65-0410
(37	Padder (Sec. 2nd I. F. Trans.)	
(38	Resistor (25,000 ohms)	33-325154
(39	Volume Control (350,000 ohms) & On-Off Switch	67-0047
(40	Condenser (6000 Mmfd.)	61-0155
(41	Condenser (.01 Mfd.)	61-0120
(42	Resistor (10,000 ohms)	33-310154

No.	Description	Part No.
(43)	Resistor (15,000,000 ohms)	33-615154
(44)	Condenser (.01 Mfd.)	61-0120
(45)	Tone Control (500,000 ohms)	67-0048
(46)	Condenser (100 Mmfd.)	60-110157
(47)	Resistor (220,000 ohms)	33-422334
(48)	Condenser (.02 Mfd.)	61-0108
(49)	Resistor (470,000 ohms)	33-447154
(50)	Filter Condenser (10-20-20 Mfd.)	61-0072
(51)	Resistor (270 ohms)	33-127436
(52)	Condenser (6000 Mmfd.)	61-0155
(53)	Output Transformer	65-0431
(54)	Field Coil (Not Replaceable)	
(55)	Test Link	55-1121
(56)	Test Socket	55-1078
(57)	Resistor (1000 ohms)	33-210434
(58)	Condenser (5000 Mmfd.)	61-0153
(59)	Power Transformer	65-0347
(60)	Resistor (100 ohms)	33-110434
(61)	Resistor (100 ohms)	33-110434
(62)	Vibrator	83-0026
(63)	Condenser (.5 Mfd.)	61-0137
(64)	Vibrator Choke	65-0151
(65)	Filament Choke	32-1604
(66)	Condenser (250 Mmfd.)	60-125157
(67)	Condenser (250 Mmfd.)	60-125157
(68)	Condenser (250 Mmfd.)	60-125157
(69)	"A" Choke	32-1644
(70)	Condenser (.5 Mfd.)	61-0137
(71)	Fuse	45-2559
	Speaker Unit	73-0062
	Replacement Cone	91-0166
	Speaker Cable	95-0161
	Speaker Gasket	55-1037
	Rubber Stop	55-1069
	Nut (Speaker Mtg.)	W124FA3
	Screw (Speaker Mtg.)	W1582FC51
	Speaker Cover	77-0862
	Tube Side Cover	57-1554FC51
	Vibrator Pad	55-1073
	Dial	55-1034
	Manual Knob	55-1297
	Manual Knob Sleeve	57-1623
	Push Button Knob Assy.	77-0613
	Volume & Tone Knob	77-0848
	Tuning Unit complete with Coils	77-0865
	Tuning Unit Only	77-0740
	Bezel	77-0854
	Antenna Connector	57-0591FA3
	Housing	77-0662FC51



Description	Part No.
Vibrator Socket	27-6153
Tube Socket	27-6151
Fuse Lead	77-0637
Interference Condenser	30-4007
Generator Condenser	30-4475
Distributor Resistor	33-1196
Hook Bolt	57-1560FA3
Wing Nut	W895FA3
R. F. Coil Spring	57-1538

Description	Part No.
R. F. Coil Spring Mtg. Screw	97-0126
Osc. Coil Stud	57-1417
Core Draw Bar Spring	57-1649
Latch Bar Spring	57-1650
P. B. Spring	57-1651
Miter Spring	57-1652
Pointer Spring	57-1653
Pointer & Cam Assy	77-0650

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OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	PUSH IN THE TUNING CONTROL KNOB UNTIL STATIONS CAN BE TUNED IN BY MANUAL TUNING				
2	270 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	㉖ ㉗ ㉜ ㉞ ㉖ ㉗ ㉜ ㉞
3	1600 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1600 K.C.	⑳
4	1360 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1360 K.C.	② ⑭ Note 4
5	590 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 590 K.C.	㉗ Note 3
6	1600 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1600 K.C.	⑳
7	1360 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1360 K.C.	② ⑭ Note 4
8	1200 to 1400 K.C.	Note 5	Note 5	Note 5	② Note 4

Make all adjustments for maximum reading on the meter.

NOTE 1 — Connect the aerial lead, Part No. 95-0111, to the aerial receptacle in the radio. Connect a 40 Mmfd. Condenser in series between the signal generator and the aerial lead.

NOTE 2 — Turn the tuning control clockwise as far as it will go.

NOTE 3 — Rock the tuning control while adjusting the low frequency screw. Tune the control to the signal and adjust the screw for maximum output. Rotate the tuning control back and forth slightly for maximum output. Then readjust the screw for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the aerial stage adjustment is made with the Radio installed in the car, the Radio aerial lead must be connected to the car aerial in the usual manner. Connect the signal generator output lead to a wire placed near the car aerial but not connected to it.

NOTE 5 — When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Remove the plug button on the end of the radio and adjust the aerial compensator ㊱ (see Figure 3) for maximum signal.

INSTRUCTIONS FOR SETTING UP THE AUTOMATIC TUNING BUTTONS

Turn on the radio and allow it to operate for twenty minutes or longer, if possible.

Press in any automatic button so that it remains engaged. Then tune in the station desired by turning the small wheel in the button. The station can be identified by the pointer, which indicates the frequency of the station in Kilocycles. The automatic buttons may be readjusted to any station within the range of the broadcast band. The automatic buttons may be readjusted to stations in any sequence desired. However, for convenience in remembering stations, it is recommended that the buttons be set up in the same order that the stations appear across the dial.

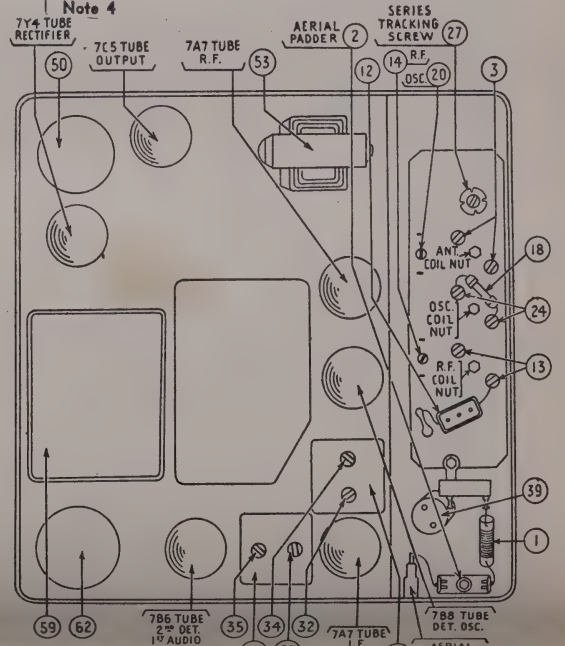
CAUTION — All adjustments must be carefully made so that reception can be received best when remote from the broadcasting station. Careless tuning off to one side even though the signal is heard, will result in distorted reception.

AUDIO OUTPUT METER. If an audio output meter is used, connect the leads across the voice coil of the speaker. Use the 0-30 volt scale.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

FIGURE 3



PHILCO RADIO & TELEVISION CORP. MODEL F-1840

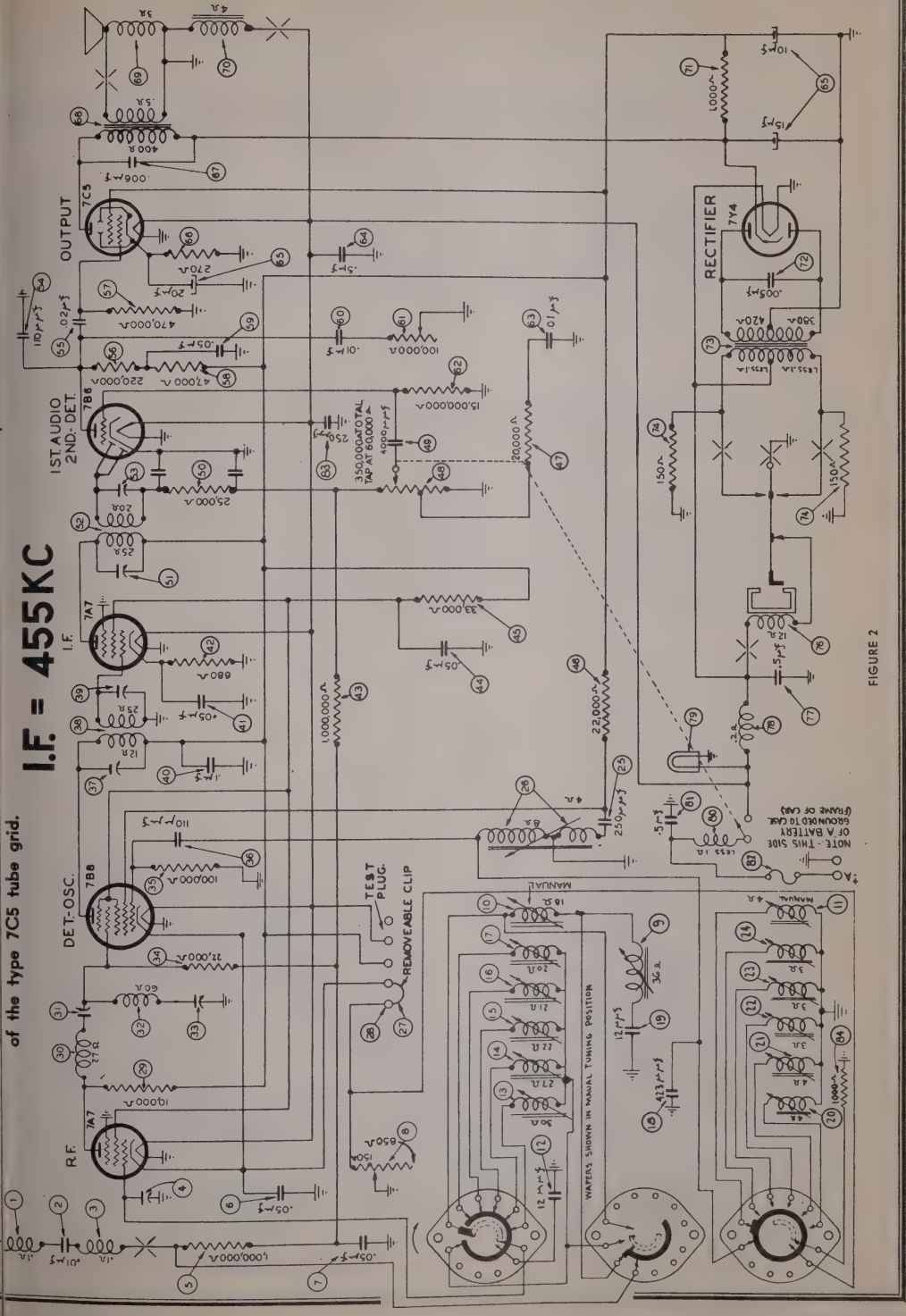


FIGURE 2

of the type 7C5 tube grid.

Run No. 4 — A resistor (390 ohms) Part No. 33-139334 has been added in series between the plates of

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Run No. 3 — A ground spring has been added on the sub-base to make contact with the speaker field coil pot, to reduce crackle.

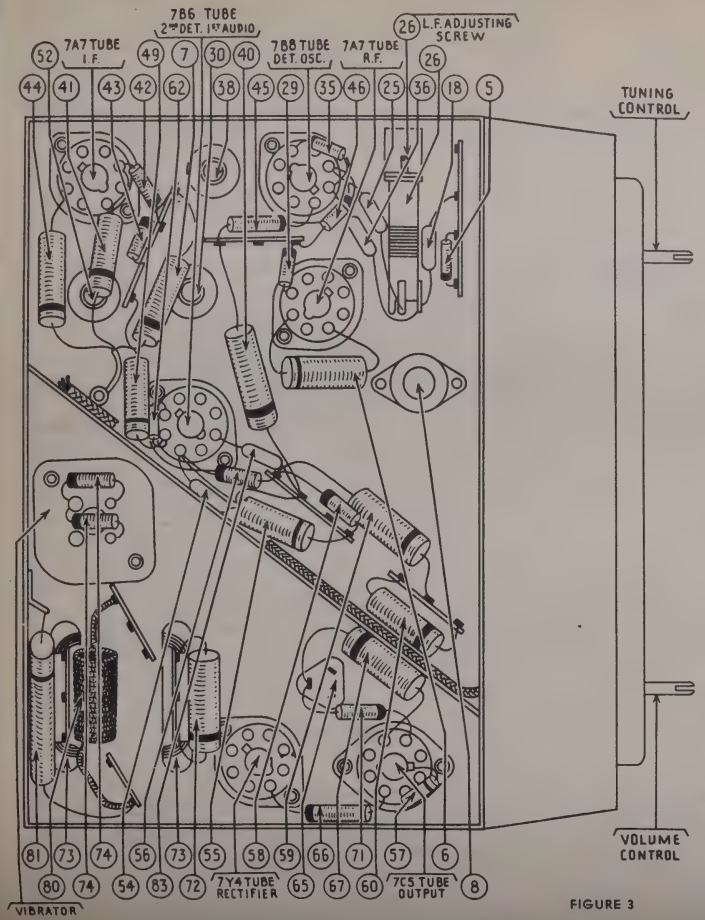

FIGURE 3

PARTS LIST — F-1840

No.	Description	Part No.
①	Antenna Choke	65-0102
②	Condenser (.01 Mfd.)	61-0114
③	Antenna Choke	30-2063
④	Aerial Compensator	63-0063
⑤	Resistor (1,000,000 ohms)	33-510154
⑥	Condenser (.05 Mfd.)	61-0111
⑦	Condenser (.05 Mfd.)	61-0101
⑧	Sensitivity Control	67-0025
⑨	Image Trap Coil	Part of ⑩
⑩	Inductive Tuning Unit	77-0701
⑪	Manual Tuning Oscillator Transformer	Part of ⑩
⑫	Condenser (12 Mmfd.)	60-012327
⑬	Push Button Coil Assembly	77-0706
⑭	Push Button Coil Assembly	Part of ⑬
⑮	Push Button Coil Assembly	Part of ⑬
⑯	Push Button Coil Assembly	Part of ⑬
⑰	Push Button Coil Assembly	Part of ⑬
⑱	Silver Mica Condenser (423 Mmfd.)	61-0066
⑲	Condenser (12 Mmfd.)	60-012327
⑳	Push Button Coil Assembly	Part of ⑬
㉑	Push Button Coil Assembly	Part of ⑬
㉒	Push Button Coil Assembly	Part of ⑬
㉓	Push Button Coil Assembly	Part of ⑬
㉔	Push Button Coil Assembly	Part of ⑬
㉕	Condenser (250 Mmfd.)	60-125157
㉖	Oscillator Tracking Coil	65-0388
㉗	Test Socket Link	57-1121
㉘	Test Socket	55-1104
㉙	Resistor (10,000 ohms)	33-310334
㉚	R. F. Transformer (Pri.)	65-0413
㉛	Padder	Part of ㉜
㉜	R. F. Transformer (Sec.)	Part of ㉜
㉝	Padder	Part of ㉜
㉞	Resistor (22,000 ohms)	33-322334
㉟	Resistor (100,000 ohms)	33-410154
㊱	Condenser (110 Mmfd.)	60-110157
㊲	Padder (Pri. 1st. I. F. Trans.)	
㊳	First I. F. Transformer	65-0386
㊴	Padder (Sec. 1st I. F. Trans.)	
㊵	Condenser (.1 Mfd.)	61-0113
㊶	Condenser (.05 Mfd.)	61-0101
㊷	Resistor (680 ohms)	33-168336
㊸	Resistor (1,000,000 ohms)	33-510154
㊹	Condenser (.05 Mfd.)	61-0101
㊺	Resistor (33,000 ohms)	33-333434
㊻	Resistor (22,000 ohms)	33-322334
㊼	Resistor (20,000 ohms)	33-320154
㊽	Volume Control (35,000 ohms) & On-Off Switch	67-0042
㊾	Condenser (4,000 Mmfd.)	61-0128
㊿	Resistor (25,000 ohms)	33-325154
(51)	Padder (Pri. 2nd I. F. Trans.)	
(52)	Second I. F. Transformer	65-0387
(53)	Padder (Sec. 2nd I. F. Trans.)	
(54)	Condenser (110 Mmfd.)	60-110157
(55)	Condenser (.02 Mfd.)	61-0116
(56)	Resistor (220,000 ohms)	33-422334
(57)	Resistor (470,000 ohms)	33-447154
(58)	Resistor (47,000 ohms)	33-347334
(59)	Condenser (.05 Mfd.)	61-0122
(60)	Condenser (.01 Mfd.)	61-0100
(61)	Tone Control (100,000 ohms)	85-0128
(62)	Resistor (15,000,000 ohms)	33-615154
(63)	Condenser (.01 Mfd.)	61-0110
(64)	Condenser (.5 Mfd.)	61-0106
(65)	Filter Condenser (10-15-20 Mfd.)	61-0089
(66)	Resistor (270 ohms)	33-127436
(67)	Condenser (6,000 Mmfd.)	61-0105
(68)	Output Transformer	65-0391
(69)	Replacement Cone (For Speaker 73-0054-2)	91-0166
(70)	Field Coil	Not Replaceable
(71)	Resistor (1,000 ohms)	33-210434
(72)	Condenser (5,000 Mmfd.)	61-0153
(73)	Power Transformer	65-0347N
(74)	Resistor (150 ohms)	33-115334
(75)	Vibrator	83-0026
(76)	Condenser (.5 Mfd.)	61-0137
(77)	Vibrator Choke	65-0398
(78)	Pilot Lamp	34-2064
(79)	"A" Choke	65-0037
(80)	Condenser (.5 Mfd.)	61-0137
(81)	Fuse	45-2559
(82)	Condenser (250 Mmfd.)	60-125157
(83)	Resistor (1,000 ohms)	33-210334
	Selector Switch Knob & Spring	318-2376
	Tuning & Volume Knob	77-0708
	Rubber Baffle Gasket	55-1154
	Speaker Cover Screws	W2212FA4
	Bezel	55-1140
	Dial	55-1143
	Bezel Spring	57-1769FA3
	Bezel Clip	57-1772FA3
	Tone Knob	57-1780FA8
	Tone Knob Spring	57-1937
	Drive Cord	55-1157
	Drive Cord Spring	57-1425FA3
	Pointer	57-1794
	Screws (Wiring Side Cover)	W2212FA4
	Wiring Side Cover	57-1718FC1
	Housing Assembly	318-2323FC1
	Speaker Cover	57-1717FC1
	Speaker Unit	73-0054
	Bolt (Speaker Mtg.)	W1582FA4
	Lockwasher (Speaker Mtg.)	W291FE7
	Nut (Speaker Mtg.)	W124FA3
	Loktal Socket	27-6151
	Vibrator Socket	27-6153
	Wafer Switch	77-0760
	Hook Bolt (Radio Mtg.)	97-0094FA3
	Wing Nut (Radio Mtg.)	97-0048FA3
	Gland Nut & Sleeve	77-0459
	Interference Condenser ("A") (Voltage Regulator)	61-0162
	Interference Condenser (Oil Gauge) (Dist.)	61-0163

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However when readjustments are required, the procedure given below must be followed in detail.

AUDIO OUTPUT METER. If an audio output meter is used, connect the leads across the voice coil of the speaker. Use the 0-30 volt scale.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

Make all adjustments for maximum reading on the meter.

NOTE 1 — Connect the aerial lead Part No. 95-0111, to the aerial receptacle in the radio. Connect a 20 Mmfd. Condenser in series between the signal generator and the aerial lead.

NOTE 2 — Turn the tuning control clockwise as far as it will go.

NOTE 3 — Rock the tuning control while adjusting the low frequency screw. Tune the control to the signal and adjust the screw for maximum output. Rotate the tuning control back and forth slightly for maximum output. Then readjust the screw for maximum output. Repeat this procedre until no further improvement is noticed.

NOTE 4 — When the aerial stage adjustment is made with the Radio installed in the car, the Radio aerial lead must be connected to the car aerial in the usual manner. Connect the signal generator output lead to a wire placed near the car aerial but not connected to it.

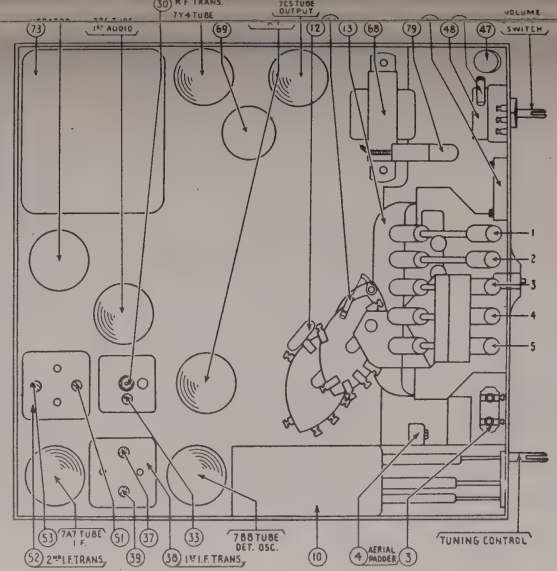

FIGURE 1

OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	TURN THE SELECTOR SWITCH KNOB TO "D" SO THAT STATIONS CAN BE TUNED IN BY MANUAL TUNING.				
2	455 K.C.	To Aerial Receptacle on Radio	.1 Mfd.	Note 2	57 59 51 53 57 59 51 53
3	455 K.C.	To Aerial Receptacle on Radio	.1 Mfd.	Note 2	59 Min.
4	1360 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1360 K.C.	4 Note 4
5	590 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 590 K.C.	26 Note 3
6	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1400 K.C.	4 Note 4
7	590 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 590 K.C.	26 Note 3

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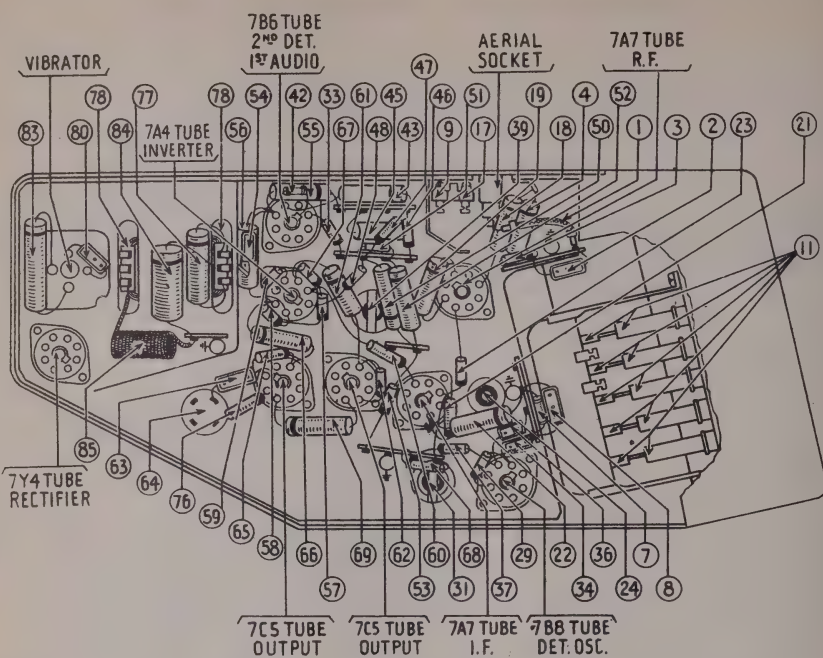
MODEL C-1908

PHILCO RADIO & TELEVISION CORP.



No.	Description	Part No.
(1)	Antenna Choke	65-0437
(2)	Condenser (250 mmfd.)	60-125157
(3)	Resistor (1,000,000 ohms)..	33-510154
(4)	Condenser (.05 mfd.)	61-0101
(5)	Push Button Switch	85-0127
(6)	Image Padder	63-0069
(7)	Condenser (55 mmfd.)	61-0149
(8)	Condenser (360 mmfd.)	61-0157
(9)	Antenna Padder (P.B.)	77-0748
(10)	Inductive Tuning Unit	77-0962
(10)a	Inductive Tuning Unit Part of	(10)
(10)b	Inductive Tuning Unit Part of	(10)
(11)	Push Button Switch and Coil Assembly	77-0943
(11)a	Push Button Switch and Coil Assembly	Part of (11)
(12)	Push Button Switch and Coil Assembly	Part of (11)
(12)a	Push Button Switch and Coil Assembly	Part of (11)
(13)	Push Button Switch and Coil Assembly	Part of (11)
(13)a	Push Button Switch and Coil Assembly	Part of (11)
(14)	Push Button Switch and Coil Assembly	Part of (11)
(14)a	Push Button Switch and Coil Assembly	Part of (11)
(15)	Push Button Switch and Coil Assembly	Part of (11)
(15)a	Push Button Switch and Coil Assembly	Part of (11)
(16)	On-Off Switch	Part of (5)
(17)	Antenna Padder (Manual)	Part of (9)
(18)	Condenser (.05 mfd.)	61-0101
(19)	Condenser (.05 mfd.)	61-0111
(20)	Sensitivity Control (350) ohms)	67-0025
(21)	Resistor (680 ohms)	33-168336
(22)	Condenser (.05 mfd.)	61-0101
(23)	Resistor (15,000 ohms)	33-315334
(24)	R. F. Transformer Assembly	65-0421
(25)	Padder	Part of (24)
(26)	Trap Coil	Part of (24)
(27)	Padder	Part of (24)
(28)	Resistor (100,000 ohms)	Part of (24)
(29)	Resistor (100,000 ohms)	33-410154
(30)	Padder (Pri 1st I. F. Trans.)	
(31)	First I. F. Transformer	65-0365
(32)	Padder (Sec. 1st I.F. Trans.)	
(33)	Resistor (1,000,000 ohms)	33-510154
(34)	Condenser (250 mmfd.)	60-125157
(35)	Oscillator Shunt Coil	65-0370
(36)	Condenser (250 mmfd.)	60-125157
(37)	Resistor (22,000 ohms)	33-322334
(38)	Padder (Pri 2nd I.F. Trans.)	
(39)	Second I.F. Transformer	65-0366
(40)	Padder (Sec. 2nd I.F. Trans.)	
(41)	Resistor (25,000 ohms)	33-325154
(42)	Resistor (10,000,000 ohms)	33-610154
(43)	Condenser (4000 mmfd.)	61-0179
(44)	Volume Control (350,000 ohms)	67-0040
(45)	Condenser (.05 mfd.)	61-0101
(46)	Resistor (220,000 ohms)	33-422154
(47)	Resistor (1,000,000 ohms)	33-510154
(48)	Resistor (6800 ohms)	33-268154
(49)	Tone Control (4,000,000 ohms)	Part of (44)
(50)	Condenser (.02) mfd.)	61-0154
(51)	Resistor (4700 ohms)	33-247334
(52)	Condenser (.05 mfd.)	61-0101
(53)	Resistor (2200 ohms)	33-222154
(54)	Condenser (100 mmfd.)	60-110157
(55)	Condenser (.01 mfd.)	61-0120
(56)	Condenser (4000 mmfd.)	61-0179
(57)	Resistor (220,000 ohms)	33-422154
(58)	Resistor (10,000,000 ohms)	33-610154
(59)	Resistor (220,000 ohms)	33-422154
(60)	Resistor (27,000 ohms)	33-327434
(61)	Condenser (.01 mfd.)	61-0120
(62)	Resistor (470,000 ohms)	33-447154
(63)	Resistor (330 ohms)	33-133438
(64)	Filter Condenser (5-10-10-20 mfd.)	61-0150
(65)	Resistor (470,000 ohms)	33-447154
(66)	Condenser (.01 mfd.)	61-0120
(67)	Resistor (220,000 ohms)	33-422154
(68)	Resistor (1000 ohms)	33-210438
(69)	Condenser (6000 mmfd.)	61-0105
(70)	Output Transformer	65-0363
(71)	Condenser (250 mmfd.)	60-125157
(72)	Replacement Cone (For 73-0067-2 Spkr.)	91-0164
	(For 73-0067-3 Spkr.)	91-0165
	(For 73-0067-4 Spkr.)	91-0228
	Field Coil	Not Replaceable
(73)	Condenser (250 mmfd.)	60-125157
(74)	Resistor (1000 ohms)	33-210438
(75)	Condenser (5000 mmfd.)	61-0153
(76)	Power Transformer	65-0347
(77)	Resistor (100 ohms)	33-110438
(78)	Vibrator	83-0026
(83)	Condenser (.5 mfd.)	61-0137
(84)	Condenser (.5 mfd.)	61-0134
(85)	Vibrator Choke	65-0389
(86)	Pilot Lamp	34-2064
(89)	Condenser (250 mmfd.)	60-125157
(90)	Condenser (.5 mfd.)	61-0137
(91)	Fuse	45-2559
(92)	"A" Choke	32-1644
	Speaker	73-0067
	Speaker Mtg. Stud	77-0400
	Speaker Mtg. Nut	W124FA3
	Speaker Mtg. Lockwasher	W291FE7
	Speaker Cable & "A" Lead	95-0166
	Generator Condenser	61-0156
	Ignition Switch Condenser	61-0177
	Distributor Resistor	38-9562
	Fuel Gauge Resistor	67-0050
	Braid	95-0073
	Fuse Holder Clip	57-2202FE7
	Pointer	55-1366
	Pointer Drive Cord	55-1408
	Tone Drive Cord	55-1409
	Cord Spring	57-1701FA38
	Dial (Plymouth)	55-1371
	Dial (Dodge)	55-1370
	Dial (DeSoto)	55-1369
	Dial (Chrysler)	55-1368
	Dial Mtg. Spring	57-2218FE11
	Diffusing Screen	55-1428
	Diffusing Screen Bracket	57-2242FA3
	Trim Plate (Dodge)	57-2286FA40
	Screws	97-0215FA40
	Housing Front (Dodge)	57-2211FC70
	Bezel (Chrysler, DeSoto, Plymouth) Die Cast	57-2216FA8
	Bezel (Chrysler, DeSoto, Plymouth) Stamped	57-2292FA40
	Bezel (Dodge)	57-2220FA40
	Bezel Screws	97-0213FA40
	Tuning Shaft	57-2217FA3
	Fuse Lead	77-0052
	Four Prong Socket	27-6044
	Loktal Socket	27-6151
	Color Cap Assembly	77-0667
	Tone Indicator Drum	77-0914
	Push Button "Plain" Plymouth	77-0926
	Push Button "Off" Plymouth	77-0924
	Push Button "Dial" Plymouth	77-0925
	Push Button "Plain" Dodge	77-0972
	Push Button "Off" Dodge	77-0973
	Push Button "Dial" Dodge	77-0974
	Push Button "Plain" DeSoto	77-0975
	Push Button "Off" DeSoto	77-0976
	Push Button "Dial" DeSoto	77-0977
	Push Button "Plain" Chrysler	77-0978
	Push Button "Off" Chrysler	77-0979
	Push Button "Dial" Chrysler	77-0980
	Tone Knob (chrome) (Mo Par)	57-1682FA8
	Tone Knob (plastic) (Mo Par)	77-1011
	Nut Cover (chrome) (Mo Par)	57-1683FA8
	Nut Cover (plastic) (Mo Par)	77-1012
	Tuning & Volume Knob	77-0948
	Tone Knob (Plastic) DeSoto	77-1052
	Nut Cover (Plastic) DeSoto	77-1053
	Tone Knob (Plastic) Chrysler	77-1054
	Nut Cover (Plastic) Chrysler	77-1055
	Tone Knob (Plastic) Dodge	77-1056
	Nut Cover (Plastic) Dodge	77-1057
	Push Button Key Assembly (1-2-3-4-5) Plymouth, DeSoto, Chrysler	77-0916
	Push Button Key Assembly (Dial-Off) Plymouth, DeSoto, Chrysler	77-0923
	Push Button Key Assembly (Off) Dodge	77-0915
	Push Button Key Assembly (No. 2) Dodge	77-0917
	Push Button Key Assembly (No. 3)	77-0918
	Push Button Key Assembly (No. 4) Dodge	77-0919
	Push Button Key Assembly (No. 5) Dodge	77-0920
	Push Button Key Assembly (No. 6) Dodge	77-0921
	Push Button Key Assembly (Dial) Dodge	77-0922
	Wiring Side Cover	57-2186FC70
	Tube Side Cover	318-2854
	Housing (Dodge, Mo Par, DeSoto, Chrysler)	77-0941FC70
	Padder Plate	57-1693FC70
	Wing Nut (Cover Mtg.)	97-0142FA36
	Bracket (Radio Mtg.)	57-1712FA8
	Nut (Radio Mtg.)	W55FA3
	Front Nut (Radio Mtg.	97-0091FA3

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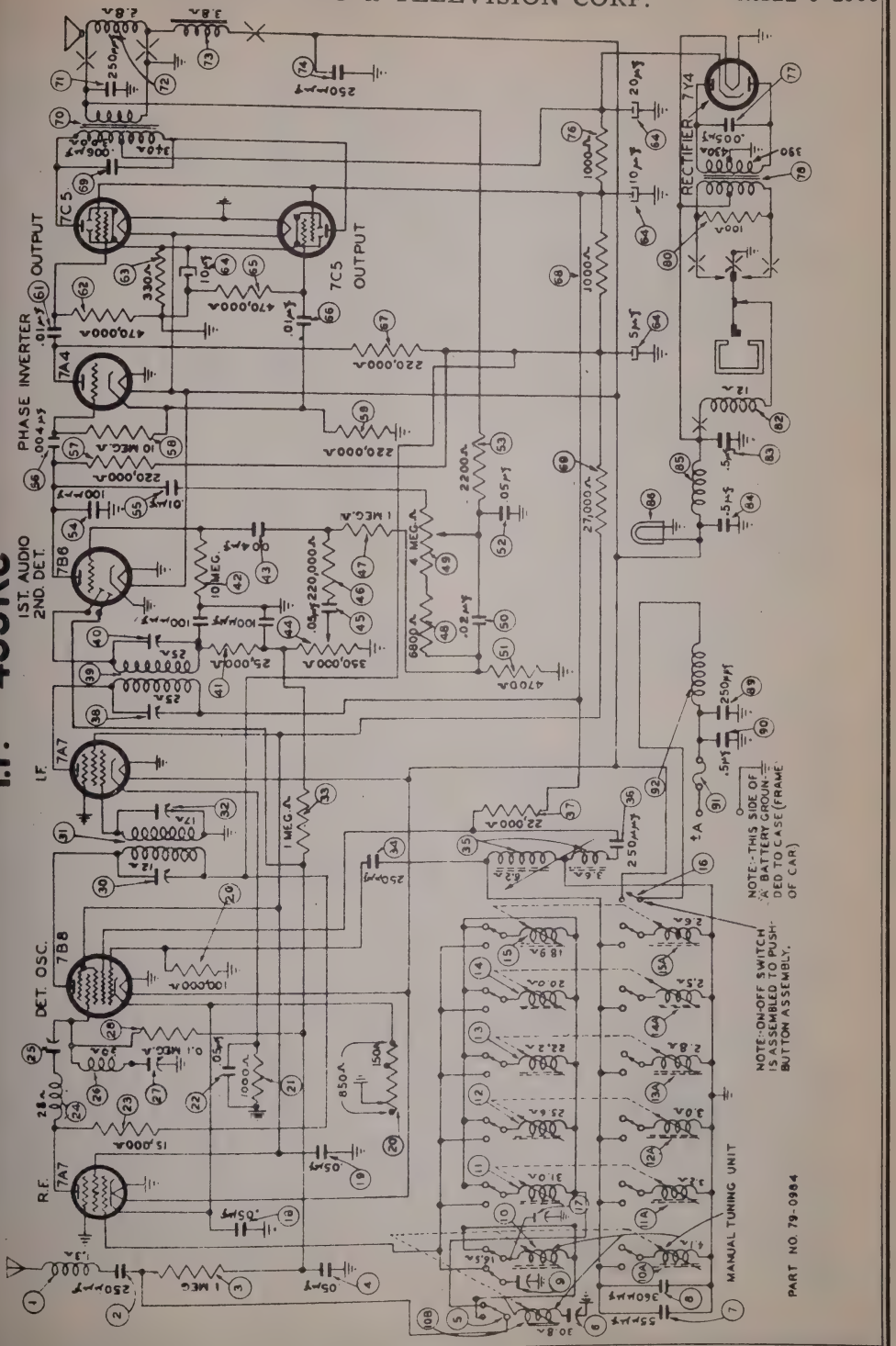

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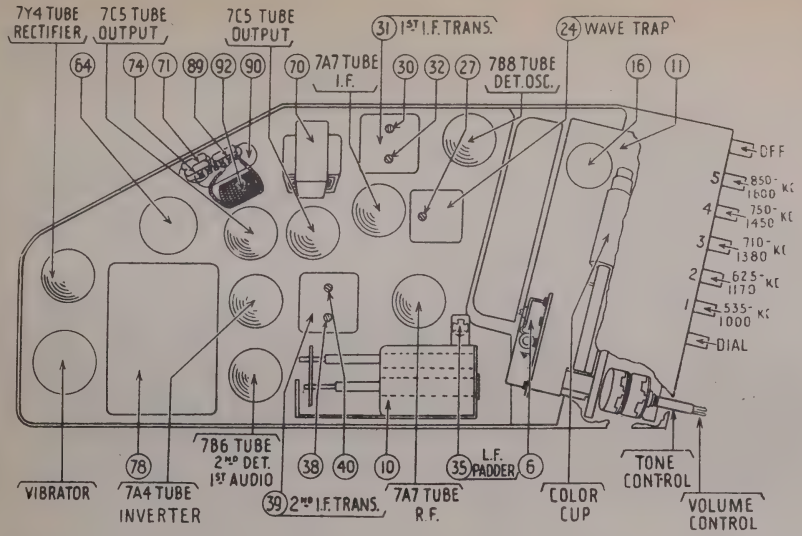

GAS GAUGE INTERFERENCE IN 1942 CHRYSLER PRODUCTS CARS

It is very important when installing the gas gauge filter assembly that the bronze spring at the top of the fuel gauge filter makes good contact with the special contact provided at the top of the fuel gauge. If this bronze spring does not make contact, a terrific amount of gas gauge interference will be encountered.

We have found that by bending this spring slightly so that it will make contact with the special contact on the fuel gauge, the noise will be eliminated.

DRIFT IN 1942 CHRYSLER MODEL C-1908

To reduce drift in the push button circuit of the Chrysler-Philco Auto Radio Model C-1908, the ceramicon condenser, part No. 61-0149, has been re-located and incorporated with the push button switch and coil assembly, part No. 77-0943. This change in production is run No. 2.

If it is ever necessary to replace the push button switch and coil assembly, be sure this condenser is in the assembly. If this condenser is in the new assembly, the condenser which originally is installed on the panel on the subbase must be removed, otherwise the radio will not track properly.

PUSH BUTTONS ON CHRYSLER-PHILCO AUTO RADIO MODEL C-1908

On early production Model C-1908 Chrysler-Philco custom-built radios from serial No. C-0001 to No. C-07425 at Philadelphia, and from serial No. EY-00001 to No. EY-02700 at Sandusky, we have found that under extreme conditions of heat and cold, some shrinkage may occur in the plastic insert of the push button cap, causing the insert to drop off. When this condition occurs, the entire cap should be replaced. The parts affected are: —

No. 77-0924 push button cap "off"
No. 77-0925 push button cap "dial"
No. 77-0926 push button cap "plain"

OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	PRESS THE "DIAL" BUTTON AND STATIONS CAN BE TUNED IN BY "DIAL" TUNING				
2	455 K.C.	To Aerial Receptacle on Radio	.1 Mfd.	Note 2	(40) (39) (32) (38) (40) (39) (32) (38)
3	455 K.C.	To Aerial Receptacle on Radio	.1 Mfd.	Note 2	(27) Min.
4	1500 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1500 K.C.	(17) Note 4
5	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 580 K.C.	(35) Note 3
6	1500 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1500 K.C.	(17) Note 4
7	580 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 580 K.C.	(35) Note 3

Make all adjustments for maximum reading on the meter.

NOTE 1 — Connect the aerial lead, Part No. 95-0111, to the aerial receptacle in the radio. Connect a 25 Mmfd. Condenser in series between the signal generator and the aerial lead.

NOTE 2 — Turn the tuning control clockwise as far as it will go.

NOTE 3 — Rock the tuning control while adjusting the low frequency screw. Tune the control to the signal and adjust the forth slightly for maximum output. Then readjust the screw for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the aerial stage adjustment is made with the Radio installed in the car, the Radio aerial lead must be connected to the car aerial in the usual manner. Connect the signal generator output lead to a wire placed near the car aerial but not connected

Jon F. Rider

Procedure for Aligning the Inductive Tuning Units for Chrysler Models C1808 and C1908, Ford Models F1840 and F1841, and Studebaker Models S1824 and S1924

The following is the procedure for aligning the above tuning units after a coil or core has been replaced. The unit should be aligned after it is installed in the Radio.

1. Complete alignment.

a. Turn the control knob clockwise as far as it will go.

b. Adjust antenna and oscillator cores according to dimensions given in Figures 1, 2 and 3.

c. Set up the signal generator, connecting the lead through the proper dummy to the antenna connection. Tune the signal generator to the Radio. The signal should come in between 1570 and 1615 K.C.

d. Adjust the antenna padder to this signal.

e. Set the signal generator to 900 K.C. and tune the Radio to receive maximum signal at 900 K.C. Adjust the antenna core for maximum signal at 900 K.C.

f. Set the signal generator to 1400 K.C. and tune the Radio to 1400 K.C. on the dial. Adjust the antenna padder for maximum signal.

g. Repeat e and f until there is no improvement.

h. Set the signal generator to 580 K.C. and tune the Radio to 580 K.C. Adjust the oscillator tracking coil core for maximum signal. "Rock" the tuning control while making this adjustment. Tune the control to the signal and adjust the oscillator tracking coil core for maximum signal. Rotate the tuning control back and forth slightly until maximum signal is obtained. Then readjust the oscillator tracking coil core for maximum signal. Repeat this procedure until no further improvement is noticed.

i. In case a great adjustment was necessary in h, the adjustment of e, f and h should be repeated. The unit should then be perfectly aligned at 1400 K.C., 900 K.C. and 580 K.C.

j. Set the signal generator to 550 K.C. and tune the Radio for maximum signal.

k. Peak the generator to image frequency of 550 K.C. (1460 K.C.).

l. Adjust the trap core for minimum signal as in 1 or 2 below.

1. If the unit uses a fixed trap condenser adjust the core.

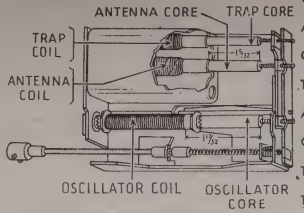

FIGURE 1 — Inductive Tuning Unit for Models C1808, C1908

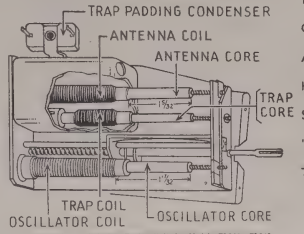

FIGURE 2 — Inductive Tuning Unit for Models F1840, F1841

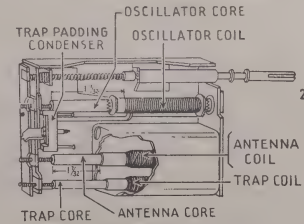

FIGURE 3 — Inductive Tuning Unit for Models S1824, S1924

2. If the unit uses a padder trap condenser set the core so that the screw end of the core is 11/32" from the bakelite cross head and adjust the padder for minimum signal.

m. Repeat steps e, f and h described above since the wave trap adjustments will affect the alignment at 580, 900 and 1400 K.C.

DESCRIPTION	MODEL C-1808	MODEL C-1808*	MODEL C-1908	MODEL F-1840	MODEL F-1841	MODEL S-1824	MODEL S-1924
Complete Inductive Unit	77-0666	77-0962	77-0962	77-0701	77-0701	77-0709	77-0709
Antenna Coil	65-0380	65-0449	65-0449	65-0394	65-0394	65-0407	65-0407
Oscillator Coil	65-0439	65-0439	65-0439	65-0392	65-0392	65-0405	65-0405
Trap Coil	65-0382	65-0382	65-0382	65-0393	65-0393	65-0406	65-0406
Antenna Core	57-1702	57-1702	57-1702	57-1702	57-1702	57-1702	57-1702
Oscillator Core	57-1703	57-1703	57-1703	57-1703	57-1703	57-1703	57-1703
Trap Core	77-0677	77-0677	77-0677	77-0677	77-0677	77-0677	77-0677
Trap Padder	Not Used	Not Used	Not Used	63-0071	63-0071	63-0071	63-0071
Tuning Shaft	77-0767	77-0767	77-0767	77-0766	77-0766	77-0715	77-0715
Oscillator Coil Retaining Spring	57-1673	57-1673	57-1673	57-1673	57-1673	57-1673	57-1673
Antenna Coil Retaining Spring	57-1398	57-1398	57-1398	57-1398	57-1398	57-1398	57-1398
Hairpin (Shaft Retaining)	57-1868	57-1868	57-1868	Not Used	Not Used	57-1868	57-1868
Speed Nut (Shaft Retaining)	57-1329	57-1329	57-1329	57-1329	57-1329	57-1329	57-1329
"C" Washer (Shaft Retaining)	Not Used	Not Used	Not Used	28-2043	28-2043	Not Used	Not Used

** Latest Production*

n. Set the signal generator at 900 K.C. and tune the Radio for maximum signal. Slide the pointer to the 900 K.C. mark on the dial scale.

2. Alignment when only antenna coil or core is replaced.

a. Turn the tuning control knob clockwise as far as it will go.

b. Adjust the antenna core according to dimensions given in Figures 1, 2 and 3.

c. Tune the signal generator to the Radio and adjust the antenna padder to this signal.

d. Set the signal generator to 900 K.C. and tune the Radio to this signal. Adjust the antenna core for maximum output.

e. Set the signal generator and Radio to 1400 K.C. and adjust the antenna padder for maximum output.

f. Repeat d and e until no further improvement is noticed.

g. Check and adjust the oscillator tracking coil core at 580 K.C. if necessary.

3. Alignment when only oscillator tracking coil or core has been replaced.

a. Set the signal generator and Radio to 580 K.C. Adjust the oscillator tracking coil core for maximum signal by the "rocking in" process as described in 1 h.

b. Check and adjust the antenna padder at 1400 K.C.

c. Repeat step a if necessary.

4. Alignment when trap coil or core has been replaced.

a. Follow instructions in 1 j, k, l, m.

5. Proceed as in 1 above when parts in more than one circuit are replaced and when oscillator coil or core is replaced.

Note — When cores are moved in aligning the Receiver or replacing parts, it will be necessary to reseal the core screws to the retaining nuts. Use Philco cement, Part No. 45-2623, for this purpose.

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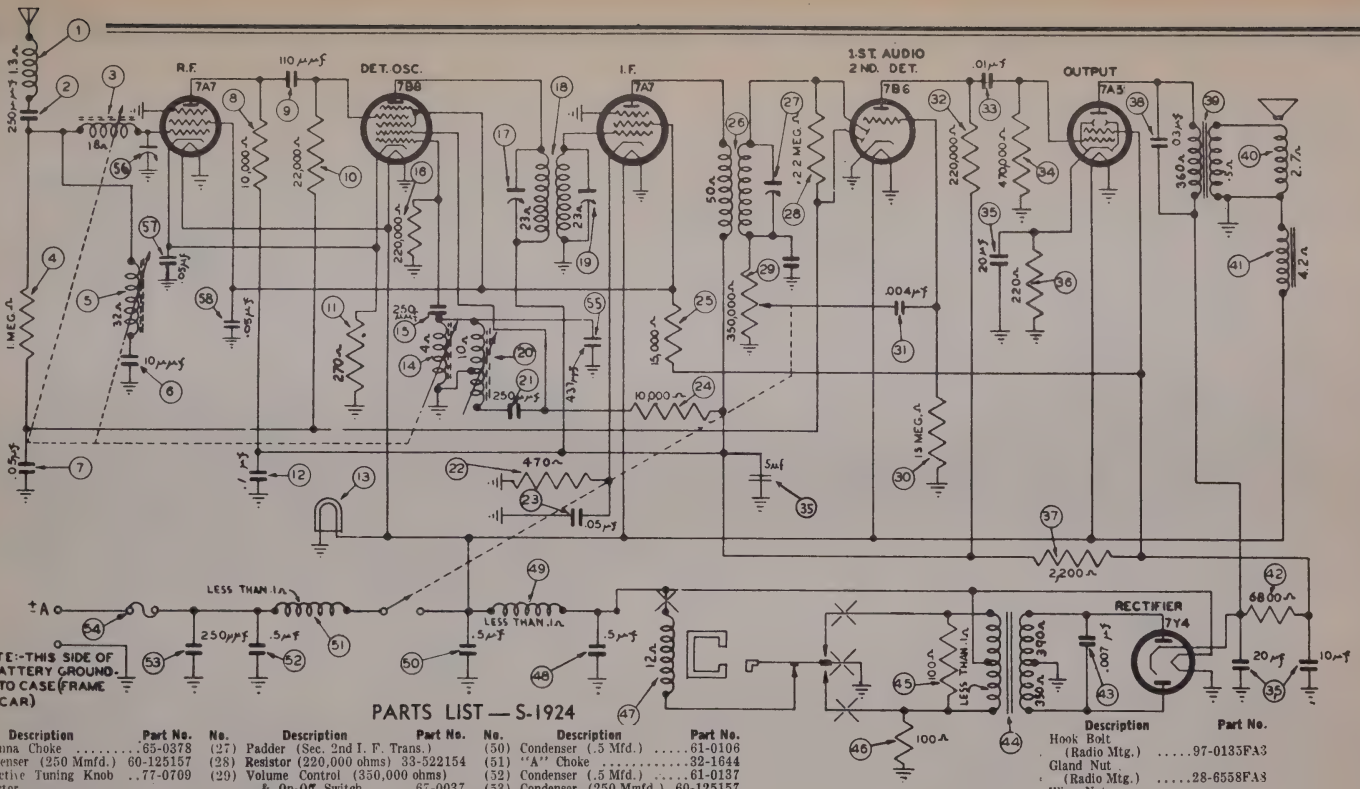
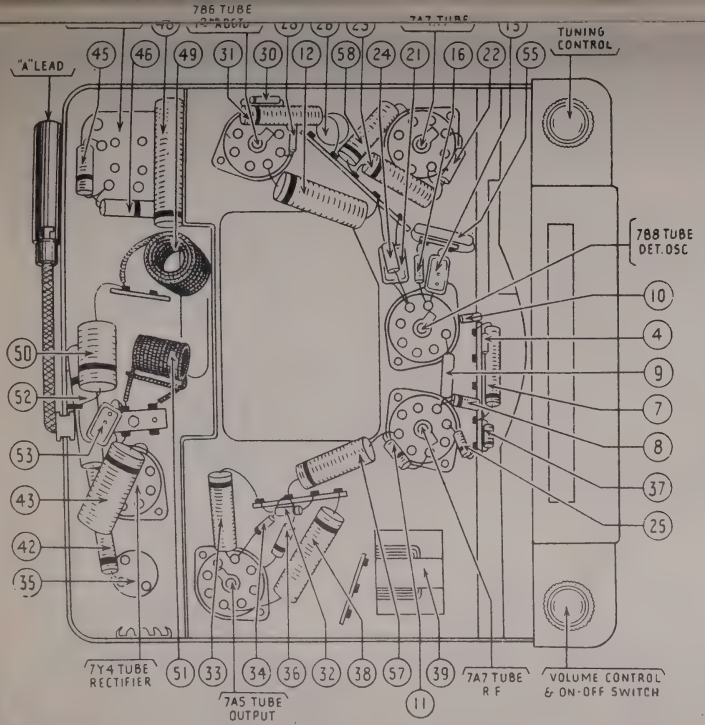


PARTS LIST — S-1924

No.	Description	Part No.
(1)	Antenna Choke	65-0378
(2)	Condenser (250 Mmfd.)	60-125157
(3)	Inductive Tuning Knob	77-0709
(4)	Resistor (1,000,000 ohms)	33-510154
(5)	Image Trap Coil	(Part of 3)
(6)	Condenser (10 Mmfd.)	63-0071
(7)	Condenser (.05 Mfd.)	61-0111
(8)	Resistor (10,000 ohms)	33-310334
(9)	Condenser (110 Mmfd.)	60-110157
(10)	Resistor (22,000 ohms)	33-322154
(11)	Resistor (270 ohms)	33-127336
(12)	Condenser (.1 Mfd.)	61-0104
(13)	Pilot Lamp	34-2064
(14)	Oscillator Coil	(Part of 3)
(15)	Condenser (250 Mmfd.)	60-125157
(16)	Resistor (220,000 ohms)	33-422154
(17)	Padder (Prl. 1st I. F. Trans.)	
(18)	First I. F. Transformer	65-0399
(19)	Padder (Sec. 1st I. F. Trans.)	
(20)	Oscillator Tracking Coil	65-0401
(21)	Condenser (250 Mmfd.)	60-125157
(22)	Resistor (470 ohms)	33-147336
(23)	Condenser (.05 Mfd.)	61-0111
(24)	Resistor (10,000 ohms)	33-310334
(25)	Resistor (15,000 ohms)	33-315334
(26)	Resistor (50 ohms)	33-105334
(27)	Padder (Sec. 2nd I. F. Trans.)	
(28)	Resistor (220,000 ohms)	33-522154
(29)	Volume Control (350,000 ohms) & On-Off Switch	67-0037
(30)	Resistor (15,000,000 ohms)	33-615154
(31)	Condenser (4000 Mmfd.)	61-0129
(32)	Resistor (220,000 ohms)	33-422334
(33)	Condenser (.01 Mfd.)	61-0120
(34)	Resistor (470,000 ohms)	33-447154
(35)	Filter Condenser (10-20-20 Mfd.)	61-0150
(36)	Resistor (220 ohms)	33-122336
(37)	Resistor (2200 ohms)	33-222334
(38)	Condenser (.03 Mfd.)	61-0119
(39)	Output Transformer	65-0395
(40)	Cone & Voice Coil (For 73-0068-2 Speaker)	91-0238
(41)	Field Coil	(Not Replaceable)
(42)	Resistor (6800 ohms)	33-268434
(43)	Condenser (7000 Mmfd.)	61-0127
(44)	Power Transformer	65-0404
(45)	Resistor (100 ohms)	33-110434
(46)	Resistor (100 ohms)	33-110434
(47)	Vibrator	83-0026
(48)	Condenser (.5 Mfd.)	61-0106
(49)	"A" Choke	32-1644
(50)	Condenser (.5 Mfd.)	61-0137
(51)	Condenser (250 Mmfd.)	60-125157
(52)	Fuse	45-2559
(53)	Condenser (437 Mmfd.)	61-0071
(54)	Aerial Padder	63-0064
(55)	Condenser (.5 Mfd.)	61-0101
(56)	Condenser (.05 Mfd.)	61-0111
	Housing	77-0699FC59
	Tube Side Cover	57-1547FC59
	Speaker Cover	57-1548FC59
	Speaker Cable	95-0161
	Speaker Gasket	55-1045
	Speaker Unit	73-0068
	Nut (Speaker Mtg.)	W-124FA3
	Bolt (Speaker Mtg.)	W1582FA3
	Lockwasher (Speaker Mtg.)	W291FE7
	Vibrator Socket	27-6153
	Loktal Socket	27-6151
	Volume Control Cable	95-0222
	"A" Switch Cable	95-0155
	"A" Lead	77-0638
	Fuse Lead	77-0052
	Hook Bolt (Radio Mtg.)	97-0135FA3
	Gland Nut (Radio Mtg.)	28-6558FA3
	Wing Nut (Radio Mtg.)	97-0048FA3
	Bezel	57-2248FA8
	Screw (Bezel to Housing)	97-0111FA3
	Screw (Bezel Sides)	W2212FA3
	Screw (Cover Mtg.)	97-0111FA3
	Tuning & Volume Knob	77-1043
	Pointer	57-2253
	Dial	55-1410
	Dial Background Plate	55-1159
	Drive Cord	55-1158
	Drive Cord Spring	57-1425FA38
	Distributor Suppressor	32-2250
	Fender Straps	77-0966
	Ground Strap	77-0336
	Copper Braid	95-0073
	Interference Condenser	30-4007
	Distributor Choke	77-0947
	Antenna Connector	57-0591FA3
	Gland Nut Wrench	28-5636FA3
	Ground Strap Screws	W745FA3

I.F. = 455KC



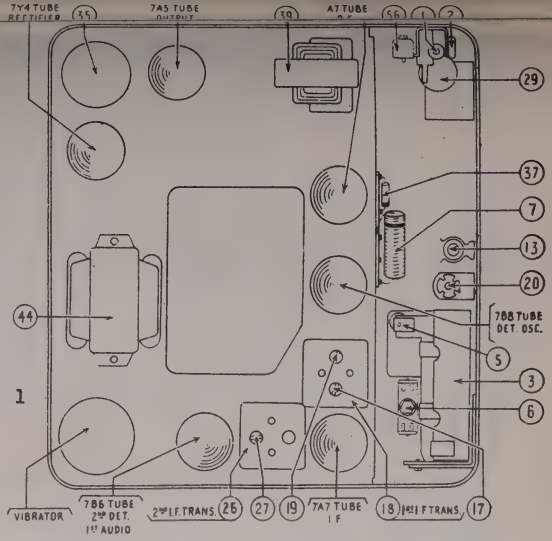


FIG. 1

OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	455 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	(37) (18) (17) (47) (18) (17)
2	1360 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1360 K.C.	(56)
3	590 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 590 K.C.	(24) Note 3
4	1360 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1360 K.C.	(56)
5	1200 to 1400 K.C.	Note 5	Note 5	Note 5	(56) Note 4

Make all adjustments for maximum reading on the meter.

NOTE 1 — Connect the aerial lead, Part No. 95-0111, to the aerial receptacle in the radio. Connect a 35 Mmfd. Condenser in series between the signal generator and the aerial lead.

NOTE 2 — Turn the tuning control clockwise as far as it will go.

NOTE 3 — Rock the tuning control while adjusting the low frequency screw. Tune the control to the signal and adjust the screw for maximum output. Rotate the tuning control back and forth slightly for maximum output. Then readjust the screw for maximum output. Repeat this procedure until no further improvement is noticed

NOTE 4 — When the aerial stage adjustment is made with the Radio installed in the car, the Radio aerial lead must be connected to the car aerial in the usual manner. Connect the signal generator output lead to a wire placed near the car aerial but not connected to it.

NOTE 5 — When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Remove the plug button on the end of the radio and adjust the aerial compensator (56) (see Figure 1) for maximum signal.

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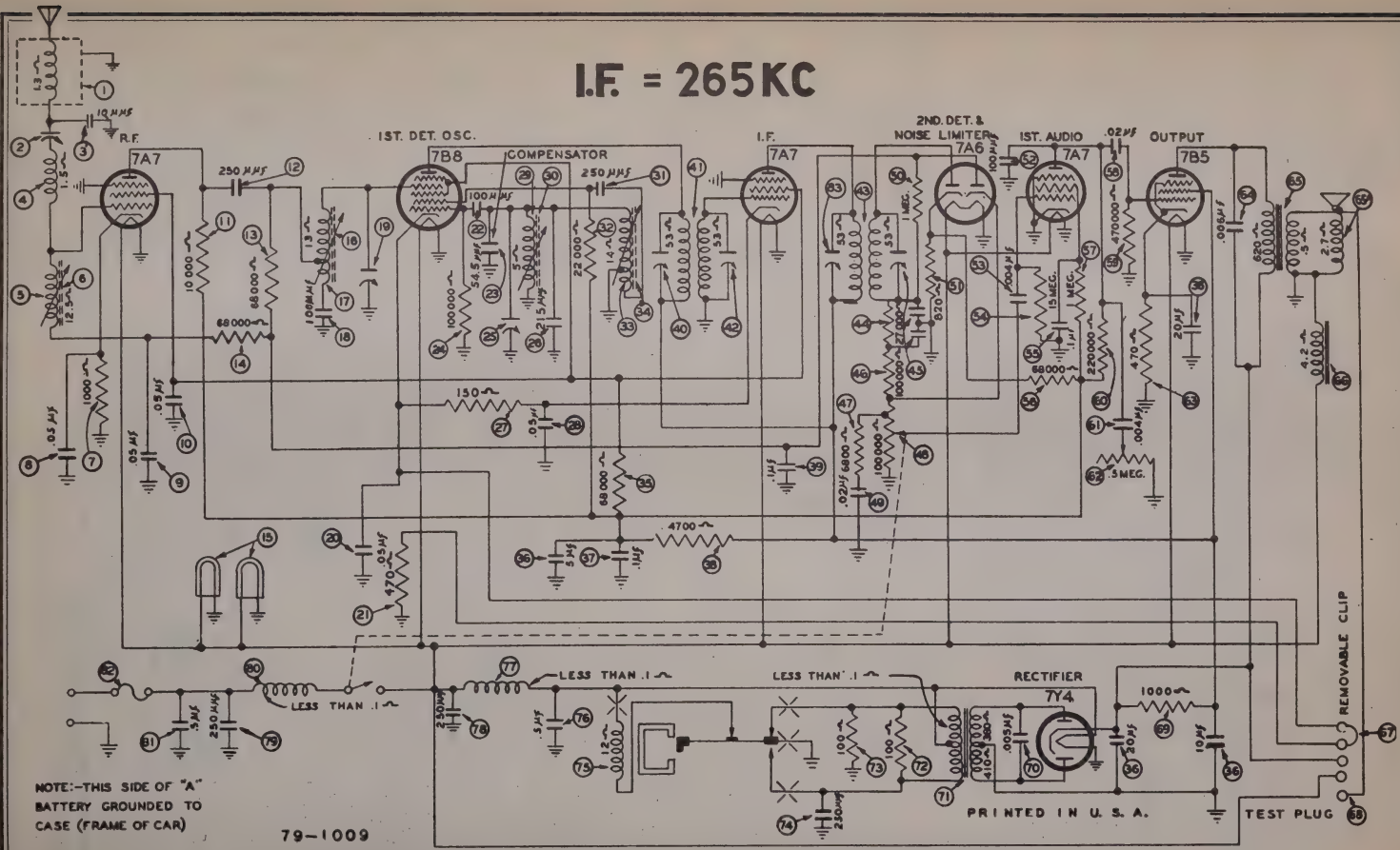


INSTRUCTIONS FOR SETTING UP THE AUTOMATIC TUNING BUTTONS

Turn on the radio and allow it to operate for twenty minutes or longer if possible.

Press in any automatic button so that it remains engaged. Then tune in the station desired by turning the small wheel in the button. The station can be identified by the pointer, which indicates the frequency of the station in Kilocycles. The automatic buttons may be readjusted to any station within the range of the stations in any sequence desired. However, for convenience in remembering stations, it is recommended that the buttons be set up in the same order that the stations appear across the dial.

CAUTION — All adjustments must be carefully made so that reception can be received best when remote from the broadcasting station. Careless tuning off to one side, even though the signal is

PHILCO RADIO & TELEVISION CORP.

OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	PUSH IN THE TUNING CONTROL KNOB UNTIL STATIONS CAN BE TUNED IN BY MANUAL TUNING				
2	270 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	(43)(45)(60)(62) (51)(52)(60)(62)
3	1600 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1600 K.C.	(75)
4	1360 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1360 K.C.	(2)(38) Note 4
5	590 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 590 K.C.	(63) Note 3
6	1600 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1600 K.C.	(75)
7	1360 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1360 K.C.	(2)(38) Note 4
8	1200 to 1400 K.C.	Note 5	Note 5	Note 5	(2) Note 4

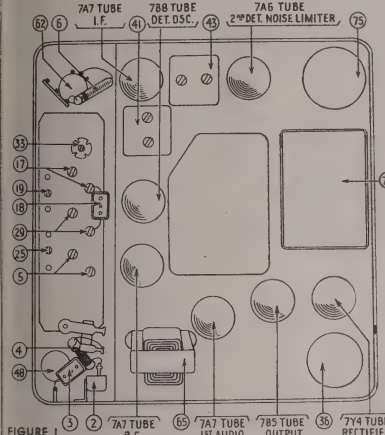


FIGURE 1

Make all adjustments for maximum reading on the meter.

NOTE 1 — Connect the aerial lead, Part No. 95-0111, to the aerial receptacle in the radio. Connect a 35 Mmfd. Condenser in series between the signal generator and the aerial lead.

NOTE 2 — Turn the tuning control clockwise as far as it will go.

NOTE 3 — Rock the tuning control while adjusting the low frequency screw. Tune the control to the signal and adjust the screw for maximum output. Rotate the tuning control back and forth slightly for maximum output. Then readjust the screw for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the aerial stage adjustment is made with the Radio installed in the car, the Radio aerial lead must be connected to the car aerial in the usual manner. Connect the signal generator output lead to a wire placed near the car aerial but not connected to it.

NOTE 5 — When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Remove the plug buttom on the end of the radio and adjust the aerial compensator (2) (see Figure 1) for maximum signal.

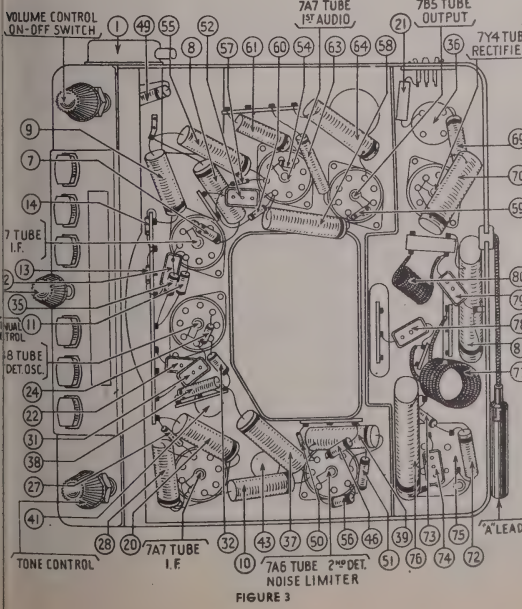
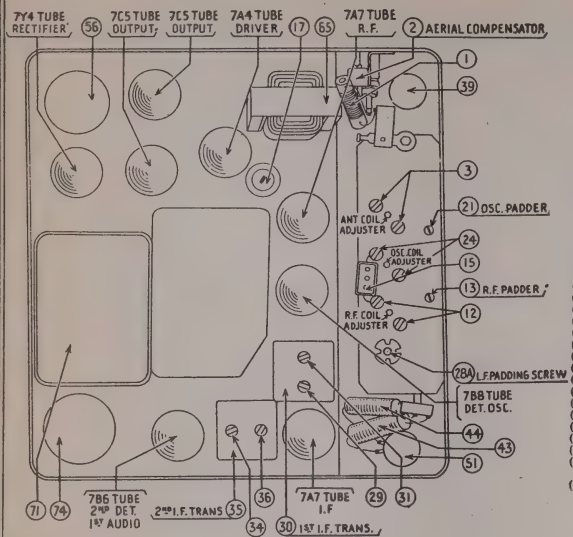


FIGURE 3

No.	Description	Part No.
(1)	Antenna Choke (on Housing)	65-0459
(2)	Aerial Padder	63-0053
(3)	Condenser (10 Mmfd.)	60-010137
(4)	Antenna Choke	65-0428
(5)	Antenna Transformer	65-0349
(6)	Antenna Transformer Core	57-1541
(7)	Resistor (1000 ohms)	33-210334
(8)	Condenser (.05 Mfd.)	61-0101
(9)	Condenser (.05 Mfd.)	61-0101
(10)	Condenser (.05 Mfd.)	61-0101
(11)	Resistor (10,000 ohms)	33-310334
(12)	Condenser (250 Mmfd.)	60-125151
(13)	Resistor (68,000 ohms)	33-368154
(14)	Resistor (68,000 ohms)	33-368154
(15)	Pilot Lamp	34-2066
(16)	R. F. Transformer	57-1541
(17)	R. F. Transformer	65-0359
(18)	Condenser (100 Mmfd.)	61-110157
(19)	R. F. Padder	63-0052
(20)	Condenser (.05 Mfd.)	61-0101
(21)	Resistor (470 ohms)	33-147336
(22)	Condenser (100 Mmfd.)	60-110127
(23)	Condenser (54.5 Mmfd.)	61-0149
(24)	Resistor(100,000 ohms)	33-410154
(25)	Oscillator Padder	63-0053
(26)	Condenser (215 Mmfd.)	61-0148
(27)	Resistor (150 ohms)	33-115336
(28)	Condenser (.05 Mfd.)	61-0111
(29)	Oscillator Transformer	65-0350
(30)	Oscillator Transformer Core	57-1542
(31)	Condenser (250 Mmfd.)	60-125157
(32)	Resistor (22,000 ohms)	33-322334
(33)	Oscillator Tracking Coil	65-0351
(34)	Oscillator Tracking Coil Core	57-1659
(35)	Resistor (68,000 ohms)	33-368334
(36)	Filter Condenser (5-10-20-20 Mfd.)	61-0150
(37)	Condenser (.1 Mfd.)	61-0113
(38)	Resistor (4700 ohms)	33-247434
(39)	Condenser (.1 Mfd.)	61-0104
(40)	Padder (Prt. 1st I. F. Trans.)	
(41)	First I. F. Transformer	65-0352
(42)	Padder (Sec. 1st I. F. Trans.)	
(43)	Second I. F. Transformer	65-0448
(44)	Resistor (27,000 ohms)	33-327154
(45)	Padder (Sec. 2nd I. F. Trans.)	
(46)	Resistor(100,000 ohms)	33-410334
(47)	Resistor (6800 ohms)	33-268154
(48)	Volume Control (100,000 ohms) & On-Off Switch	67-0036
(49)	Condenser (.02 Mfd.)	61-0154
(50)	Resistor (1,000,000 ohms)	33-510154
(51)	Resistor (820 ohms)	33-182336
(52)	Condenser (100 Mmfd.)	60-110157
(53)	Condenser (4000 Mmfd.)	61-0179
(54)	Resistor (15,000,000 ohms)	33-615154
(55)	Condenser (.1 Mfd.)	61-0104
(56)	Resistor (68,000 ohms)	33-368334
(57)	Resistor (1,000,000 ohms)	33-510154
(58)	Condenser (.02 Mfd.)	61-0108
(59)	Resistor(470,000 ohms)	33-447154
(60)	Resistor(220,000 ohms)	33-422154
(61)	Condenser (4000 Mmfd.)	61-0179
(62)	Tone Control (500,000 ohms)	67-0036
(63)	Resistor (470 ohms)	33-147436
(64)	Condenser (6000 Mmfd.)	61-0105
(65)	Output Transformer	65-0354
(65a)	Replacement Core (For 73-0033-3 Speaker)	91-0166
(66)	Field Coil	Not Replaceable
(67)	Jumper Plug	57-1121
(68)	Test Socket	55-1387
(69)	Resistor (1000 ohms)	33-210334
(70)	Condenser (5000 Mmfd.	61-0133
(71)	Power Transformer	65-0347
(72)	Resistor (100 ohms)	33-110434
(73)	Resistor (100 ohms)	33-110434
(74)	Condenser (250 Mmfd.)	60-125157
(75)	Vibrator	83-0026
(76)	Condenser (.5 Mfd.)	61-0137
(77)	Vibrator Choke	65-0151
(78)	Condenser (250 Mmfd.)	60-125157
(79)	Condenser (250 Mmfd.)	60-125157
(80)	"A" Choke	32-1644
(81)	Condenser (.5 Mfd.)	61-0137
(82)	Fuse	45-2556
(83)	Padder (Prt. 2nd I. F. Trans	
	Housing	1039PC50
	Tube Side Cover	2413PC50
	Speaker Cover	1549PC50
	Speaker Cable	95-0101
	Speaker Gasket	55-1045
	Speaker Unit	73-0053
	Nut (Speaker Mtg.)	W151FA3
	Bolt (Speaker Mtg.)	W1582FA3
	Lockwasher (Speaker Mtg.)	W291FA3
	Vibrator Socket	27-6153
	Loktal Socket	27-6151
	"A" Switch Cable	95-0291
	"A" Lead	77-0638
	Fuse Lead	77-0082
	Volume & Tone Control Nut	W684
	Hook Bolt (Radio Mtg.)	97-0135FA3
	Nut (Radio Mtg.)	97-0229FA3
	Wing Nut (Radio Mtg.)	97-0048FA3
	Bezel	77-1023FA8
	Screw (Bezel to Tuning Unit)	92-0228FA3
	Screw (Bezel Mtg.)	
	Screw (Cover Mtg.)	W2213FA3
	Volume & Tone Knob	77-1043
	Tuning Knob	77-1038
	Push Button Knob	77-1042
	Pointer & Cam Assembly	77-1030
	Dial	55-1452
	Tuning Switch	77-0970
	Solenoid	85-0380
	Muter Switch	85-0125
	Push Button Spring	57-1651
	Latch Bar Spring	57-1650
	Slide Take-up Spring	57-1649
	Manual Knob Spacer	57-1689
	Manual Knob Screw	57-1623FA3
	Manual Knob Spring	57-1628FA38
	Nut Cover	77-1026
	Power Transformer Can	57-0875FA5
	Grommet ("A" Lead)	27-4676
	Clamp ("A" Lead)	28-1644FA8
	Nut (Pwr. Trans. Mtg.)	W124FA3
	Plug Button (Antenna Padder)	W1638FA8
	Screw (Ant. Choke Mtg.)	97-0111FA3
	Interference Condenser	30-4007
	Distributor Suppressor	32-2250
	Distributor Choke	77-0947
	Copper Braid	95-0073
	Fender Strap	77-0686
	Ground Strap	77-0336

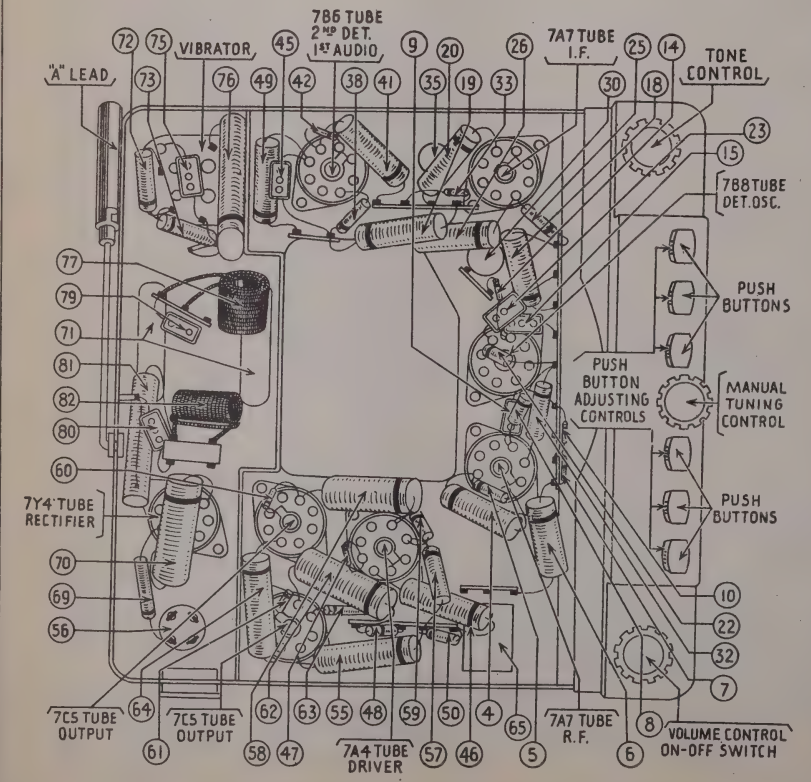
MODEL P-1935

PHILCO RADIO & TELEVISION CORP.



No.	Description	Part No.
(1)	Antenna Choke	65-0378
(2)	Antenna Compensator	63-0053
(3)	Antenna Transformer	65-0349
(3a)	Iron Core	57-1541
(4)	Condenser (.05 Mfd.)	61-0111
(5)	Resistor (680 ohms)	33-168336
(6)	Condenser (.05 Mfd.)	61-0101
(1)	Resistor (68,000 ohms)	33-368154
(8)	Resistor (10,000 ohms)	33-310334
(9)	Condenser (250 Mmfd.)	60-125157
(10)	Resistor (68,000 ohms)	33-368154
(11)	Condenser (100 Mmfd.)	60-110327
(12)	R. F. Transformer	65-0359
(12a)	Iron Core	57-1541
(13)	Padder	63-0052
(14)	Resistor (100,000 ohms)	33-410154
(15)	Condenser (100 Mmfd.)	60-110157
(16)	Condenser (215 Mmfd.)	61-0148
(17)	Sensitivity Control	67-0036
(18)	Condenser (.05 Mfd.)	61-0111
(19)	Condenser (.05 Mfd.)	61-0111
(20)	Condenser (.05 Mfd.)	61-0111
(21)	Padder	63-0055
(22)	Resistor (22,000 ohms)	33-322334
(23)	Condenser (250 Mmfd.)	60-125157
(24)	Oscillator Transformer	65-0350
(24a)	Iron Core	57-1542
(25)	Resistor (150 ohms)	33-115336
(26)	Condenser (.05 Mfd.)	61-0111
(27)	Condenser (54.5 Mmfd.)	61-0149
(28)	Oscillator Tracking Trans.	65-0351
(28a)	Oscillator Tracking Core	57-1542
(29)	Padder (Pri. 1st I. F. Trans.)	
(30)	First I. F. Transformer	65-0352
(31)	Padder (Sec. 1st I. F. Trans.)	
(32)	Resistor (27,000 ohms)	33-327434
(33)	Resistor (1,000,000 ohms)	33-510154
(34)	Padder (Pri. 2nd I. F. Trans.)	

No.	Description	Pa
(35)	Second I. F. Transformer	65
(36)	Padder (Sec. 2nd I. F. Trans.	
(37)	Resistor (25,000 ohms)	33-3
(38)	Resistor (470 ohms)	33-1
(39)	Volume Control (350,000 ohm & On-Off Switch	67
(40)	Muter Switch	85
(41)	Condenser (.01 Mfd.)	61
(42)	Resistor (10,000,000 ohms)	33-6
(43)	Condenser (.25 Mfd.)	61
(44)	Condenser (.07 Mfd.)	61
(45)	Condenser (100 Mmfd.)	60-11
(46)	Condenser (4000 Mmfd.)	61-
(47)	Resistor (10,000,000 ohms)	33-61
(48)	Resistor (220,000 ohms)	33-42
(49)	Condenser (.008 Mfd.)	61-
(50)	Resistor (220,000 ohms)	33-42
(51)	Tone Control (4,000,000 ohms)	67-
(53)	Resistor (2200 ohms)	33-22
(54)	Resistor (1500 ohms)	33-21
(55)	Condenser (.1 Mfd.)	61-
(56)	Condenser (5-10-20-20 Mfd.)	61-0
(56a)	Condenser (20 Mfd.)	Part of
(56b)	Condenser (5 Mfd.)	Part of
(56c)	Condenser (10 Mfd.)	Part of
(56d)	Condenser (20 Mfd.)	Part of
(57)	Resistor (4700 ohms)	33-24
(58)	Condenser (.05 Mfd.)	67-0
(59)	Resistor (220,000 ohms)	33-42
(60)	Resistor (470,000 ohms)	33-44
(61)	Resistor (470,000 ohms)	33-44
(62)	Condenser (.05 Mfd.)	61-0
(63)	Resistor (330 ohms)	33-13
(64)	Condenser (.01 Mfd.)	61-0
(65)	Output Transformer	65-0
(66)	Field Coil	Not Replace
(67)	Jumper Plug	57-1
(68)	Test Socket	55-1
(69)	Resistor (1000 ohms)	33-210
(70)	Condenser (.005 Mfd.)	61-0
(71)	Power Transformer	65-0
(72)	Resistor (100 ohms)	33-110
(73)	Resistor (100 ohms)	33-110
(74)	Vibrator	83-0
(75)	Condenser (250 Mmfd.)	60-125
(76)	Condenser (.5 Mfd.)	61-0
(77)	Vibrator Choke	65-0
(79)	Condenser (250 Mmfd.)	60-125
(80)	Condenser (250 Mmfd.)	60-125
(81)	Condenser (.5 Mfd.)	61-0
(82)	"A" Choke	32-1
(83)	Fuse	45-2
(84)	Solenoid	85-0
(85)	Solenoid Switch	Part of 85-0
(86)	Pilot Lamp	34-2
	Bezel	57-2188
	Pilot Lamp Shield	57-2208
	Color Disc	55-1
	Color Disc Retainer	57-1639
	Color Disc Washer	57-1640
	Tuning Switch	77-00
	Color Screen (Volume Side)	55-13
	Color Screen (Tone Side)	55-13
	Dial	55-13
	Push Button Assembly	77-08
	Speaker Gasket	55-13
	Speaker Cable	95-01
	Background Plate	57-2174
	Pilot Lamp Bracket	57-2193
	Fuse Lead Assembly	77-08
	Manual Knob Assembly	77-08
	Volume & Tone Knob	55-13
	Speaker Unit	73-00
	Hook Bolt	57-2176
	"A" Lead	77-00
	Manual Knob Spacer	57-16
	Manual Knob Sleeve	57-16
	Manual Knob Spring	57-1628
	Plug Button (Chrome)	W1638
	Plug Button (Nickel)	97-0150
	Grommet ("A" Lead)	57-16
	Gland Nut	28-6558
	Wing Nut	W895
	Ignition Switch Condenser	30-40
	Generator Condenser	30-41
	Distributor Resistor	33-11
	Ground Strap Assembly (Electromatic Switch)	77-09
	Ground Clip	57-223
	Cone & Voice Coil	91-02
	Vibrator Socket	27-615
	Tube Socket	27-615
	Tube Side Cover	57-1547
	Speaker Side Cover	57-1548
	Housing & Bracket	77-0868
	Pointer & Cam Assy.	77-00
	Pointer Spring	57-165
	Muter Spring	57-165
	Wing Nut (Radio Mtg.)	W895
	Screw (Bezel)	97-0111
	Screw (Speaker Mtg.)	W1582
	Screw (Cover Mtg.)	W2212
	Latch Bar Spring	57-165
	Push Button Spring	57-165



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PHILCO RADIO & TELEVISION CORP. MODEL P-1935

INSTRUCTIONS FOR SETTING UP THE "TUN-O-MATIC" BUTTONS

Turn on the radio and allow it to operate for twenty minutes or longer if possible.

Press in any Tun-O-Matic button so that it remains engaged. Then tune in the station desired by turning the small Tun-O-Matic wheel in the button. The station can be identified by the pointer, which indicates the frequency of the station in Kilocycles. The Tun-O-Matic buttons may be readjusted to any station within the range of the broadcast band. The Tun-O-Matic buttons may be readjusted to stations in any sequence desired. However, for convenience in remembering stations, it is recommended that the buttons be set up in the same order that the stations appear across the dial.

CAUTION— All adjustments must be carefully made so that reception can be received best when remote from the broadcasting station. Careless tuning off to one side, even though the signal is heard, will result in distorted reception.

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OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	PUSH IN THE TUNING KNOB SO THAT STATIONS CAN BE TUNED IN BY MANUAL TUNING.				
2	270 K.C.	To Aerial Receptacle on Radio	See Note 1	Note 2	⑯⑭⑪⑨ ⑯⑭⑪⑨
3	1600 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1600 K.C.	⑪
4	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1400 K.C.	② ⑬ Note 4
5	590 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 590 K.C.	⑨ Note 3
6	1600 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1600 K.C.	⑪
7	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1400 K.C.	② Note 4
8	1200 to 1400 K.C.	Note 5	Note 5	Note 5	② Note 5

Make all adjustments for maximum reading on the meter.

NOTE 1 — Connect the aerial lead, Part No. 95-0111, to the aerial receptacle in the radio. Connect a 40 Mmfd. Condenser in series between the signal generator and the aerial lead.

NOTE 2 — Turn the tuning control clockwise as far as it will go.

NOTE 3 — Rock the tuning control while adjusting the low frequency screw. Tune the control to the signal and adjust the screw for maximum output. Rotate the tuning control back and forth slightly for maximum output. Then readjust the screw for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the aerial stage adjustment is made with the Radio installed in the car, the Radio aerial lead must be connected to the car aerial in the usual manner. Connect the signal generator output lead to a wire placed near the car aerial but not connected to it.

NOTE 5 — When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Remove the plug button on the end of the radio and adjust the aerial compensator ② (see Figure 3) for maximum signal.

The following is the procedure for aligning the Packard tuning unit after a coil or other part of the assembly has been replaced. The unit should be aligned after it is mounted in the radio.

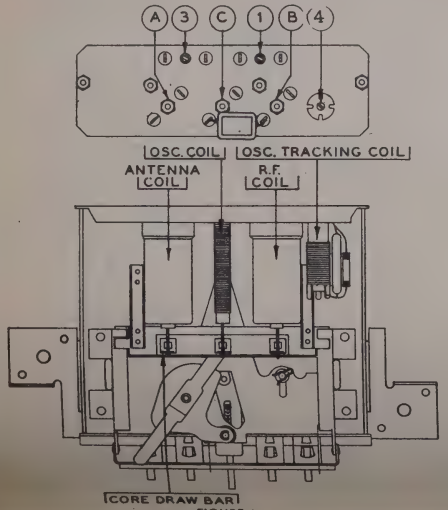


FIGURE 1

1 — COMPLETE ALIGNMENT PROCEDURE

(a) Push in the tuning control knob so that stations can be tuned in by manual tuning.

(b) Turn the tuning control knob clockwise as far as it will go so that the cores will be in the extreme "out" position. Set the signal generator to 1600 K.C. and adjust padder (3) (Fig. 1) for maximum signal.

(c) Adjust padder (2) aerial compensator **in radio** and padder (1) (see Fig. 1) for maximum signal.

(d) Set the signal generator at 1400 K.C. and tune the manual control to 1400 K.C. Adjust the R.F. and antenna coil for maximum signal by turning the mounting nuts (A) and (B).

(e) Repeat (c) and (d) until no further improvement is noticed.

(f) Set the signal generator at 600 K.C. and the tuning control at 600 K.C. Adjust the screw (4) (see Fig. 1) for maximum signal. Rock the tuning control when making this adjustment. Tune the control to the signal and adjust the screw for maximum output. Rotate the tuning control back and forth slightly until maximum output is obtained. Then readjust the screw until no further improvement is noticed.

(g) In case a great adjustment was necessary in (f) the adjustments (c) and (d) should be repeated.

(h) In case the dial calibration is off frequency, it can be corrected by changing the starting position of the oscillator core. This is done by unsoldering the piano wire from the lug and moving the core slightly. A change of 1/64" in the position of the core is equivalent to approximately 20 K.C. on the dial. If the dial reads low, it can be corrected by starting the oscillator core further in the coil form. If it reads high, the core should be pulled out. If this position is changed, it will be necessary to realign the radio as described above.

2 — ALIGNMENT WHEN ONLY THE ANTENNA COIL OR CORE IS REPLACED

(a) Set the piano wire end of the core 1¼" from the end of the coil form when the core draw bar is in the extreme "out" position, and solder the wire to the lug.

(b) Set up the signal generator to 1600 K.C., and adjust the aerial compensator (2) **in the radio** for maximum signal.

(c) Adjust the signal generator to 1400 K.C. and set the tuning control at 1400 K.C. Adjust the coil for maximum signal by turning the mounting nut (A) until maximum signal is obtained. In case a peak cannot be obtained, it may be necessary to unsolder the piano wire and move the core slightly, either in or out.

(d) Repeat (b) and (c).

3 — ALIGNMENT WHEN ONLY THE R.F. TRANSFORMER OR CORE IS REPLACED

(a) Set the piano wire end of core 1¼" from the end of the coil form when the core draw bar is in the exterme "out" position and solder the wire to the lug.

(b) Set up the signal generator to 1600 K.C. and adjust padder (1) (see Fig. 1) for maximum signal.

(c) Adjust the signal generator to 1400 K.C. and set the tuning control at 1400 K.C. Adjust the coil form by turning the mounting nut (B) until maximum signal is obtained. In case a peak cannot be obtained it may be necessary to unsolder the piano wire and move the core slightly, either in or out.

(d) Repeat (b) and (c).

4 — ALIGNMENT WHEN ONLY THE OSCILLATOR TRACKING COIL OR CORE IS REPLACED

(a) Set the signal generator to 600 K.C. and the tuning control at 600 K.C. Adjust screw (4) (see Fig. 1) for maximum signal. Rock the tuning control while making this adjustment. Tune the control to the signal and adjust the screw for maximum output. Rotate the tuning control back and forth slightly until maximum output is obtained. Then readjust the screw until no further improvement is noticed.

(b) Check and readjust the aerial compensator (2) in the radio, and padders (1), (2) and (4) as described in 1.

5 — ALIGNMENT WHEN ONLY THE OSCILLATOR COIL OR CORE IS REPLACED

(a) Set the piano wire end of the core 1¼" from the end of the coil form when the core draw bar is in the extreme "out" position, and solder the wire to the lug.

(b) Set up the signal generator to 1600 K.C. and adjust padder (3) (see Fig. 1) for maximum signal.

(c) Follow the same procedure as outlined under "1—Complete Alignment Procedure".

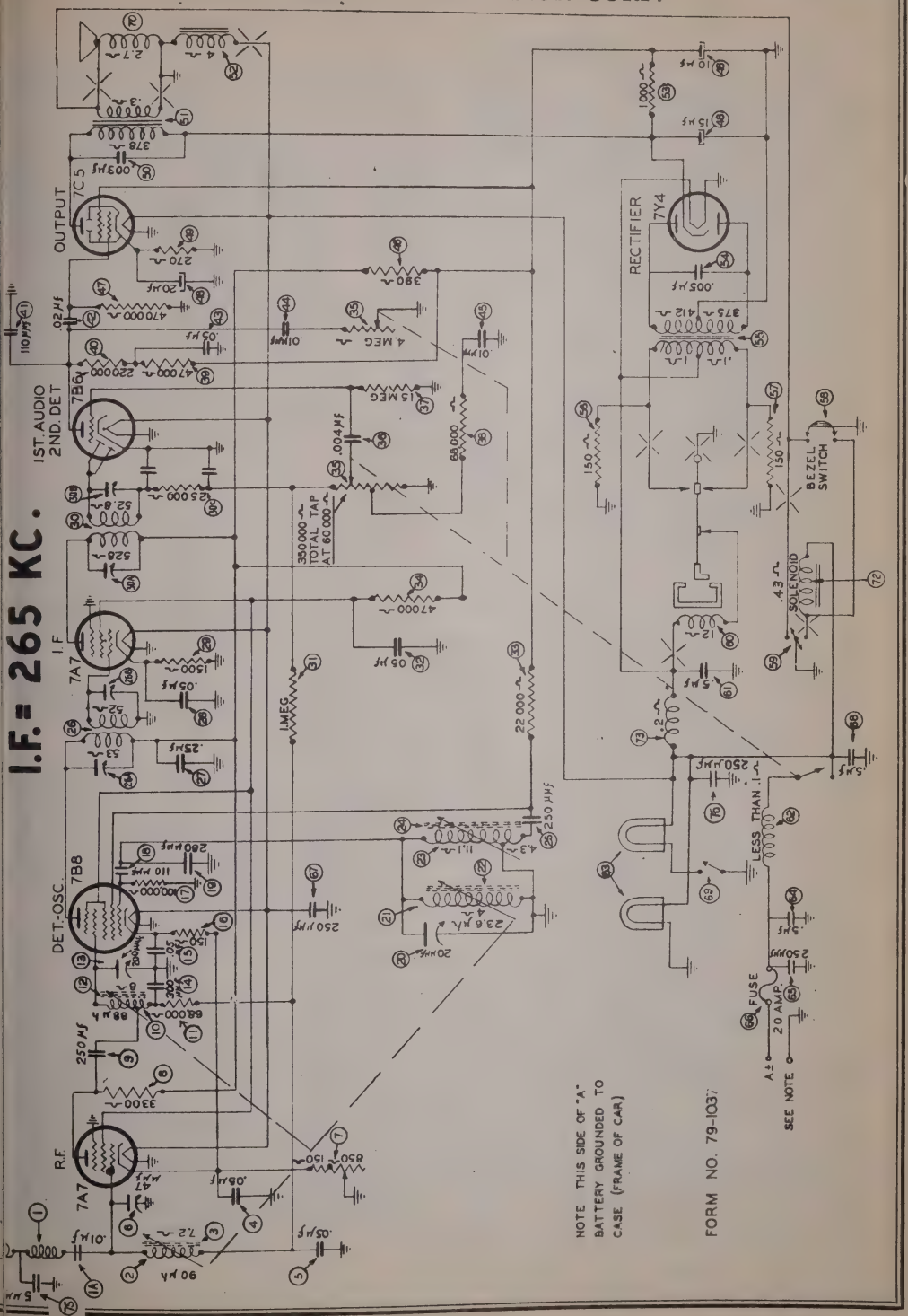
AUDIO OUTPUT METER. If an audio output meter is used, connect the leads across the voice coil of the speaker. Use the 0-30 volt scale.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

PHILCO RADIO & TELEVISION CORP.

MODEL F-1942



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OPERATION	SIGNAL GENERATOR FREQUENCY	SIGNAL GENERATOR CONNECTION	DUMMY CAPACITY	SPECIAL INSTRUCTIONS	ADJUST PADDER
1	PRESS THE TOUCH BAR AND RELEASE UNTIL THE WORD "DIAL" IN THE CENTER OF THE DIAL SCALE LIGHTS UP				⑨A ⑨B ⑨A ⑨B ⑨A ⑨B ⑨A ⑨B
2	265 K.C.	To Aerial Receptacle on Radio	.1 Mfd.	Note 2	⑨
3	1600 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1600 K.C.	⑧
4	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1400 K.C.	⑥ ⑬ Note 4
5	590 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 590 K.C.	⑮ Note 3
6	1600 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1600 K.C.	⑧
7	1400 K.C.	To Aerial Receptacle on Radio	See Note 1	Set Tuning Control at 1400 K.C.	⑥ Note 4
8	1200 to 1400 K.C.	Note 5	Note 5	Note 5	⑥ Note 5

Make all adjustments for maximum reading on the meter.

NOTE 1—Connect the aerial lead, Part No. 95-0236, to the aerial receptacle in the radio. Connect a 30 Mmfd. Condenser in series between the signal generator and the aerial lead.

NOTE 2—Turn the tuning control counter-clockwise as far as it will go.

NOTE 3—Rock the tuning control while adjusting the low frequency screw. Tune the control to the signal and adjust the screw for maximum output. Rotate the tuning control back and forth slightly for maximum output. Then readjust the screw for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4—When the aerial stage adjustment is made with the Radio installed in the car, the Radio aerial lead must be connected to the car aerial in the usual manner. Connect the signal generator output lead to a wire placed near the car aerial but not connected to it.

NOTE 5—When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the dial. Adjust the aerial compensator ⑥ (see Figure 3) for maximum signal.

SETTING UP "ADJUST-O-MATIC" TUNING

Turn the radio on and allow it to operate for at least 20 minutes, or longer if possible.

Press the touch bar and release; repeat this operation until the word "DIAL" in the center of the dial scale lights up, then press once more. This leaves the tuner in the first automatic position.

Press the right hand knob and tune the desired station by rotating the knob. The pointer moves as the knob is rotated, indicating the frequency to which the radio is tuned in the automatic position.

Press the touch bar again. This releases the knob and advances the tuner to the second automatic position.

Repeat the above procedure for the remaining four automatic positions.

Any of the automatic positions may be reset at any time and any position can be adjusted to receive any station in the broadcast band within the range of the set.

The automatic positions may be set to stations in any sequence desired. However, for convenience in remembering the stations, it is recommended that the automatic positions be set up in the same order that the stations appear across the dial.

NOTE—These adjustments must be carefully made, exactly in tune with the stations. It will be found that precision in these adjustments is easy when at a distance from the station or in a shielded building, under a viaduct or in any location where the strength of the signal from the station is considerably reduced.

PARTS LIST—F-1942

No.	Description	Part No.
(1)	Antenna Choke	65-0102
(1a)	Condenser (.01 Mfd.)	61-0114
(2)	Antenna Transformer	65-0443
(3)	Antenna Transformer Core	57-2334
(4)	Condenser (.05 Mfd.)	61-0111
(5)	Condenser (.05 Mfd.)	61-0111
(6)	Antenna Padder	83-0079
(7)	Sensitivity Control	67-0025
(8)	Resistor (3300 ohms)	33-333334
(9)	Condenser (250 Mmfd.)	60-125157
(10)	R. F. Transformer	65-0444
(11)	Resistor (68,000 ohms)	33-368154
(12)	R. F. Transformer Core	57-2334
(13)	R. F. Padder	83-0080
(14)	Condenser (300 Mmfd.)	60-130137
(15)	Condenser (.05 Mfd.)	61-0111
(16)	Resistor (150 ohms)	33-115331
(17)	Resistor (100,000 ohms)	33-410154
(18)	Condenser (110 Mmfd.)	60-110157
(19)	Condenser (380 Mmfd.)	61-0043
(20)	Oscillator Padder	83-0082
(21)	Oscillator Transformer	65-0463
(22)	Oscillator Transformer Core	57-2633
(23)	Oscillator Tracking Transformer	65-0441
(24)	Oscillator Tracking Transformer Core	57-2335
(25)	Condenser (250 Mmfd.)	60-125157
(26)	First I. F. Transformer	65-0460
(26a)	Padder (Prt. 1st I. F. Trans.)	
(26b)	Padder (Rec. 1st I. F. Trans.)	
(27)	Condenser (.25 Mfd.)	61-0125
(28)	Condenser (.05 Mfd.)	61-0101
(29)	Resistor (1500 ohms)	33-315154
(30)	Second I. F. Transformer	65-0461
(30a)	Padder (Prt. 2nd I. F. Trans.)	
(30b)	Padder (Sec. 2nd I. F. Trans.)	
(30c)	Resistor (25,000 ohms)	33-325154
(31)	Resistor (1,000,000 ohms)	33-510154
(32)	Condenser (.05 Mfd.)	61-0101
(33)	Resistor (22,000 ohms)	33-322154
(34)	Resistor (47,000 ohms)	33-347434
(35)	Volume Control (250,000 ohms) Tone Control (4,000,000 ohms) & On-Off Switch	67-0060
(36)	Condenser (5400 Mmfd.)	61-0179
(37)	Resistor (15,000,000 ohms)	33-815154
(38)	Resistor (68,000 ohms)	33-368154
(39)	Resistor (47,000 ohms)	33-347334
(40)	Resistor (220,000 ohms)	33-422334
(41)	Condenser (110 Mmfd.)	60-110157
(42)	Condenser (.02 Mfd.)	61-0116
(43)	Condenser (.05 Mfd.)	61-0122
(44)	Condenser (.01 Mfd.)	61-0178
(45)	Condenser (.01 Mfd.)	61-0114
(46)	Resistor (300 ohms)	33-139334
(47)	Resistor (470,000 ohms)	33-447154
(48)	Filter Condenser (10-15-30 Mfd.)	61-0089
(49)	Resistor (270 ohms)	33-127431
(50)	Condenser (3900 Mmfd.)	61-0115
(51)	Output Transformer	65-0454
(52)	Field Coil	(Not Replaceable)
(53)	Resistor (1000 ohms)	33-310434
(54)	Condenser (5000 Mmfd.)	61-0153
(55)	Power Transformer	65-0455
(56)	Resistor (150 ohms)	33-115334
(57)	Resistor (150 ohms)	33-115334
(58)	Bezel Switch	85-0152
(59)	Foot Switch Kit	81-0395
(60)	Vibrator	83-0026
(61)	Condenser (.5 Mfd.)	61-0134
(62)	"A" Choke	33-1644
(63)	Pilot Lamp	34-2064
(64)	Condenser (.5 Mfd.)	61-0137
(65)	Condenser (250 Mmfd.)	60-125157
(66)	Fuse	45-2659
(67)	Condenser (25 Mmfd.)	60-125157
(68)	Condenser (.5 Mfd.)	61-0106
(69)	Dial Light Contact (Part of Turret)	
(70)	Replacement Cone (For 73-0071-2)	91-0238
	(For 73-0071-4)	91-0240
(72)	Solenoid	(Not Replaceable)
(73)	Vibrator Choke	65-0465
(74)	Antenna Choke	65-0378
(75)	Condenser (5 Mmfd.)	60-905137
(76)	Condenser (25 Mmfd.)	
	"A" Lead	77-1086
	Condenser (Volt Rec. & "A" Line)	61-0162
	Condenser (Oil Gauge)	61-0182
	Condenser (Coil)	61-0181
	Distributor Resistor	67-0082
	Ground Lead (Voltage Regulator)	77-0810
	Tube Socket	27-6151
	Vibrator Socket	27-6153
	Housing	77-1119

No.	Description	Part No.
	Wiring Side Cover	57-2392FC71
	Tube Side Cover	77-1071FC71
	Screw (Bezel Mtg. Top)	97-0275FA1
	Screw (Bezel Mtg. Bottom)	97-0276FA1
	Bezel	57-2476PCP
	Dial	55-1465
	Dial Mtg. Clip	57-2464FE7
	Dial Mtg. Clip	57-2465FE7
	Dial Mtg. Screw	97-0254FA3
	Dial Mtg. Screw	97-0255FA3
	Rubber Bumper	55-1474
	Key Bar Assembly	77-1073
	Tuning & Volume Knob	77-1081
	Knob Backing Ring	57-2472FA8
	Tone Knob	57-2467FA8
	Spring (Tuning Shaft)	57-2727FA38
	Spring Retainer (Tuning Shaft)	57-2469FA3
	Nut (Vol. Control Mtg.)	W684FA3
	Aerial Lead	95-0236
	Support Bracket	57-2474FA3
	Hook Bolt (Receiver Mtg.)	57-2468FA3
	Bolt (Receiver Mtg.)	W763FA3
	Wing Nut (Receiver Mtg.)	97-0103FA3
	Speaker	73-0071
	Nut (Speaker Mtg.)	97-0252FA3
	*Aerial (Closed Car)	91-0236
	*Aerial (Open Car)	91-0237

* NOTE—1942 Ford Aerials are now available through Philco and may be ordered from Authorized Philco Warranty Service Stations or Philco distributors.

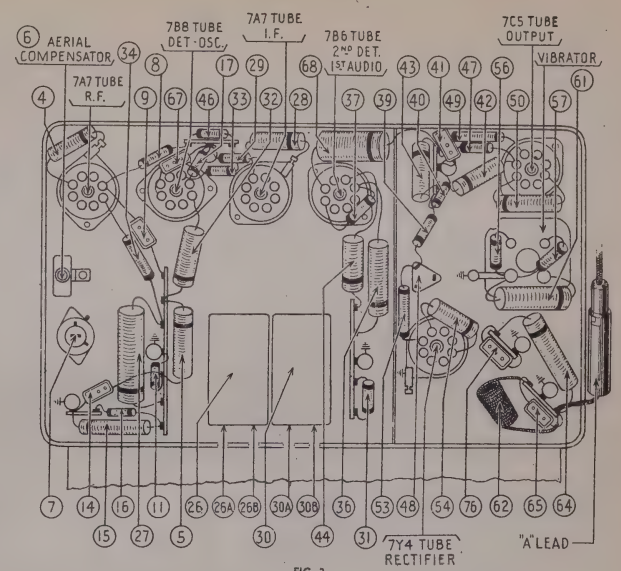
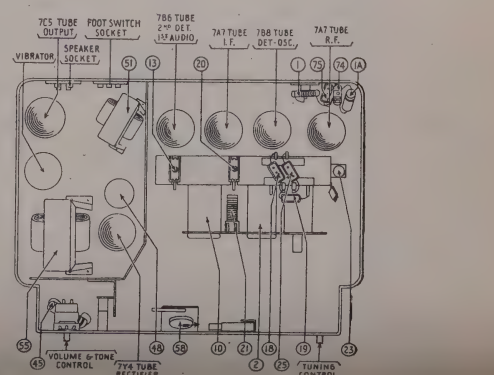


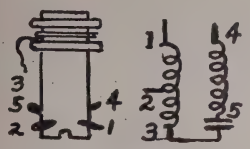
FIG. 3



PHILCO RADIO & TELEVISION CORP.

MODEL 41-231

The physical sketch of aerial transformer 9 and 10 shown on the diagram is incorrect. The correct sketch and diagram with lug locations is shown below.



9610 ANT TRANS
Model 41-231

MODEL 42-PT-87

Three types of speakers were used on this model and each require a different cone assembly number. These are as follows:

Speaker	Cone Assembly
36-1521-3	36-4175
36-1556-1	36-4214
36-1577-1	36-4214

When using speaker Part No. 36-1556, condenser (26) .0015 mfd. 400 volts, Part No. 30-4555, is changed to .004 mfd., 600 volt, Part No. 30-4623. Chassis with this change are marked run 2. Chassis with this change also have a .01 mfd., condenser Part No. 30-4572 connected from the plate of the 35Z5GT output tube to the aerial terminal panel on top of chassis. This condenser used as a means of connecting an output meter to the output circuit for test purposes.

When using speaker Part No. 36-1577, condenser (26) .0015 mfd. 400 volts, Part No. 30-4555 is changed to .002 mfd., 600 volt, Part No. 30-4622. Chassis with this change are marked run 3.

MODEL 42-PT-88

Three types of speakers were used on this model and each require a different cone assembly number. These are as follows:

Speaker	Cone Assembly
36-1521-3	36-4175
36-1556-1	36-4214
36-1577-1	36-4214

When using speaker Part No. 36-1556, condenser (26) .0015 mfd 400 volts Part No. 30-4555, is changed to .004 mfd., 600 volt Part No. 30-4623. Chassis with this change are marked run 2. Chassis with this change also have a .01 mfd., condenser Part No. 30-4572 connected from the plate of the 35Z5GT output tube to the aerial terminal panel on top of chassis. This condenser used as a means of connecting an output meter to the output circuit for test purposes.

When using speaker Part No. 36-1577, condenser (26), .0015 mfd., 400 volts, Part No. 30-4555 is changed to .002 mfd 600 volts, Part No. 30-4622. Chassis with this change are marked run 3.

MODELS 42-PT-91, 92, 93, 94, 95

Condenser and choke assembly (5) Part No. 76-1161 changed to Part No. 76-1418.

Models PT-94 and PT-95 dial pointers changed from Part No. 54-4043 to 54-4148. Model PT-94. Knob changed from Part No. 27-4809 to 54-4137.

Model PT-95 knob changed from Part No. 27-4810 to Part No. 54-4143.

Three types of speakers were used on these models. The speakers Part Nos. are 36-1542-9, 36-1542-3 and 36-1542-2. The cone assemblies for each speaker differ as follows:

Speaker	Cone Assembly
36-1542-9	36-4204
36-1542-3	36-4225
36-1542-2	36-4218

MODEL 42-327, CODE 121-122

Cabinet Part No. 10561B is used with Code 122 chassis. The cabinet for Code 121 is Part No. 10561-A as listed in the Service Bulletin. The push-button escutcheon for Code 122 is Part No. 56-2233FCP.

The aerial transformer (2) (Broadcast) on later production chassis was changed from Part No. 32-3714 to 32-3877. Lug wiring on both coils remains the same as shown in the Service Bulletin.

Correction: The rectifier tube is listed as a 35Z3GT. The correct designation is 35Z3.

MODEL 42-335, CODE 121

The power transformer for operation on 115 or 230 volt 60 cycle current is Part No. 32-8093.

Tuning shaft changed from Part No. 56-6152FA3 to 56-6193CP. New shaft is coated with fiberblock instead of rubber.

Drive cord changed from Part No. 31-2546 to Part No. 31-2615 when using tuning shaft 56-6193CP.

MODEL 42-340, Code 121

The power transformer for operating this model on 115 volts, 25 cycle current is Part No. 32-8075. Shield (power transformer) 56-1547FC40; base (power transformer) 56-1548FA5.

To increase sensitivity aerial transformer (Broacast) (4) is changed from Part No. 32-3724 to Part No. 32-3871.

For operation on 115 or 230 volt, 60 cycle operation power transformer Part No. 32-8093 is used; conversion plug is L-3275 required.

Tuning shaft changed from Part No. 56-6152FA3 to 56-6193CP.

Drive cord changed from Part No. 31-2546 to Part No. 31-2615 when using tuning shaft Part No. 56-6193CP.

MODEL 42-345, CODE 121

To operate this model on 115 volts, 25 cycle current use power transformer Part No. 32-8075.

For operation on 115 or 230 volt, 60 cycle current use power transformer Part No. 32-8093.

Tuning shaft changed from Part No. 56-6152FA3 to Part No. 56-6193CP when using tuning shaft Part No. 56-6193CP.

Drive cord change from Part No. 31-2546 to Part No. 31-2615 when using tuning shaft Part No. 56-6193CP.

MODEL 42-350, CODE 121

To improve filtering in the rectifier circuit and prevent flutter on the F.M. band, electrolytic condenser (40) (40A) 4-4 mfd., 400 volts Part No. 30-2477 changed to 4-12 mfd. Part No. 30-2537. The 4 mfd. section is connected to position (40A) and the 12 mfd. section in position (40).

To prevent parasitic oscillation the ground lead of condenser (30) is removed from contact 4 of the 7V7 1st I. F. tube socket and reconnected to contact (8) of the same tube socket.

In the schematic diagram, circled numbers (15A) should be (11), 11B should be (15A) and 11 should be (11B).

Tuning shaft changed from Part No. 56-6156FA3 to 56-6194CP.

Drive cord changed from Part No. 31-2546 to Part No. 31-2615 when using tuning shaft 56-6194CP.

Beginning with chassis marked production run 2, the power transformer seventy-nine was changed from Part No. 32-8183 to Part No. 32-8220.

MODEL 42-355, CODE 121

Push-button knob changed from Part No. 54-4111 to 54-4144.

To operate this model on a 115 or 230 volt, 60 cycle power supply power transformer Part No. 32-8212 is required.

To increase sensitivity aerial transformer (5) Part No. 32-3811 is changed to 32-3874.

Tuning shaft changed from Part No. 56-6152FA3 to 56-6193CP.

Beginning with chassis marked run 2, the power transformer (90) was changed from Part No. 32-8187 to 32-8221.

NOTES, CHANGES

PHILCO RADIO & TELEVISION CORP.

MODEL 42-360, CODE 12?

To operate on 115 volts, 25 cycle A.C. current power transformer Part No. 32-8149 is used.

For operation on a 115 or 220 volt, 60 cycle A.C. power supply, use transformer Part No. 32-8094.

To improve performance aerial transformer (Brdcst Band) (5) is changed from Part No. 32-3726 to 32-3863. The lug arrangement for both coils is shown on the schematic diagram. In some later production chassis of Model 42-360 a 7Y4 rectifier tube is used in place of an 84 tube.

MODEL 42-365, CODE 121

The pointer drive cord on later production chassis was changed from Part No. 31-2597 to 31-2608. The new cord is shorter than the original one.

To operate this model on 115 volts, 25 cycle A.C. current change power transformer (61) from Part No. 32-8117 to Part No. 32-8149.

For operation on 115 or 230 volt, 60 cycle A.C. power circuits use power transformer 32-8094.

Aerial transformer (9) changed from Part No. 32-3755 to 32-3864 to improve the operating performance of the receiver.

MODEL 42-380, CODE 121

To operate this model on 115 volt, 25 cycle A.C. current replace power transformer (62) Part No. 32-8177 with Part No. 32-8195.

For operation on a 220 volt 60 cycle A.C. current power transformer Part No. 32-8212 is required.

In later production models the aerial transformer (3) Part No. 32-3746 was changed to Part No. 32-3869 to increase the sensitivity.

Tuning shaft changed from Part No. 56-6152FA3 to 56-6193CP.

MODEL 42-390, CODE 121

To increase the sensitivity the aerial transformer (5) was changed from Part No. 32-3790 to Part No. 32-3870.

Push-button knobs changed from Part No. 54-4111 to 54-4144.

To operate this model on a 115 volt 25 cycle A.C. power supply change the power transformer from Part No. 32-8177 to 32-8195.

For operation on 220 volts, 60 cycle current, power transformer 32-8212 is required.

Tuning shaft changed from Part No. 56-6152FA3 to 56-6193CP.

Beginning with chassis marked run 2, the power transformer (90) Part No. 32-8177 is changed to Part No. 32-8222.

MODEL 42-395, CODE 121

A few early production chassis of this model used speaker Part No. 36-1515-4 (cone assembly 36-4181) and speaker Part No. 36-1515-2 (cone assembly 36-4173).

All later production models use speaker Part No. 36-1530 (cone assembly 36-4181) as list in the Service Bulletin.

To operate on 115 volts, 25 cycle current change the power transformer from Part No. 32-8192 to Part No. 32-8209.

For operation on 220 volts, 60 cycle current, use power transformer Part No. 32-8213.

The broadcast aerial transformer (3) Part No. 32-3790 was changed to Part No. 32-3870 on later production chassis to increase the sensitivity.

Tuning shaft changed from Part No. 56-6164 to 56-6195CP.

To improve the I.F. filtering of the plate voltage supply, condenser (47) was changed from .05 mfd. Part No. 30-4518 to .2 mfd. Part No. 30-4594.

MODEL 42-400, CODE 121

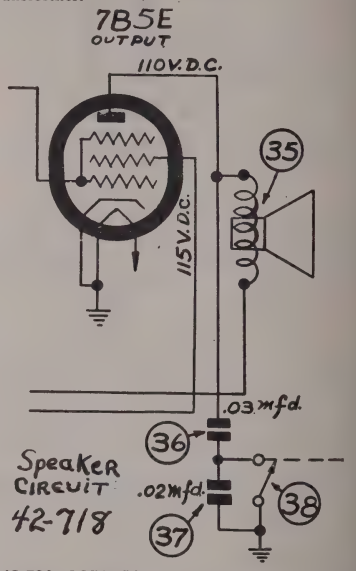
Condenser (59D) which is mounted in the fourth I.F. transformer is Part No. 60-150227. This number is not shown in the parts list.

MODEL 42-718, CODE 121

Beginning with run 2, the speaker (35) was changed fro Part No. 36-1520-4 to Part No. 36-1576. The new speaker a permanic type and the wiring is different from that show on the diagram for speaker Part No. 36-1520-4. The wirin for the new speaker is shown below.

Output transformer (34) Part No. 32-8106 is also remove when the permanic speaker Part No. 36-1576 is installed.

The voice coil in the new speaker takes the place of th output transformer.



MODEL 42-730, CODE 121

To prevent moisture from affecting circuits, condenser (44), (48) and (51) changed from Part No. 30-4591 to Par No. 30-4610. Values remain the same.

MODEL 42-760, CODE 121

Beginning with chassis marked run 2, the band switch (85) was changed from 42-1660 to 42-1711.

MODEL 42-761, CODE 121

Beginning with chassis marked run 4 condenser (13) Par No. 30-4586 .1 mfd., 200 volts changed to .1 mfd., 400 volt Part No. 30-4527.

Correction: Dial scale pointer Part No. should be 56-213 instead of 56-1234 as shown in the parts list.

MODEL 42-762, CODE 121

Beginning with chassis marked run 3, the speaker of this model was changed from permanent magnet type Part No 36-1508-3 to electro-dynamic type Part No. 36-1568. Speaker cable for the new speaker is Part No. 41-3535.

The voice coil of the electro-dynamic speaker is connected as shown in the Service Bulletin. The field coil of the speaker is connected to the + positive and (—) negative wiring of the 6 volt storage battery.

MODEL 42-788, CODE 121

To improve operating conditions in humid climates the part numbers of the following condensers were changed. Values remain the same:

Schematic No.	Description	Original Part No.	New Part No.
54	CONDENSER (.01 mfd.) 400 volts	30-4572	30-4598 (1000 volts)

Continued on next page

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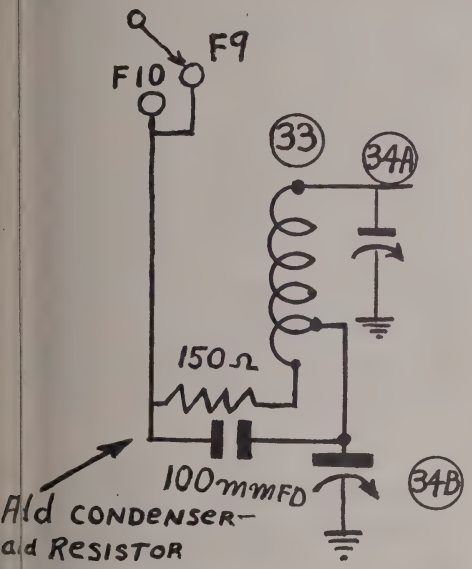
1	CONDENSER (.006 mfd.)	30-4591 400 volts	30-4610
0	CONDENSER (.05 mfd.)	30-4519 200 volts	30-4609 200 volts
4	CONDENSER (.003 mfd.)	30-4582 (600 volts)	30-4608

trouble is experienced in padding the 22 M.C. normal tu g range (compensator 38A), the installation of a 150 ohm re tor Part No. 33-115339 and a 100 mmfd. condenser will im ove the operation. These parts are installed in the cir- cu as shown in the diagram below.



MODELS 42-842, 42-843, 42-844

T improve the tuning operation of the oscillator circuit the osci tor transformer (7) was changed from Part No. 32-3633 to 33685. The iron core for both of these transformers is Part No. 57-2325.

P wer cord changed from Part No. L-3199 to L-3299.

C rection: Resistor (49) shown as 33-218339 in the parts list ould be changed to 33-3410.

MODELS 42-853, 42-854

C rection, Note B

T second line of this paragraph should read as follows: adj ted, the image signal will be found by turning the signal gene tor 910 K.C. above the fundamental signal which will be 1910 M.C."

MODEL 42-1001, CODE 121

CONVERTING THE PHONOGRAPH MOTOR FOR USE ON 50 CYCLE A.C. LINES

T motor in this model designed for operation on 60 cycle A.C. lines. The motor will operate satisfactorily on 50 cycle lines The only change that needs to be made is to change the ive ratio between the motor pulley and the turntable drive pulley. This is accomplished by putting a coil spring, Part No. 28-8999, over the motor drive pulley. Screw it on the ive pulley counterclockwise with the long pig tail at the top. The pig tail can be cut off after the spring has been place on the pulley.

MODEL 42-1002, CODE 121-122

CONVERTING THE PHONOGRAPH MOTOR FOR USE ON 50 CYCLE A.C. LINES

Follow instructions as for Model 42-1001

MODEL 42-1003, CODE 121-122

The light beam pick-up (9) of later production Code 122 chassis was changed from a metal tone arm Part No. 35-2517 to a plastic tone arm Part No. 35-2601. The counter-weight when using the plastic tone arm is Part No. 318-2863 (3 oz.). A new rubber bumper is also required Part No. 54-4167.

CONVERTING THE PHONOGRAPH MOTOR FOR USE ON 50 CYCLE A.C. LINES

Follow instructions as for Model 42-1001

MODEL 42-1004, CODE 121

To improve the operating performance of the rectifier circuit, the wiring of rectifier tube 50Y6GT socket was changed as follows:

Remove the bare wire between contacts 2 and 3. Connect a wire from contact 3 of the socket (see figure 3 in bulletin) to the lug of the filament resistor (43) to which condenser (40) is already attached. This change was incorporated in all chassis marked run 2. Sets prior to run 2 do not have this wiring change.

Beginning with chassis marked run 3 condenser (36) .01 mfd., 400 volts Part No. 30-4572 was changed to .006 mfd., 400 volts Part No. 30-4591. This change was made to improve the tone quality of the phonograph.

Loop Aerial (1) changed from Part No. 76-1368 to Part No. 76-1372.

CONVERTING THE PHONOGRAPH MOTOR FOR USE ON 50 CYCLE A.C. LINES

Follow instructions as for Model 42-1001

MODEL 42-1005, CODE 121-122

Two types of Photo Electric pickups (9) were used on Code 122 models. One consisted of a metal tone arm Part No. 35-2531 and the other a plastic arm Part No. 35-2602. When using the plastic tone arm a 3 oz. counter weight Part No. 318-2863 must be used in the supporting end of the arm. A new tone arm bumper Part No. 54-4167 is also required.

CONVERTING THE PHONOGRAPH MOTOR FOR USE ON 50 CYCLE A.C. LINES

Follow instructions as for Model 42-1001

MODEL 42-1006, CODE 122

Condenser (7) changed from Part No. 76-1161 to 76-1227. Values remain the same. Construction change only.

CONVERTING THE PHONOGRAPH MOTOR FOR USE ON 50 CYCLE A.C. LINES

Follow instructions as for Model 42-1001

NOTES, CHANGES

PHILCO RADIO & TELEVISION CORP.

MODEL 42-1008, CODE 121-122
42-1009, CODE 121-122

Production changes 42-1008, 42-1009, Code 121-122.

No. 1. Two types of Phonograph Reproducer Tone arms (90) were used on the Record changer. Tone arm Part No. 35-2518 is made of metal die cast material and Part No. 35-2540 a Plastic material. Since the weight of each tone arm is different, two counter weights are required. The aluminum arm requires a 1½ ounce weight Part No. 218-1420 and the bakelite arm a 3 ounce weight Part No. 218-1531.

CODE 121

To improve the performance of the phonograph reproducer light oscillator circuit, the oscillator transformer (16) was changed from Part No. 32-3785 to 32-3866. The wiring lug arrangement as shown in the Service Bulletin applies to both transformers.

CIRCUIT DIFFERENCES, CODE 121 AND 122

Production Code 122 of Models 42-1008 and 42-1009 differs from Code 121 in several circuit parts. The service information in Radio Service Bulletin 401 for Code 121 with the exception of these parts apply to Code 122. The circuit changes are as follows:

The phonograph oscillator transformer (16) changes from Part No. 32-3785 to 32-3866.

Condenser (56) .2 mfd. is replaced with a 10 mfd. condenser Part No. 30-2500 in Code 122 chassis.

Resistor (57) 2200 ohms is changed to 3300 ohms Part No. 33-233339.

Power transformer (78) Part No. 32-8129 is changed to Part No. 32-8217.

Transformer Part No. 32-8217 does not have filament winding "A" "A" for the 7C6 oscillator tube as shown in bulletin 401.

In Code 122 the 7C6 phonograph oscillator tube filament is connected to filament winding B of transformer Part No. 32-8217 one connection of the tube filament is grounded.

The phonograph input transformer (91) in Code 122 models is Part No. 32-8215.

The tuning shaft in Code 122 is Part No. 56-6196 FCP.

Tuning shaft drive cord Code 122 is Part No. 31-2614.

PUSH-BUTTON PADDING PROCEDURES CHANGE
42-1008, CODE 122

A few models were assembled with the push-button compensator assembly (20) reversed. The padder locations for the push-button is the reverse of that shown

The push-button adjustments on these receivers should be adjusted in accordance with the frequency coverage shown below.

Button Position From Front of Cabinet	Adjust Padder Number (From Rear of Cabinet)	Range Coverage K.C.
1 (Next to On-Off Switch)	1 & 2	1185-1720
2	3 & 4	850-1600
3	5 & 6	710-1185
4	7 & 8	540-980
5	9 & 10	540-980

MODELS 42-1010, 42-1011, CODE 121

Beginning with later production of Model 42-1010 and first production of Model 42-1011, a 10 mmfd. condenser Part No. 60-010137 was connected in series with compensator (5B) osc. This condenser improves the padding of compensator (5B) osc. on 15 MC.

Beginning with run 2 chassis of Models 42-1010 and 42-1011 resistor (7) Part No. 33-322339 was changed to 33-333339. This change was made to prevent the phono reproducer light control (17) elements from becoming shorted due to high current.

HUM REDUCTION

To reduce hum, electrolytic condenser (32)-(32A) 8-8 mfd. 475 volts Part No. 30-2535 was changed to 8-24 mfd., 475 volts Part No. 30-2538. The 8 mfd. section is connected in the circuit position (32) and the 24 mfd. section in position (32A). Chassis with this change are marked run 4. In some receivers prior to this change an 18 mfd. condenser was connected in parallel with (32A).

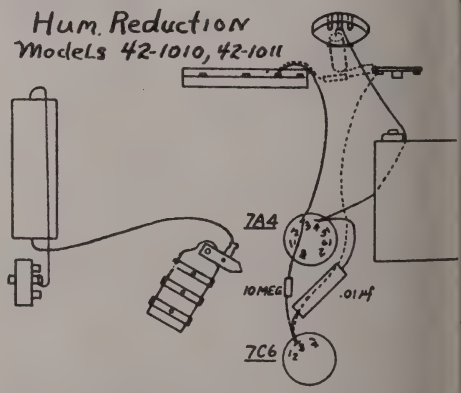
Remove the .01 mfd. condenser, Part No. 30-4572, which is connected to the center tap of the volume control to the terminal on the wiring panel right below it. Also, remove the 10 meg. resistor which is wired to this terminal and to the second terminal of the bias resistor 82 .

Remove the wire which formerly connected the resistor and condenser to the #3 terminal of the 7C6 tube socket.

Connect the center terminal of the volume control to the dummy #4 terminal of the 7A4 tube socket. Connect the second terminal of the resistor 82 to the dummy #3 terminal of the 7A4 tube socket. Both of these leads must be dressed close to the sub base. Follow the layout shown in the accompanying diagram.

Connect the .01 mfd. condenser, Part No. 30-4572, from the #3 terminal of the 7C6 tube to the #4 terminal of the 7A4 tube. Connect the 10 meg. resistor from the #3 terminal of the 7C6 tube to the #3 terminal of the 7A4 tube.

In the diagram, the parts and wires indicated by the dotted lines are to be removed. The 10 meg. resistor and the .01 mfd. condensers are shown in their new location. The location of the 18 mfd. condenser and the wiring connections are also shown.



To prevent oscillation a .2 mfd. 400 volts condenser, Part No. 30-4594, was connected in the circuit at the lug of the terminal panel were resistors (33), (39) and (44) are connected. Ground one side of the condenser. Chassis with this change are marked run 3.

The tuning condenser (24) tuning shaft changed from Part No. 56-6168 FA3 to 56-6195 FCP.

Beginning with chassis marked run 5. Mica condenser (16) 375 mmfd. Part No. 20-037517 was changed to 350 mmfd., Part No. 20-035021. This change made to improve oscillator performance.

Correction diagram

The connection from contact 13 of the B.C. pushbutton should be connected to the tuning condenser only. The line shown connected to the line which connects contact 11 to the antenna socket should be removed.

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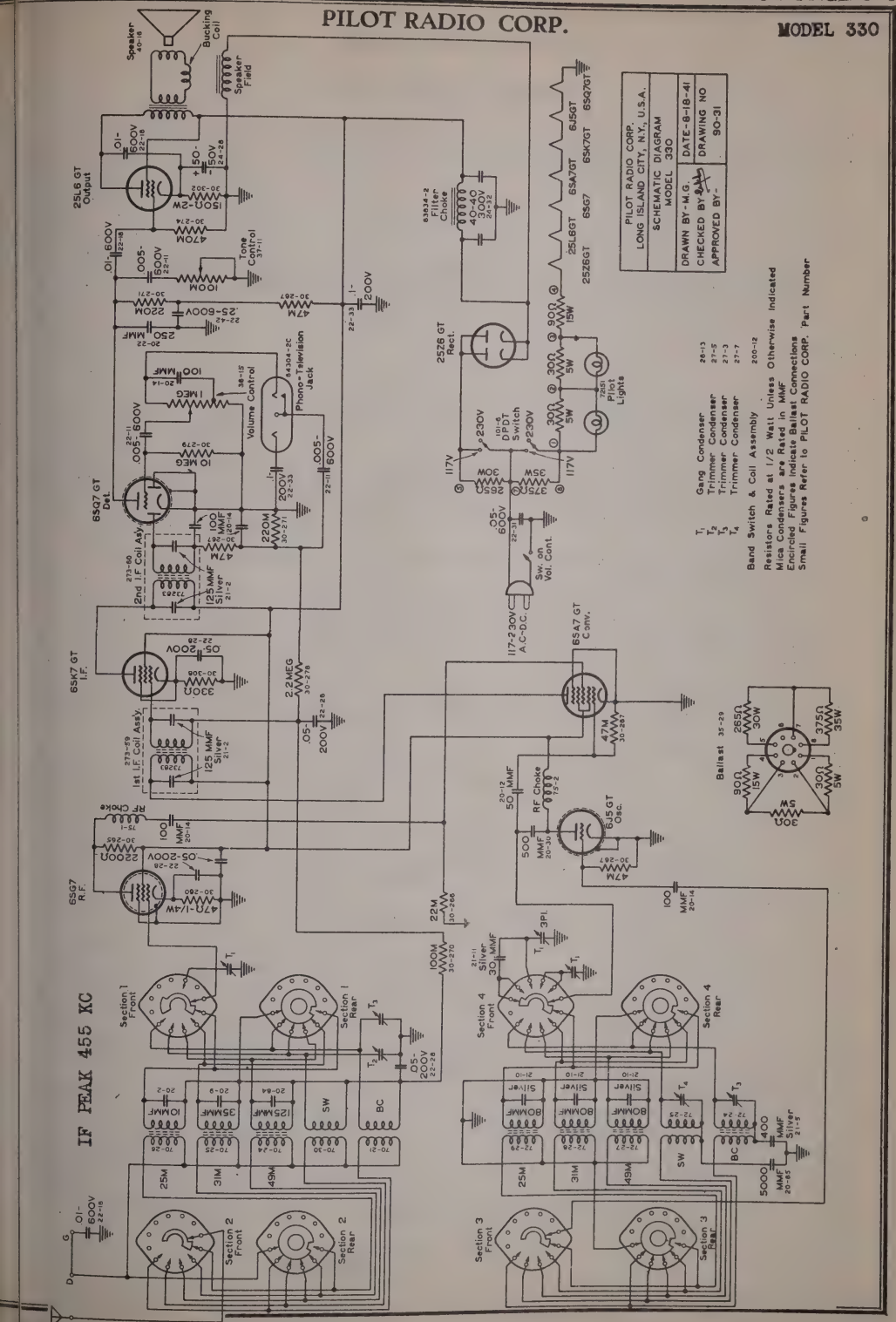

PILOT RADIO CORP.
MODEL 330
IF PEAK 455 KC
PILOT RADIO CORP.
LONG ISLAND CITY, N.Y., U.S.A.
SCHEMATIC DIAGRAM
MODEL 330
DRAWN BY - M.G.
CHECKED BY -
APPROVED BY -
DATE - 8-18-41
DRAWING NO 90-31
Band Switch & Coil Assembly 200-12
Resistors Rated at 1/2 Watt Unless Otherwise Indicated
Mica Condensers are Rated in MMF
Encircled Figures are Socket Connections
Small Figures Refer to PILOT RADIO CORP. Part Number
T1 Gang Condenser 26-13
T2 Trimmer Condenser 27-5
T3 Trimmer Condenser 27-3
T4 Trimmer Condenser 27-7
Speaker 40-16
Bucking Coil
Speaker Field
25L6 GT Output
6SQ7 GT Det.
6SK7 GT I.F.
6SK7 GT I.F.
6SA7 GT Conv.
6E5 GT Osc.
6S67 R.F.
5Y3 GT Rect.
6SA7GT 6A6GT 6A5GT 6SK7GT 6SQ7GT
25L6GT 6S67 25Z6GT
Phono-Television Jack
Volume Control
Tone Control
Pilot Lights
DPDT Switch
Sw. on Vol. Cont.
2nd I.F. Coil Assy.
1st I.F. Coil Assy.
RF Choke
Filter Choke
Ballast
Section 1 Front
Section 1 Rear
Section 2 Front
Section 2 Rear
Section 3 Front
Section 3 Rear
Section 4 Front
Section 4 Rear
117-230V A.C.-D.C.

MODEL 330

PILOT RADIO CORP.

PHONOGRAPH AND TELEVISION JACKS

On the rear of the chassis is a set of "Pin" jacks. They are intended to be employed for connection with an electrical phonograph, or with the sound outlet of a television receiver.

BAND SPREAD TUNING

The International Short Wave Broadcast Bands have been spread out over the full dial length to make the tuning in of foreign broadcasts as easy and accurate as the local stations on the broadcast band.

SERVICE NOTES

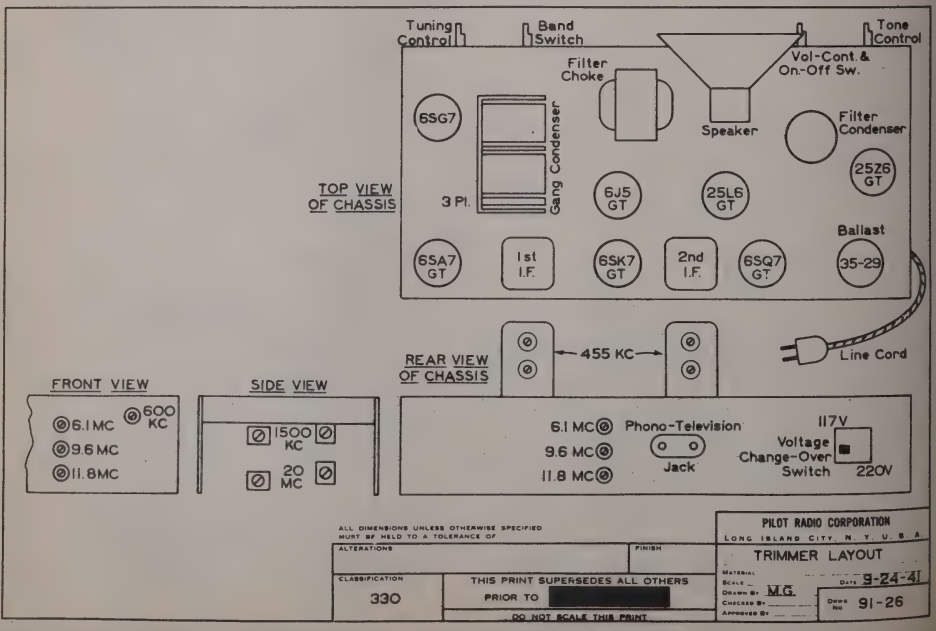
The location of all adjustments used in re-aligning this receiver, and the frequencies at which these adjustments should be made, are shown in the accompanying diagram.

When aligning the I.F. amplifier, the generator must be connected to the grid of the 6SA7 tube through a .1 mfd condenser. When aligning the receiver on the Broadcast Band, connect the generator to the Antenna wire through a .0002 mfd condenser, and on the four short wave bands through a 400 ohm carbon resistor.

In general it is not recommended to re-align the bandspread coils unless it is definitely necessary.

First adjust the oscillator iron core to make the pointer correspond with the calibration mark. Then adjust the antenna iron core for maximum output. The signal generator must be accurate within 5 kc on each band, and the use of a calibrating crystal oscillator is recommended. Otherwise a broadcast signal of known frequency may be used.

In this receiver the oscillator frequency is higher than the signal frequency on the broadcast band and lower on the four other bands.



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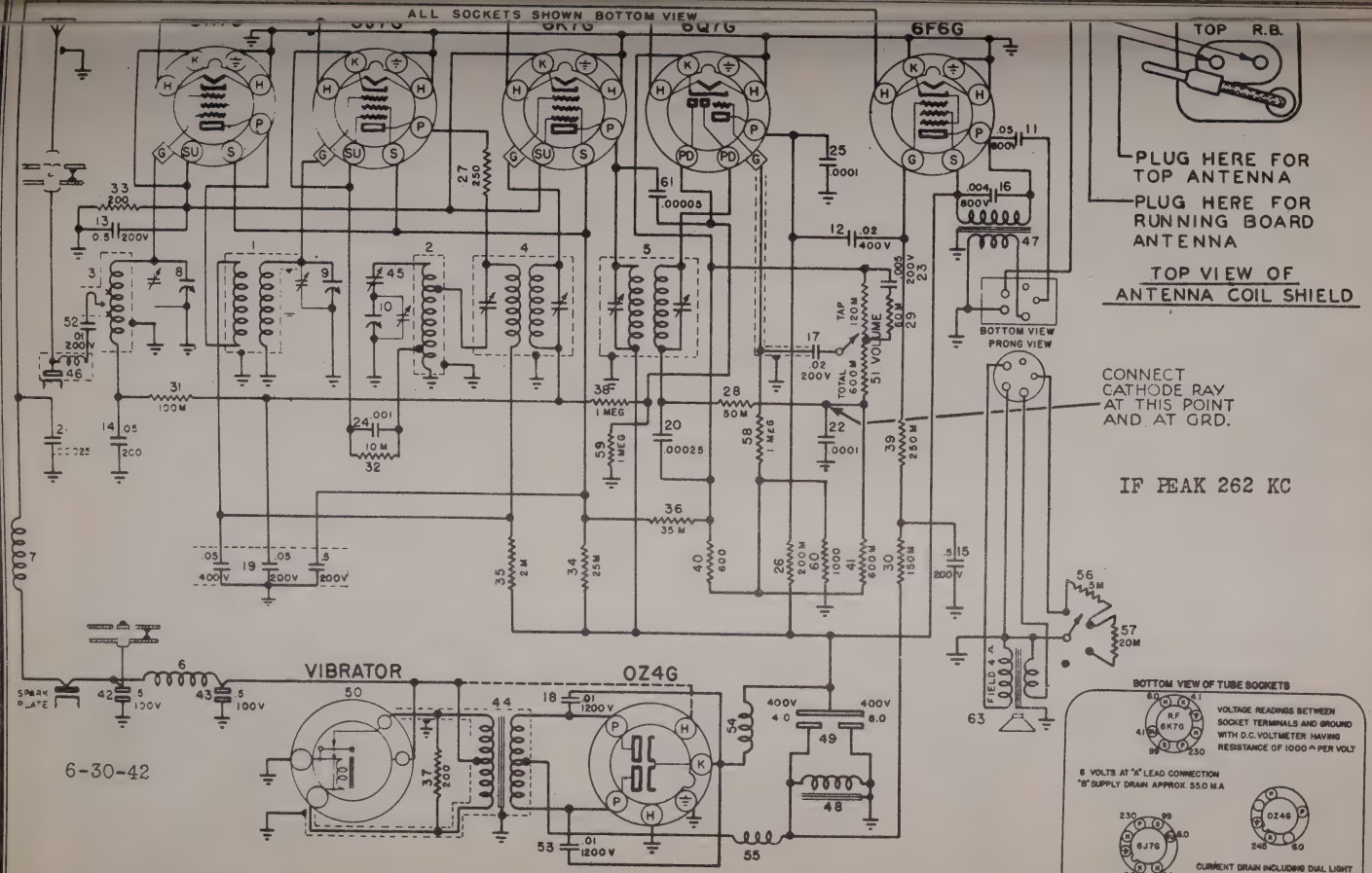

ALL SOCKETS SHOWN BOTTOM VIEW
6F6G
VIBRATOR
0Z4G
TOP R.B.
PLUG HERE FOR TOP ANTENNA
PLUG HERE FOR RUNNING BOARD ANTENNA
TOP VIEW OF ANTENNA COIL SHIELD
BOTTOM VIEW PRONG VIEW
CONNECT CATHODE RAY AT THIS POINT AND AT GRD.
IF PEAK 262 KC
51 VOLUME
TAP
TOTAL 600M
SPARK PLATE
FIELD 4 A
BOTTOM VIEW OF TUBE SOCKETS
VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000 Ω PER VOLT
6 VOLTS AT "A" LEAD CONNECTION
"B" SUPPLY DRAIN APPROX. 55.0 M.A
CURRENT DRAIN INCLUDING DIAL LIGHT AND SPEAKER 6.7 ± .5 AMPERES
TUBE SOCKET VOLTAGES

6-30-42

MODEL 983616 PONTIAC

PONTIAC MODEL 7232553 (983570) CIRCUIT DIAGRAM

The service information and parts for model 983616 are identical to Model 983570.

MODELS 983570, 7232553

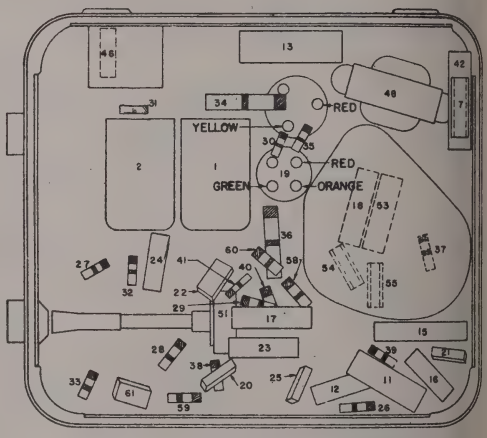
PONTIAC DIV.-GENERAL MOTORS

Series Condenser Or Dummy Antenna	Connect To	Signal Generator Frequency	Adjust Screws In Order
.25	Grid 6J7G Tube	262 K.C.	I.F. Coils - A,B, C,D
.0002	Antenna Terminal	1560 K.C.	Center Section Gang H
.0002	Antenna Terminal	1400 K.C.	Outside Sections Gang R
.0002	Antenna Terminal	600 K.C.	E
Repeat 1400 K.C. Adjustments.			

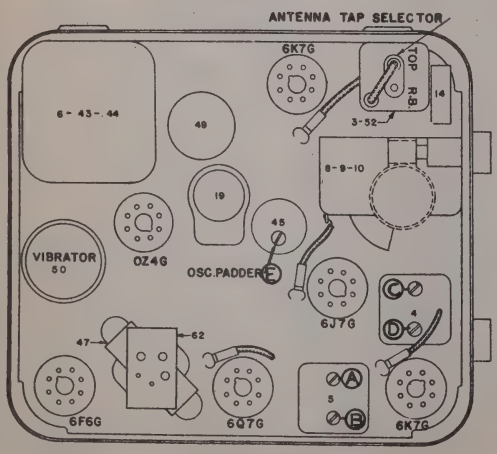
SPECIAL INSTRUCTIONS

Have antenna selector tap in correct position for type of antenna used.

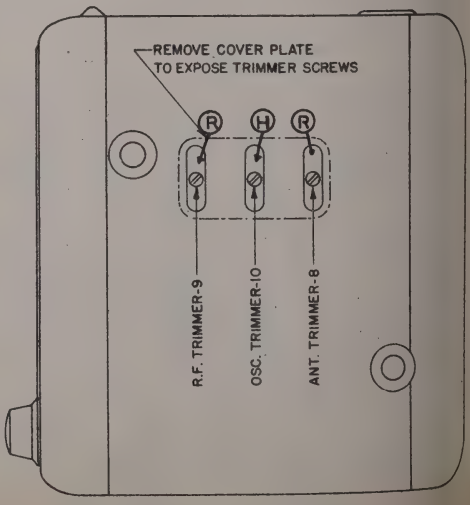
Adjust antenna trimmer (nearest to back of set when installed) to match car antenna (1400 kc).



PARTS LAYOUT--Bottom View



PARTS LAYOUT--Top View



PARTS LAYOUT--Side View

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PONTIAC DIV.-GENERAL MOTORS

MODELS 983570, 7232553
MODEL 983680

Pontiac 983680 CHASSIS ELECTRICAL PARTS

Illus. No.	Part No.	Part Name	Description
1	1213660	Coil	Ant. Filter Choke
2	1213661	Coil Assy.	Coil & Core Tuning Assy.
		Sec. A	Antenna Stage
		Sec. B	R.F. Stage
		Sec. C	Oscillator Stage
		Sec. G	Antenna Trimmer
		Sec. H	R.F. Trimmer
		Sec. J	Oscillator Padder
		Sec. K	Resistor 1 meg. 1/3 W.
3	1213662	Coil Assy.	I-F Assy.
		Sec. A	I-F Coils
		Sec. B	Primary Trimmer
		Sec. C	Secondary Trimmer
		Sec. D	Resistor 47,000 ohm 1/3 W.
4	1213663	Coil	Vibrator Hash Choke
5	1212452	Coil	"A" Filter Choke
6	1213664	Coil	Filament Choke
7	1213665	Condenser	Electrolytic
		Sec. A	10 mfd. 450 V.
		Sec. B	5 mfd. 400 V.
		Sec. C	20 mfd. 25 V.
		Sec. D	5 mfd. 350 V.
8	1213666	Condenser	Antenna Filter
		Sec. A	.00006 mfd.
		Sec. B	.00006 mfd.
9	1207625	Condenser	Molded .00005 mfd.
10	7230592	Condenser	Tub. .05 mfd. 600 V.
11	1213854	Condenser	Tub. .004 mfd. 1500 V.
13,14	7240248	Condenser	Tub. .5 mfd. 100 V.
15	1212098	Condenser	Tub. .004 mfd. 800 V.
16	1212099	Condenser	Tub. .02 mfd. 600 V.
17	1212098	Condenser	Tub. .004 mfd. 800 V.
18	7230912	Condenser	Tub. .005 mfd. 800 V.
19	1213667	Control	Volume-tone-switch
		Sec. A	Volume 350,000 ohm
		Sec. B	Off-On Switch
		Sec. C	Tone Switch
20	1211003	Resistor	Ins. 150 ohm 1 W.
21	1211007	Resistor	Ins. 47,000 ohm ½ W.
22	1211164	Resistor	Ins. 2 meg. ½ W.
23	1211007	Resistor	Ins. 47,000 ohm ½ W.
25	1211051	Resistor	Ins. 2,700 ohm 1 W.
26	1213343	Resistor	Ins. 15 meg. ½ W.
27	1213846	Resistor	Ins. 270 ohm 1 W.
28	1209885	Resistor	Ins. 1 meg. ½ W.
29	1211163	Resistor	Ins. 150,000 ohm ½ W.
30	1210850	Resistor	Ins. 35,000 ohms ½ W.
31	1211097	Resistor	Ins. 15,000 ohm ½ W.
32	1213668	Speaker	Dynamic 5"
33	1213669	Transformer	Output
34	1213670	Transformer	Power
35	8638	Vibrator	Primary
36	1207636	Condenser	Molded .0005 mfd.
37	7230592	Condenser	Tub. .05 mfd. 600 V.
38	1211154	Resistor	Ins. 5 meg. ½ W.
39	1211063	Resistor	Ins. 4,500 ohm ½ W.
40	1208600	Condenser	Tub. .01 mfd. 600 V.
41	1211107	Resistor	Ins. 45,000 ohm ½ W.
42	Incl.in Illus. 46	Choke	Antenna
43	Incl.in Illus. 46	Condenser	Trimmer
44	1208600	Condenser	Tub. .01 mfd. 600 V.
45	1212278	Condenser	Spark Plate
*46	1213739	Choke Assy.	Antenna Choke
		Sec. A	Choke
		Sec. B	Trimmer

* In early production sets, the antenna choke and trimmer were two separate parts. Use #1213739 for service replacement.

TUNING CONTROL PARTS

1213682	Button Assy.	Push Button	7238487	Knob	Tone Control
1212233	Cord Assy.	Pointer Dr.(8' Length)	51	Lamp	Pilot Light Mazda #51
1213676	Drum Assy.	Drum & Pinion - Pointer Drive	1213680	Link Assy.	Spacer & Springs
			1213681	Pulley	Wood 7/16 Dia.
1213678	Gear Assy.	Sector-complete	7236443	Pulley	Wood 13/32 Dia.
1213679	Glass	Dial	1213686	Tuner Assy.	Less Man. Drive & Elec. Parts
7238288	Knob	Tuning and Volume			
504909	Knob	Dummy	1213733	Shaft Assy.	Tuning Shaft & Brkt.

Pontiac 7232553 CHASSIS ELECTRICAL PARTS
983570

Illus. No.	Service Part No.	Part Name	Description
1	7232371	Coil Assy.	R-F
2	7232373	Coil Assy.	Oscillator
3	7232519	Coil Assy.	Antenna
4	7232710	Coil Assy.	1st I-F
5	7232711	Coil Assy.	2nd I-F
6	7232382	Choke	"A" Filter
7	7232383	Choke	Motor Noise
11	7230592	Condenser	.05 mfd. 600 V. Tub.
12	1212099	Condenser	.02 mfd. 600 V. Tub.
13	1212100	Condenser	.5 mfd. 400 V. Tub.
14	7230592	Condenser	.05 mfd. 600 V. Tub.
15	7232580	Condenser	Flat .5 mfd. 200 V.
16	1212098	Condenser	.004 mfd. 800 V. Tub.
17	1212099	Condenser	.02 mfd. 600 V. Tub.
18	7232556	Condenser	.01 mfd. 1200 V. Tub.
19	7232581	Condenser	By-pass Block
		Sec. A	.05 mfd. 400 V.
		Sec. B	.05 mfd. 200 V.
		Sec. C	.5 mfd. 200 V.
20,21	1209055	Condenser	.00025 mfd. Molded
22	1210275	Condenser	.001 mfd. Molded
23	7230912	Condenser	.005 mfd. 800 V. Tub.
24	1212097	Condenser	.001 mfd. 800 V. Tub.
25	1210275	Condenser	.0001 mfd. Molded
26	1210119	Resistor	200,000 ohms ½ W. Ins.
27	12110C9	Resistor	250 ohms ½ W. Ins.
28	1210116	Resistor	50,000 ohms ½ W. Ins.
29	1210881	Resistor	60,000 ohms ½ W. Ins.
30	1211163	Resistor	150,000 ohms ½ W. Ins.
31	1209883	Resistor	100,000 ohms ½ W. Ins.
32	1210834	Resistor	10,000 ohms ½ W. Ins.
33	1211006	Resistor	200 ohms ½ W. Ins.
34	7231811	Resistor	25,000 ohms 2 W. Ins.
35	1211224	Resistor	2,000 ohms ½ W. Ins.
36	7232406	Resistor	35,000 ohms 1 W. Ins.
37	1211006	Resistor	200 ohms ½ W. Ins.
38	1209885	Resistor	1 megohm ½ W. Ins.
39	1210117	Resistor	250,000 ohms ½ W. Ins.
40	1211222	Resistor	600 ohms ½ W. Ins.
41	7232592	Resistor	600,000 ohms ½ W. Ins.
42,43	7232390	Condenser	Special .5 mfd. 100 V.
44	7232687	Transformer	Power Inc. Terminal Brkt.
45	7232386	Condenser	Oscillator Pad
46	7230936	Coil	Ant. Series Choke
47	7232605	Transformer	Audio Output, Less Speaker Socket
48	7232606	Choke	"B" Filter Assy.
49	7232668	Condenser	Electrolytic
50	8528	Vibrator	Plug-in
51	7232384	Control	Volume, 600,000 ohms
52	1208600	Condenser	.01 mfd. 600 V. Tub.
53	7232556	Condenser	.01 mfd. 1200 V. Tub.
54	7232527	Coil	R-F Choke (red)
55	7232591	Coil	R-F Choke (Slate)
56	1211066	Resistor	5000 ohms ½ W. Ins.
57	1210882	Resistor	20,000 ohms ½ W. Ins.
58,59	1209885	Resistor	1 megohm ½ W. Ins.
60	1211035	Resistor	1,000 ohms ½ W. Ins.
61	1207625	Condenser	.00005 mfd. Molded
63	7233185	Speaker	Dynamic 8"

MODEL 983617

PONTIAC DIV.-GENERAL MOTORS

SERVICE INFORMATION FOR MODEL 983617 IS IDENTICAL TO MODEL 983569 (SEE VOL. IX INDEX) WITH THE EXCEPTION OF THE FOLLOWING PARTS WHICH REPLACE THE BYPASS BLOCK:

Illus. No.	Part No.	Part Name	Description
14 A	1212100	Condenser	Tubular .5 mfd. 400 V.
14 B	7230592	Condenser	Tubular .05 mfd. 600 V.
14 C	7230592	Condenser	Tubular .05 mfd. 600 V.
14 D	1212099	Condenser	Tubular .02 mfd. 600 V.
14 E	1208600	Condenser	Tubular .01 mfd. 600 V.
14 F	1211536	Condenser	Tubular .15 mfd. 400 V.
14 G	7230592	Condenser	Tubular .05 mfd. 600 V.

THE TUNING CONTROL IS PART NO. 501226 WITH THE EXCEPTION OF THE FOLLOWING PARTS:

Part No.	Part Name	Description
502613	Plate	Control face
503227	Knob assy.	Tuning & volume
502611	Knob	Tone control
502612	Knob	Dummy
177759	Nut	1/4-20 stamped hex

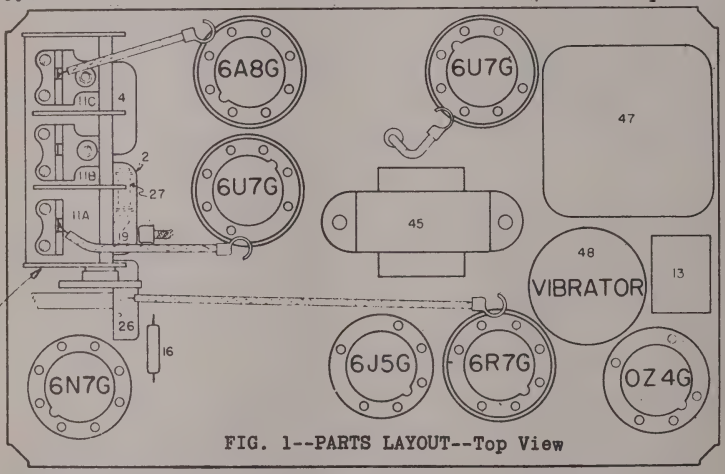

FIG. 1--PARTS LAYOUT--Top View

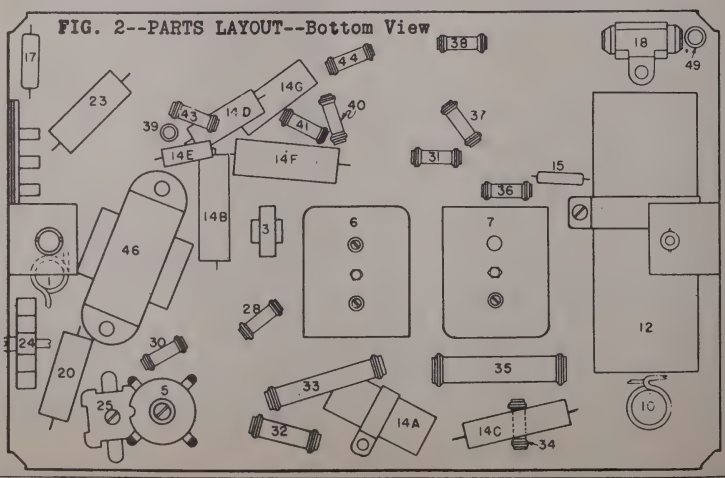

FIG. 2--PARTS LAYOUT--Bottom View

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PONTIAC DIV.-GENERAL MOTORS

MODEL 983667

MODEL 983667

PONTIAC DIV.-GENERAL MOTORS

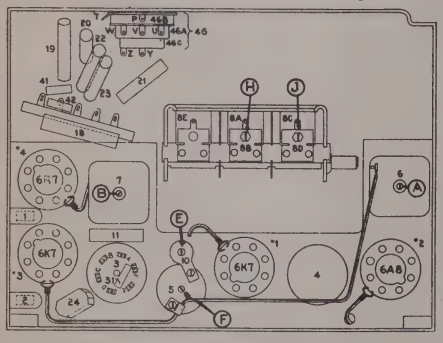
Series Condenser Or Dummy Antenna	Connect To	Signal Generator Frequency	Adjust Screws In Order
.1	Grid 6A8 Tube	260 K.C.	I-F Coils A,B,C,D
.1	Grid 6A8 Tube	1560 K.C.	E
.1	Grid 6A8 Tube	545 K.C.	F
.1	Grid 6A8 Tube	1560 K.C.	E
.0002	RB Antenna Terminal	1400 K.C.	HJ
.0002	RB Antenna Terminal	600 K.C.	F
.0002	RB Antenna Terminal	1400 K.C.	HJ

SPECIAL INSTRUCTIONS

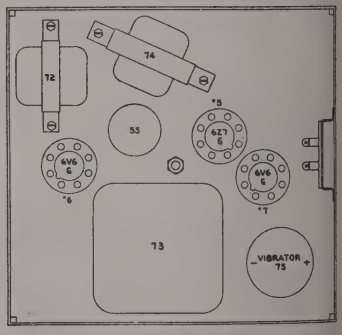
Adjust trimmer 8B to match car antenna (1400 K.C.) with antenna lead plugged into correct position for type antenna used.

PUSH BUTTON SET-UP

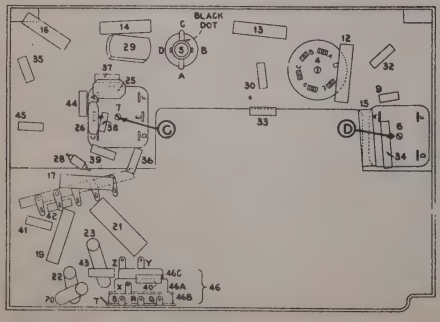
6 Buttons. Loosen button by turning counter-clockwise 1/2 turn. Tune in station desired using manual control Press button all the way in and release slowly. Lock button by turning clockwise.



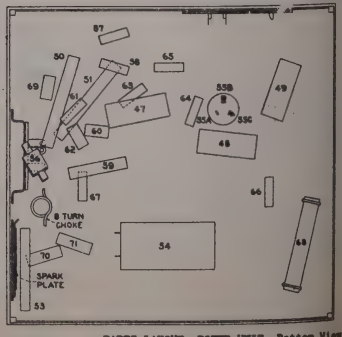
PARTS LAYOUT--I-P UNIT--Top View



PARTS LAYOUT--POWER UNIT--Top View



PARTS LAYOUT--I-P UNIT--Bottom View



PARTS LAYOUT--POWER UNIT--Bottom View

©John F. Rider

PONTIAC DIV.-GENERAL MOTORS

MODEL 983667

I-P UNIT ELECTRICAL PARTS

Illus. No.	Part No.	Part Name	Description
1-2	1213423	Coil Assy.	Ant. Choke
3	1213466	Coil	Ant. (Less Shield)
4	7236980	Coil	R-F (Less Shield)
5	7235979	Coil Assy.	Oscillator
6	1213467	Coil Assy.	1st I-F
7	1214163	Coil Assy.	2nd I-F
8	1213424	Condenser	Var. 3 Gang Tuning
9	7236178	Condenser	Temp. Comp. .000025 Mfd.
10	7235015	Condenser	Oscillator Trimmer
11	7236107	Condenser	Tub. .02 Mfd. 300 V.
12-13	1213490	Condenser	Tub. .1 Mfd. 300 V.
14	1213492	Condenser	Tub. .05 Mfd. 400 V.
15	1213490	Condenser	Tub. .1 Mfd. 300 V.
16-17	1213492	Condenser	Tub. .05 Mfd. 400 V.
18	1213494	Condenser	Tub. .25 Mfd. 300 V.
19-20	1213492	Condenser	Tub. .05 Mfd. 400 V.
21	1211201	Condenser	Tub. .035 Mfd. 400 V.
22	1211228	Condenser	Tub. .0025 Mfd. 700 V.
23	1207908	Condenser	Tub. .1 Mfd. 300 V.
24	1213497	Condenser	Molded .000012 Mfd.
25	1213498	Condenser	Molded .000056 Mfd.
26	1213499	Condenser	Molded .00015 Mfd.
27	1210275	Condenser	(Incl. in 6 & 7) Molded .0001 Mfd.
28	1213472	Condenser	Mica .00082 Mfd.
29	7236139	Condenser	Ceramic .000865 Mfd.
30	1211009	Resistor	Ins. 250 Ohms ½ W.
31	1210119	Resistor	Ins. 200,000 Ohms ½ W.
32	7236248	Resistor	Ins. 56,000 Ohms ½ W.
33	1210882	Resistor	Ins. 20,000 Ohms ½ W.
34	1211106	Resistor	Ins. 40,000 Ohms 1 W.
35	7233314	Resistor	Ins. 560 Ohms ½ W.
36	1211054	Resistor	Ins. 3,500 Ohms ½ W.
37	1211107	Resistor	Ins. 45,000 Ohms ½ W.
38	1210117	Resistor	Ins. 250,000 Ohms ½ W.
39	1211221	Resistor	Ins. 400 Ohms ½ W.
40	1211072	Resistor	Ins. 7,000 Ohms ½ W.
41	1210850	Resistor	Ins. 35,000 Ohms ½ W.
42	1210834	Resistor	Ins. 10,000 Ohms ½ W.
43	1211224	Resistor	Ins. 2,000 Ohms ½ W.
44-45	1211141	Resistor	Ins. 1.5 Meg. ½ W.
46	1213425	Control	Volume--Tone--Switch
47	1211228	Condenser	Tub. .0025 Mfd. 700 V.
48	1208600	Condenser	Tub. .01 Mfd. 600 V.
49	1211228	Condenser	Tub. .0025 Mfd. 700 V.
50	7231594	Condenser	Tub. .25 Mfd. 400 V.
51	1211232	Condenser	Tub. .025 Mfd. 400 V.
53	1212100	Condenser	Tub. .5 Mfd. 400 V.
54	1213460	Condenser	Buffer Dual .015 Mfd. 1000 V.
55	1213459	Condenser	Electrolytic
		Sec. A	20 Mfd. 25 V.
		Sec. B	10 Mfd. 400 V.
		Sec. C	10 Mfd. 400 V.
56	1213472	Condenser	Mica .00082 Mfd.
57	1209885	Resistor	Ins. 1 Meg. ½ W.
58	1213485	Resistor	Ins. 18,000 Ohms ½ W.
59	1211111	Resistor	Ins. 55,000 Ohms 1 W.
60	1211049	Resistor	Ins. 2700 Ohms ½ W.
61	1213486	Resistor	Ins. 470 Ohms ½ W.
62	1213032	Resistor	Ins. 40 Ohms ½ W.
63	1213488	Resistor	Ins. 680,000 Ohms ½ W.
64-65	1211163	Resistor	Ins. 150,000 Ohms ½ W.
66-67	1211163	Resistor	Ins. 150,000 Ohms ½ W.
68	7236082	Resistor	Ins. 390 Ohms 2 W.
69	1212288	Resistor	Ins. 50 Ohms ½ W.
70-71	1211000	Resistor	Ins. 100 Ohms ½ W.
72	1213443	Transformer	Output
73	1213444	Transformer	Vibrator Power
74	1213445	Reactor	"B" Filter
75	1213446	Vibrator	

POWER UNIT MISCELLANEOUS PARTS

1213447	Socket Assy.	Power Cable
1213448	Socket Assy.	Audio Cable
1213449	Case	Power Unit
1213450	Socket	Vibrator
1213474	Socket	Octal Tube
1213451	Socket	Speaker
1213453	Socket	Air Switch Lead

I-F UNIT MISCELLANEOUS PARTS

1213476	Push Button Tuner	Unit Complete.
503392	Button Assy.	Push Button
503227	Knob Assy.	Tuning & Volume
502611	Knob	Tone Control
502612	Knob	Dummy
503369	Escutcheon	Face Plate
503419	Cable Assy.	Audio
503417	Cable Assy.	Power
1213428	Dial Assy.	Calibrated
1213429	Drum Assy.	Drum and Gear
1213430	Gear	Sector
1213433	Plug Button	3/8"
1213432	Plug Button	1/2"
1213434	Plug Button	5/16"
1213437	Shaft Assy.	Tuning
503416	Socket Assy.	Dial Light
1213440	Spring	Push Arm Assy.
1213441	Spring	Sector Gear
1213442	Spring	Tuning Drive
7236224	Shield	Ant. Coil
1213427	Case	I-P Unit

SPEAKER PARTS

1213458	Speaker	Unit 8" P-M
503421	Cable Assy.	Spkr. to Power Unit
1213455	Case Assy.	Speaker
1213457	Grille	Speaker Screen

INSTALLATION PARTS

Part No.	Part Name	Description
503368	Brace	I-P Unit--Inst. Panel
502607	Spacer	I-P Unit--Inst. Panel
503389	Bolt	"T" Head; Power Unit Mtg
503391	Stud	Speaker Mtg.
503370	Shield	Speaker--Water
503371	Shield Cup	Speaker--Water
503372	Gasket	Speaker Shield
177759	Nut	"D" Stamped ¼-20 Hex.
1997701	Switch	Volume Levelizer
501458	Lead Assy.	Air Switch
1207821	Suppressor	Distributor
1853686	Adapter	Suppressor
1866865	Condenser	Generator

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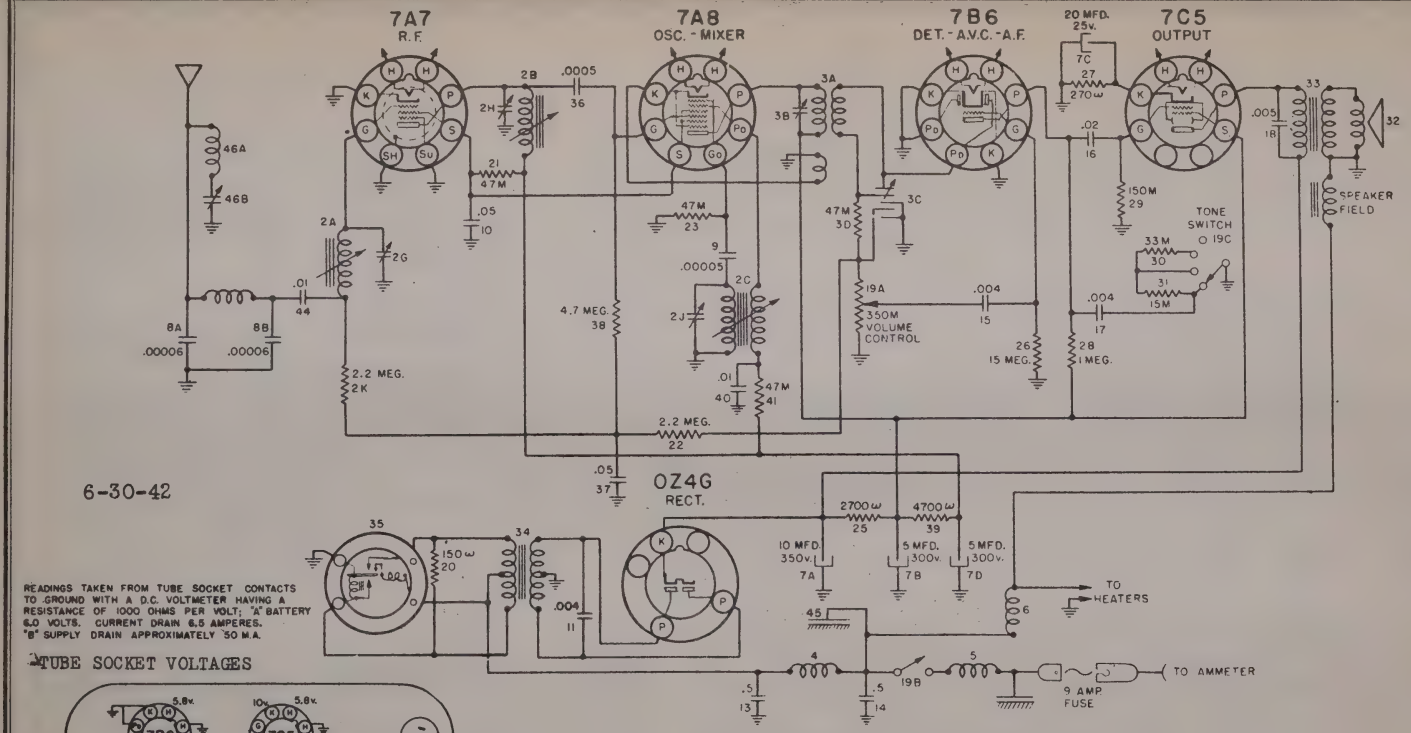


PONTIAC MODEL 983680 CIRCUIT DIAGRAM

IF PEAK 260 KC

CAR ANTENNA CAPACITY--400 mmf.
(Peak Cap.)

TUNING RANGE--550 to 1550 K.C.

PONTIAC DIV.-GENERAL MOTORS

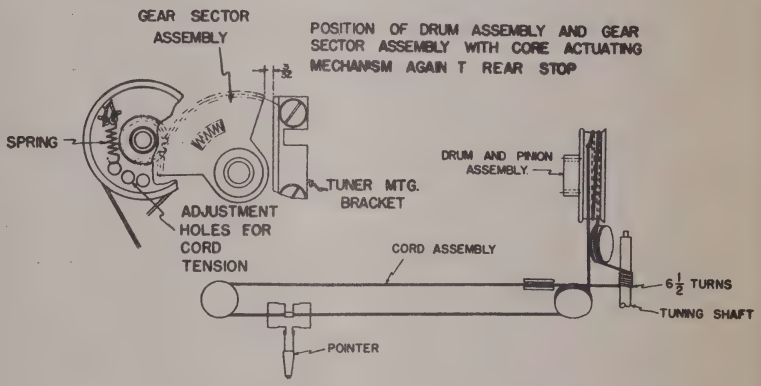
MODEL 983630

LIGNMENT PROCEDURE

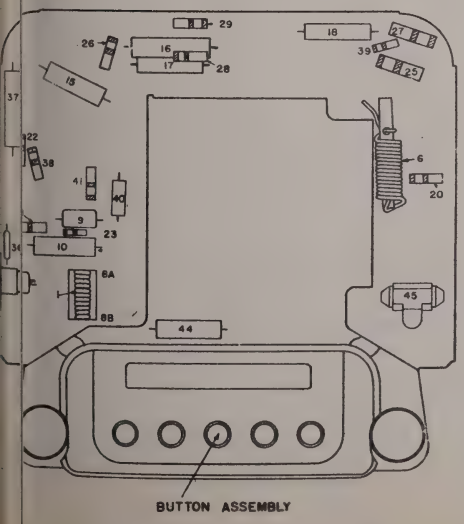
Series Condenser Or Dummy Antenna	Connect To	Signal Generator Frequency	Adjust Screws In Order
.1	X	260 K.C.	A-B
.1	X	1520 K.C.	D
.000065	Antenna Terminal	1400 K.C.	C-E
.000065	Antenna Terminal	260 K.C.	46B Min. Output

SPECIAL INSTRUCTIONS

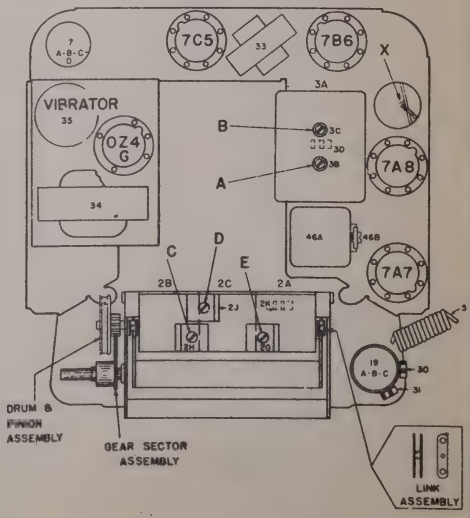
ADJUST TRIMMER E TO MATCH CAR ANTENNA (1400KC) WHEN SET IS INSTALLED.



DIAL POINTER-CORD LAYOUT



PARTS LAYOUT--Bottom View



PARTS LAYOUT--Top View

RCA MFG. CO., INC.

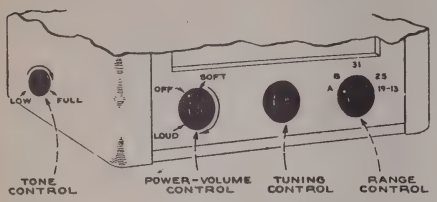
MODEL QB1
Ch.RC-529A

MODEL QB1
Ch.RC-529A

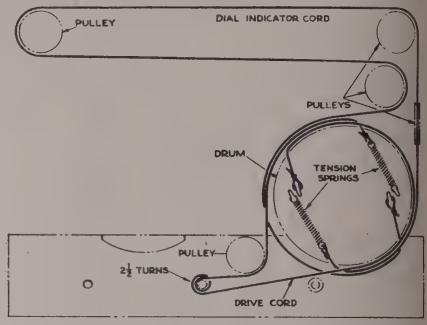
RCA MFG. CO., INC

Precautionary Lead Dress.—

1. All oscillator coil leads must be kept apart from each other as well as other leads and parts. No two leads may be less than ¼ inch apart.
2. Oscillator grid coupling condenser, C17, must bear tightly against switch or other condensers, and the green gang lead must bear against C17 from the other side. Cement with "amberoid."



3. C5 (560 mmf.) must be placed exactly midway between the two (19-13M and 25M) coils; it must be at least ¼ inch away from any coil leads.
4. C12 (47 mmf.) condenser must be at least ¼ inch away from all parts and leads.
5. C13 (68 mmf.) condenser must bear against the switch and/or C17, grid coupling condenser and be cemented with "amberoid," or else clear all parts and leads by at least ¼ inch.
6. Antenna grid coupling condenser must be as far away from all metal parts as possible.
7. Braids between gang and chassis must be so soldered as to be as far away from stator lugs as possible.
8. Both condensers on the front switch lug No. 8 (with green antenna gang lead) must be as far away from metal shields of the switch and all other metal as possible.
9. AVC by-pass condenser (C19) must clear the tuning flywheel by at least ¼ inch.
10. Make sure the bias cell polarity is correct.



STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-529A)	
35642	Calibrator—Drive drum calibrator	.10
12714	Capacitor—Air trimmer, medium	.50
34654	Capacitor—Mica trimmer comprising 3 sections of 2.5-10 mmfd.	.60
35646	Capacitor—6 mmfd.	.35
36012	Capacitor—15 mmfd.	.35
31350	Capacitor—18 mmfd.	.30
35644	Capacitor—47 mmfd., ceramic	.35
37329	Capacitor—47 mmfd., silvered mica	.35
30949	Capacitor—56 mmfd., mica	.25
12723	Capacitor—56 mmfd., moulded mica	.35
35645	Capacitor—68 mmfd., ceramic	.35
13057	Capacitor—68 mmfd., silvered mica	.35
30904	Capacitor—100 mmfd., mica	.25
12720	Capacitor—100 mmfd., moulded mica	.35
13003	Capacitor—180 mmfd.	.35
12694	Capacitor—220 mmfd.	.35
31433	Capacitor—560 mmfd.	.35
35643	Capacitor—3,000 mmfd.	.55
34459	Capacitor—.0025 mfd.	.20
4838	Capacitor—.005 mfd.	.25
4937	Capacitor—.01 mfd.	.25
32787	Capacitor—.05 mfd. (C19, C27)	.20
4886	Capacitor—.05 mfd. (C35)	.20
14626	Capacitor—.07 mfd.	.25
12484	Capacitor—0.25 mfd.	.30
37868	Capacitor—0.5 mfd.	.40
37250	Capacitor—Electrolytic—20 mfd., 250 volts	.60
37867	Capacitor—Electrolytic—30 mfd., 250 volts	.60
31583	Cell—Bias cell	.25
35632	Coil—Antenna coil—"A" band	1.10
35631	Coil—Antenna coil—spread band	.75
35623	Coil—Oscillator coil—"A" and "B" bands	.80
35624	Coil—Oscillator coil—"19-13 meter" band	.45
35625	Coil—Oscillator coil—"25 meter" band	.50
35626	Coil—Oscillator coil—"31 meter" band	.45
35619	Condenser—Variable tuning condenser	2.80
37833	Control—Volume control and power switch	2.00
32634	Cord—Drive cord (approx. 28 inch overall length)	.10
34662	Cord—Pointer cord (approx. 54 inch overall length)	.25
35788	Core—Adjustable core and stud for "A" and "B" band oscillator coil	.15
31259	Core—Adjustable core and stud for "19-13 meter," "25 meter," and "31 meter" bands oscillator coils	.15
35627	Drum—Drive drum—less calibrator	.55
35638	Flywheel—Tuning shaft flywheel	1.10
31580	Holder—Bias cell holder	.15
5119	Plug—3-contact female plug for speaker cable	.25
14404	Plug—7-prong male plug for power input cable	.35
35641	Pulley—Drive cord pulley	.10
35630	Pulley—Drive cord pulley located between the range switch shaft and the tuning shaft	.10
13714	Resistor—5,600 ohms, ½ watt	.20
30151	Resistor—18,000 ohms, 1 watt	.22
13998	Resistor—22,000 ohms, ½ watt	.20
12454	Resistor—33,000 ohms, ½ watt	.20
13734	Resistor—120,000 ohms, ½ watt	.20
13479	Resistor—390,000 ohms, ½ watt	.20
30648	Resistor—470,000 ohms, ½ watt	.20
30963	Resistor—820,000 ohms, ½ watt	.20
13730	Resistor—1 meg., ½ watt	.20
30208	Resistor—1.2 meg., ½ watt	.20
12679	Resistor—2.2 meg., ½ watt	.20
14350	Screw—No. 8-32 square head set screw for drive drum	.03
35637	Shaft—Tuning shaft	.25
35787	Socket—Phono input socket	.15
31251	Socket—Tube socket	.25
13638	Spring—Drive cord spring	.08
31418	Spring—Pointer cord spring	.05
35640	Support—Drive cord pulley support with one pulley	.35
35639	Support—Drive cord pulley support with two pulleys	.55
35622	Support—Tuning shaft and flywheel support	.20
33397	Switch—Tone switch	.45
35636	Transformer—First I.F. transformer	1.70
35628	Transformer—Second I.F. transformer	1.85
37898	Transformer—Driver transformer	2.70
37924	Transformer—Output transformer	1.90
33726	Washer—"C" washer for pulley	.02
2917	Washer—"C" washer for tuning shaft	.03
	POWER SUPPLY ASSEMBLIES	
30433	Capacitor—470 mmfd., moulded mica	.35
30673	Capacitor—470 mmfd., mica	.25
35573	Capacitor—.008 mfd.	.25
4937	Capacitor—.01 mfd.	.25
32405	Capacitor—Electrolytic 16 mfd., 350 volts	.85
37834	Case—Power supply case only—less case cover	1.00
14289	Clip—Battery clips	.30
37925	Coil—Choke coil	.35
5140	Fuse—5 Amperes	.10
34765	Resistor—100 ohms, ½ watt	.20
6134	Resistor—1,200 ohms, 1 watt	.22
35572	Resistor—2,200 ohms, ½ watt	.20
14409	Socket—Female socket for battery cable	.45
12241	Socket—Vibrator socket	.30
35544	Transformer—Vibrator transformer	4.65
35543	Vibrator—Plug-in vibrator	4.00
	SPEAKER ASSEMBLIES (RL-92-5)	
32907	Cap—Dust cap	.02
36077	Cone—Cone complete with voice coil	1.25
5118	Plug—3-prong male plug for speaker	.25
	MISCELLANEOUS ASSEMBLIES	
36103	Decalcomania—"On-off" decal	.05
37839	Decalcomania—Range switch decal	.15
35392	Decalcomania—Trade mark decal	.05
35391	Decalcomania—Tuning decal	.05
35712	Dial—Glass dial scale	1.45
37838	Frame—Dial frame complete—less indicator and dial scale	1.25
35648	Indicator—Station selector indicator	.25
37837	Knob—Range switch or volume control knob	.40
35650	Knob—Tone switch knob	.25
34489	Knob—Tuning knob	.30
14270	Spring—Retaining spring for knobs	.08

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

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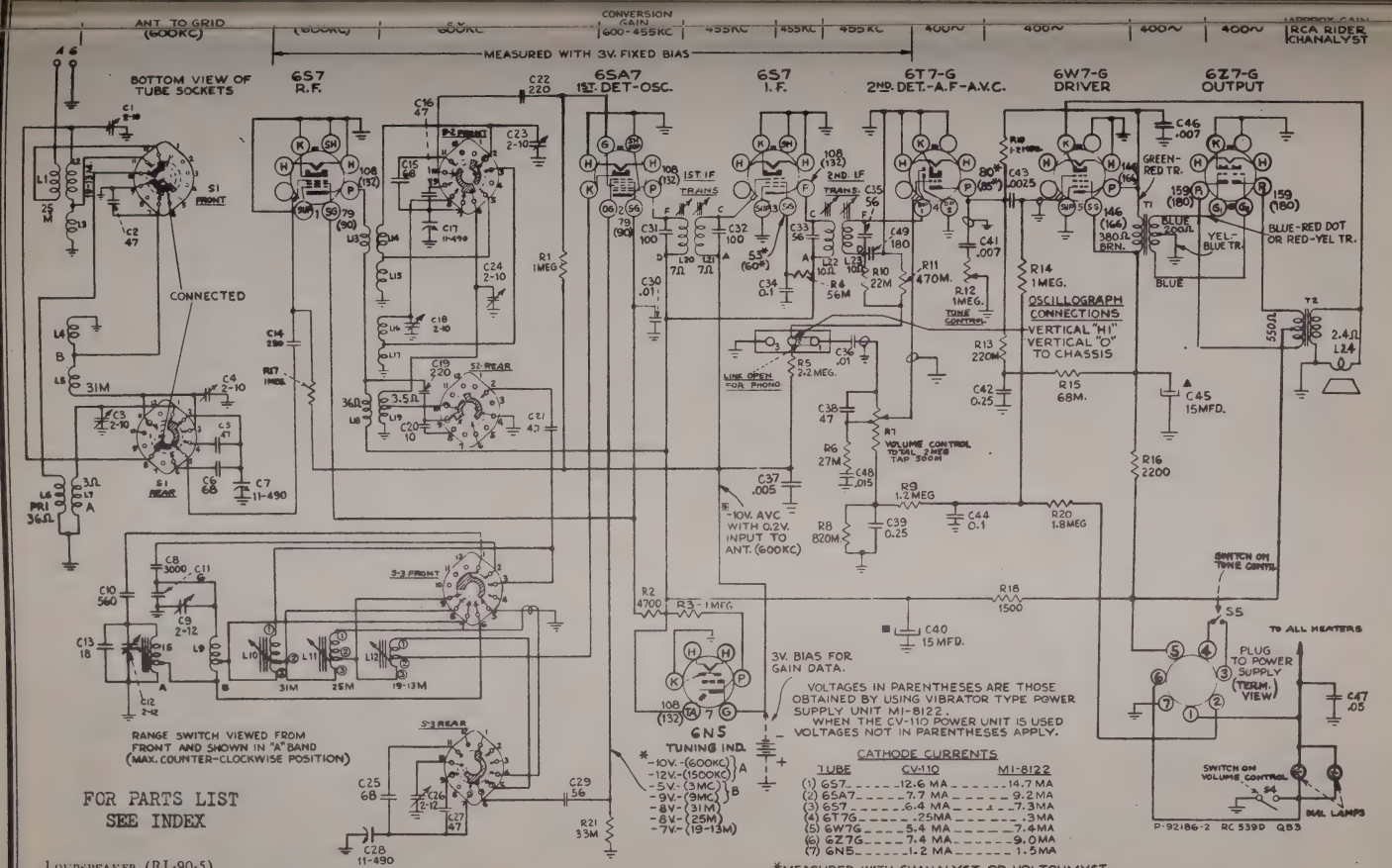


FOR PARTS LIST
SEE INDEX

VOLTAGES IN PARENTHESES ARE THOSE OBTAINED BY USING VIBRATOR TYPE POWER SUPPLY UNIT MI-8122. WHEN THE CV-110 POWER UNIT IS USED VOLTAGES NOT IN PARENTHESES APPLY.

CATHODE CURRENTS

TUBE	CV-110	MI-8122
(1) 6S7	12.6 MA	14.7 MA
(2) 6SA7	7.7 MA	9.2 MA
(3) 6S7	6.4 MA	7.3 MA
(4) 6T7G	.25 MA	.3 MA
(5) 6W7G	5.4 MA	7.4 MA
(6) 6Z7G	7.4 MA	9.0 MA
(7) 6N5	1.2 MA	1.5 MA

*MEASURED WITH CHANALYST OR VOLTOHMYST.

LOUDSPEAKER (RL-90-5)

Type ..... 8-inch Permanent-Magnet Dynamic
V. C. Impedance ..... 2.6 ohms at 400 cycles

POWER SUPPLY RATING

D-C Rating (with vibrator-type power unit MI-8122)— 6.3 volts, 3.2 amps.

A-C Rating (with CV-110 A-C power supply unit)— 105-117, 117-130, 140-160, 200-225 volts, 25-60 cycles

Dial Lamps (2) ..... Mazda No. 47, 6.3 volts, 0.15 amp.

POWER OUTPUT	CV-110 Unit	MI-8122 Unit
Undistorted	1.3 watts	2.0 watts
Maximum	1.9 watts	2.6 watts

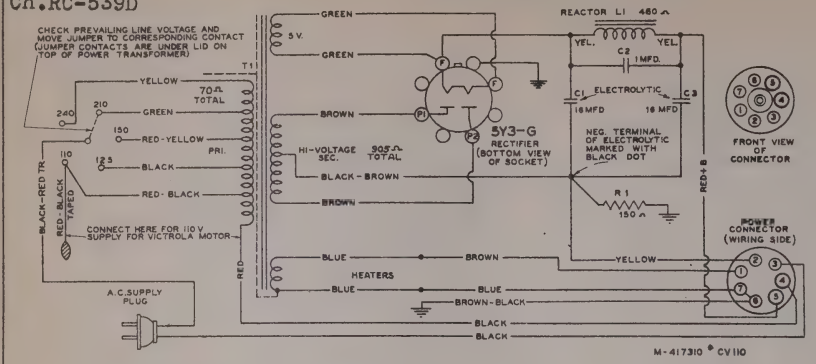
FREQUENCY RANGES

Standard Broadcast ("A" Band)	540-1,720 kc (556-174 m)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.6 m)
31 Meter Spread Band	9.5-11.7 mc (31.6-25.6 m)
25 Meter Spread Band	11.7-15.1 mc (25.6-19.9 m)
19-13 Meter Spread Band	15.1-22.5 mc (19.9-13.3 m)

INTERMEDIATE FREQUENCY ..... 455 kc

MODEL QB3
Ch.RC-539D

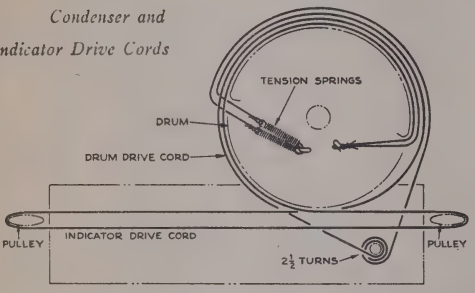
RCA MFG. CO., INC.

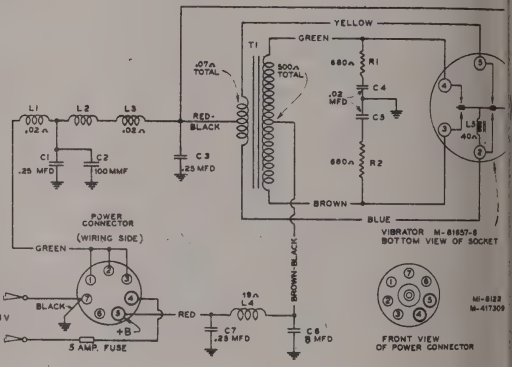


CV-110 A-C Power Supply Unit

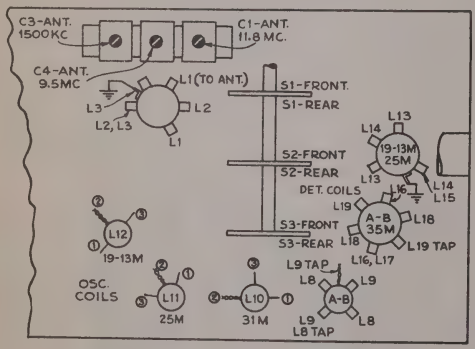
MI-8122 Vibrator Type Power Supply Unit

Condenser and Indicator Drive Cords

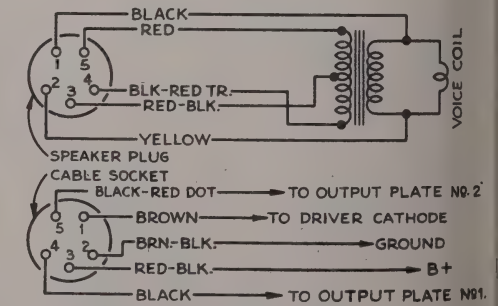




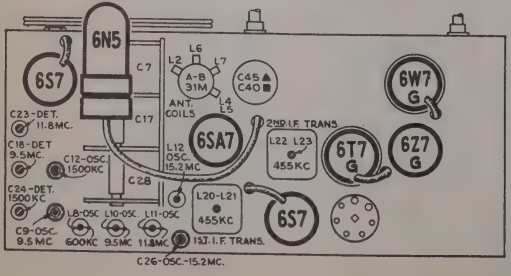
The pilot lights are illuminated by pressing in the volume control knob. (The pilot lights are not controlled by this action when the receiver is operated with the CV-110 A-C power supply unit.)



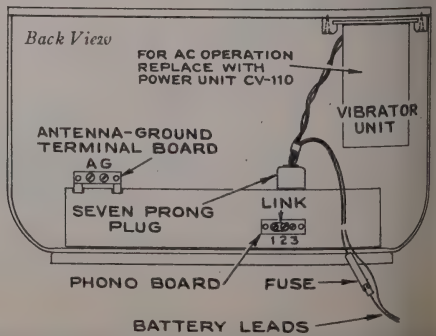
Coil and Trimmer Locations (Bottom View)



Connections and Colors of Loudspeaker and Cable



Tube and Trimmer Locations (Top View)



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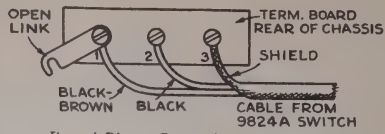
RCA MFG. CO., INC.

MODEL QB3
Ch.RC-539D

Record Player Attachment.—Terminals are provided on the rear of the chassis for convenient connection to a record player such as the RCA R-103-S. A Stock No. 9824A switch may be used to change from radio to record player. The connections of this switch are shown. In the event that a No. 9824A switch is not available, a double-pole double-throw toggle switch may be used.



Record Player Connections, Using Stock No. 9824A Switch Controls

Alignment Procedure

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range Switch	Turn Radio Dial to—	Adjust the following for max. peak output
1	6S7 I-F grid in series with .01 mfd.	455 kc	"A" band	Quiet point 600 kc end of dial	L23-L22 2nd I-F transformer
2	6SA7 1st det. grid in series with .01 mfd.				L21-L20 1st I-F transformer
3	Antenna terminal in series with 300 ohms	11.8 mc	25 meter band	11.8 mc (41.5°)	L11 (osc.) C1 (ant.) C23 (det.)
4		15.2 mc		15.2 mc (161.7°)	C26 (osc.)*†
5	Repeat steps 3 and 4 until aligned.				
6	Antenna terminal in series with 300 ohms	15.2 mc	19-13 meter band	15.2 mc (24°)	L12 (osc.)**
7		9.5 mc	31 meter band	9.5 mc (23.8°)	L10 (osc.)** C4 (ant.) C18 (det.)***
8		9.5 mc	"B" band	9.5 mc (168.5°)	C9 (osc.)*
9	Antenna terminal in series with 200 mmfd.	1,500 kc	"A" band	1,590 kc (153°)	C12 (osc.) C3 (ant.) C24 (det.)
10		600 kc		600 kc (30.5°)	L8 (osc.) Rock in
11	Repeat steps 9 and 10.				

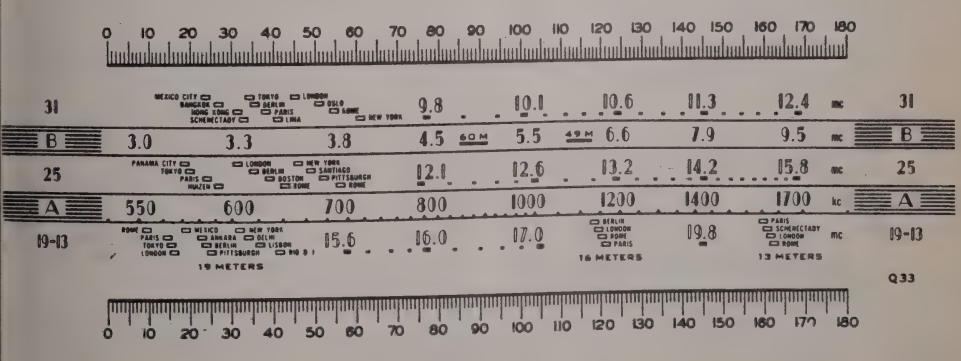
* Use minimum capacity peak if two can be obtained.

** Peak at minimum plunger position if two peaks can be obtained.

*** Use maximum capacity peak if two peaks can be obtained.

† Check image to determine that C26 has been adjusted to correct peak by tuning receiver to approximately 14.29 mc where a weaker signal should be received.

NOTE: Oscillator tracks above signals on all bands.



Calibration Scale

Reduced Reproduction of Receiver Dial and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 30° on the calibration scale corresponds to approximately 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

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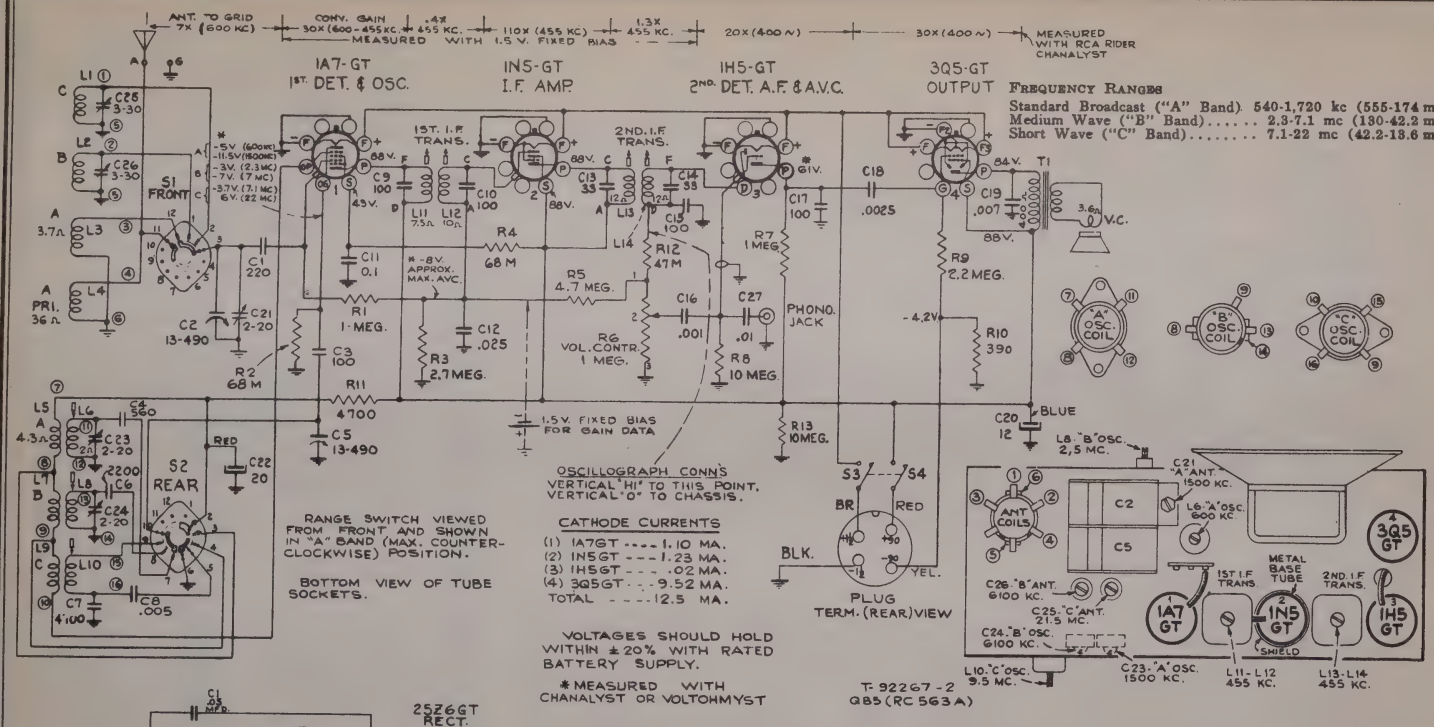

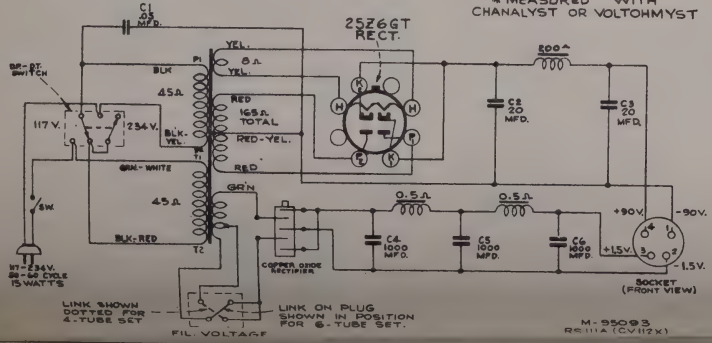

IF PEAK 455 KC

PHONOGRAPH ATTACHMENT

A jack is provided on the rear of chassis for connecting a phonograph attachment into the audio amplifying circuit. The cable from the attachment should be terminated in a Stock No. 31048 plug to fit the jack.

BATTERY CONNECTIONS

A four wire cable with plug is provided for making connection to a plug-in 1½-90 volt "A"-"B" battery pack such as the Eveready "A"-"B" 748 or equivalent.

When separate batteries are used, an adapter extension cable such as the MI-8128 is necessary and may be purchased from your dealer.

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MODEL QB5
Ch. RC-563A

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the dial backing plate for quick reference during alignment. The dial backing plate has marks corresponding to alignment frequencies as shown in accompanying sketch. Before alignment, set the dial pointer so that, with the gang in full mesh, the pointer is 1/16-in. to the left of the left-hand mark on the dial backing plate.

Cathode Ray Alignment is the preferable method. Connections for the oscillograph are shown in the diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis and keep the output as low as possible to avoid AVC action.

BATTERIES REQUIRED

1—1.5 Volt "A" Battery; 2—45 Volt "B" Batteries
Or : One 1½-90 Volt battery pack.

BATTERY DRAIN

"A" ..... .25 amp.
"B" ..... 12.50 ma.

POWER OUTPUT

Undistorted ..... .20 watt
Maximum ..... .56 watt

LOUDSPEAKER (RL-81B-2)

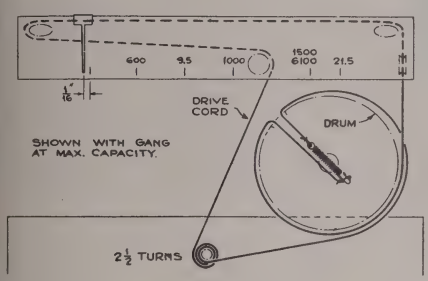
Type ..... 5-inch permanent-magnet dynamic
Voice-coil impedance ..... 4 ohms at 400 cycles

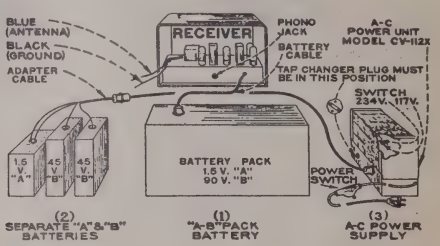
Steps	Connect high side of test osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust following for max. peak output—
1	1F grid cap in series with .01 mfd.	455 kc	"A" Band Quiet Point at High Freq. End	L14 and L13 (2nd IF Trans.)
2	1st det. grid cap in series with .01 mfd.			L12 and L11† (1st IF Trans.)
3	Antenna Lead in series with 200 mmf.	1,500 kc	1,500 kc mark	Peak C23 (osc.) and C21 (ant.)
4		600 kc	600 kc mark	L6 (osc.)
5		Repeat steps 3 and 4.		
6	Antenna Lead in series with 300 ohms	6.1 mc	6.1 mc mark	Peak C24 (osc.)* and C26 (ant.)
7		2.5 mc	600 kc mark	L8 (osc.)**
8		Repeat steps 6 and 7.		
9		9.5 mc	9.5 mc mark	L10 (osc.) Rock Gang
10		21.5 mc	21.5 mc mark	C25 (ant.) Rock Gang

*Use minimum capacity peak if two peaks can be obtained.

**Rock gang slightly for peak output.

†Do not readjust L14 or L13 when test oscillator is applied to 1A7-GT grid.





Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES	
32548	Capacitor—Electrolytic, comprising 1 section of 12 mfd., 150 volts, and 1 section of 20 mfd., 150 volts	.65
32830	Capacitor—Mica trimmer, 2 sections of 2-20 mmfd. each	.40
31292	Capacitor—Mica trimmer comprising 2 sections of 3-30 mmfd.	.40
36176	Capacitor—33 mmfd.	.30
30904	Capacitor—100 mmfd., mica	.25
12720	Capacitor—100 mmfd., moulded	.35
12694	Capacitor—220 mmfd.	.35
12537	Capacitor—560 mmfd.	.35
12951	Capacitor—2,200 mmfd.	.55
30304	Capacitor—4,700 mmfd.	.40
37102	Capacitor—.001 mfd.	.25
34459	Capacitor—.0025 mfd.	.20
4838	Capacitor—.005 mfd.	.25
5148	Capacitor—.007 mfd.	.20
4937	Capacitor—.01 mfd.	.25
4870	Capacitor—.025 mfd.	.20
4839	Capacitor—0.1 mfd.	.30
32821	Coil—Antenna coil	1.35
32148	Coil—Oscillator coil—"A" band	.90
33784	Coil—Oscillator coil—"B" band	.75
38295	Coil—Oscillator coil—"C" band	.60
38287	Condenser—Variable tuning condenser	2.50
38406	Control—Volume control and power switch	1.50
32634	Cord—Drive cord (approx. 50-in. overall length)	.10
38296	Core—Adjustable core and stud for "C" band oscillator coil	.20
32713	Core—Adjustable core and stud for oscillator coil	.35
37068	Indicator—Station selector indicator	.20
38288	Plate—Dial back plate complete with pulleys and bracket—less dial	1.00
30568	Plug—4-prong male plug for battery cable	.25
36230	Pulley—Drive cord pulley	.04
36237	Pulley—Tuning condenser pulley	.25
30498	Resistor—390 ohms, ½ watt	.20
30146	Resistor—4,700 ohms, ½ watt	.20
12412	Resistor—47,000 ohms, ½ watt	.20
13715	Resistor—68,000 ohms, ½ watt	.20
14138	Resistor—68,000 ohms, ½ watt	.20
13730	Resistor—1 meg., ½ watt	.20
30649	Resistor—2.2 meg., ½ watt	.20
14752	Resistor—2.7 meg., ½ watt	.20
30271	Resistor—4.7 meg., ½ watt	.20
30992	Resistor—10 meg., ½ watt	.20
36897	Shaft—Tuning knob shaft	.10
33742	Socket—Phono input socket	.20
31251	Socket—Tube socket	.25
31418	Spring—Drive cord spring	.05
31261	Spring—Retaining spring for "C" band oscillator coil core and stud	.01
38297	Switch—Range switch	1.20
38300	Transformer—Audio transformer	1.60
35636	Transformer—First I.F. transformer	1.70
36122	Transformer—Second I.F. transformer	1.60
33726	Washer—"C" washer for tuning shaft	.02
	SPEAKER ASSEMBLIES (RL81B2)	
35570	Cone—Cone complete with voice coil	1.20
	MISCELLANEOUS ASSEMBLIES	
36890	Clamp—Dial clamp—L.H.	.15
36891	Clamp—Dial clamp—R.H.	.15
36103	Decalcomania—"OFF-Volume" decal	.05
35480	Decalcomania—Range switch decal	.05
38328	Dial—Glass dial scale	.75
36886	Knob—Range switch or volume control knob	.25
36722	Knob—Tuning knob	.20
30900	Spring—Retaining spring for knobs	.05
	CV-112X AC POWER UNIT	
4886	Capacitor—.05 mfd.—400 volts (C1)	.20
30873	Capacitor—Electrolytic, 2 sections 20 mfd., 150 volts	1.35
36553	Capacitor—Electrolytic, 1,000 mfd., 3 volts	1.40
36547	Coil—High voltage choke coil—200 ohms	1.75
36548	Coil—Low voltage choke coil—marked 1B84	2.00
36549	Coil—Low voltage choke coil—marked 1B85	2.00
38353	Plug—2-contact filament voltage changing plug	.20
36551	Rectifier—1.5 volt rectifier	1.40
36552	Socket—4-contact power output socket	.30
18008	Socket—Tube socket	.25
36550	Switch—Power cord switch	1.00
33491	Switch—Voltage change switch	.35
38393	Transformer—Power transformer—110-220 volts, 50-60 cycle	5.10

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

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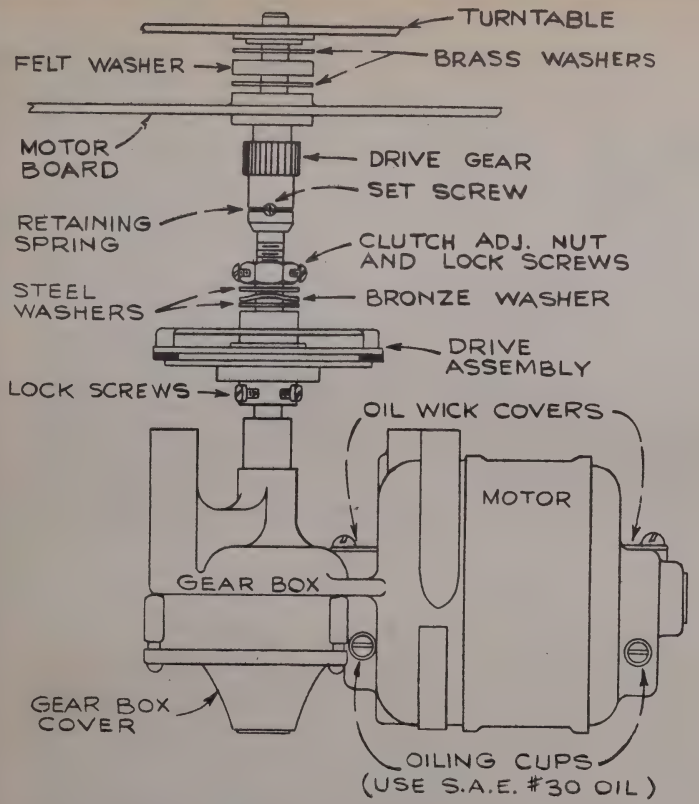
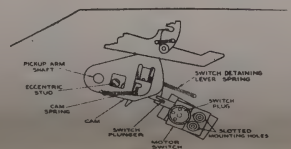
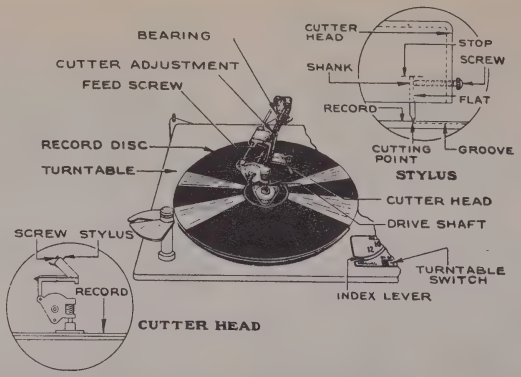
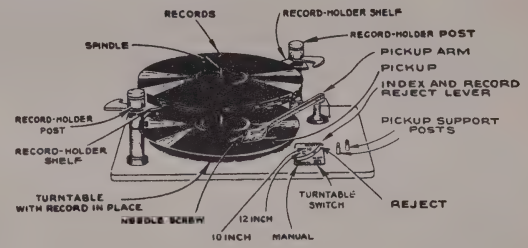


Turntable drive assembly showing friction clutch and flexible coupling.







Automatic Switch Adjustment:

An automatic motor switch is mounted under the motorboard, near the pickup arm shaft.

When the index lever is set at its "10-inch" or "12-inch" position, a detaining lever holds the switch plunger in and keeps the motor running.

When the index lever is set at its "manual" position, the detaining lever moves aside and the switch plunger is then actuated by a cam on the pickup arm shaft. In "manual" position, when the pickup is on its rest, the switch plunger is out and the motor circuit is open. When the pickup is moved from its rest to the edge of a 12-inch record, the cam pushes the switch plunger in and the motor starts. When the pickup needle reaches a point 12 inches from the centerline of the turntable spindle, the switch plunger is released by the sharp corner of the cam, thus shutting off the motor.

When the pickup is lifted off the record and moved to its rest, the motor starts momentarily.

ADJUSTMENTS:

The slotted switch mounting holes permit positioning of the switch so that the plunger will be pushed in by the cam.

The eccentric stud on the cam should be turned so that the switch plunger is released by the sharp corner of the cam when the pickup needle is 12 inches from the centerline of the turntable spindle.

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Schematic Diagram of Power Amplifier and Power Supply

Public Address Use

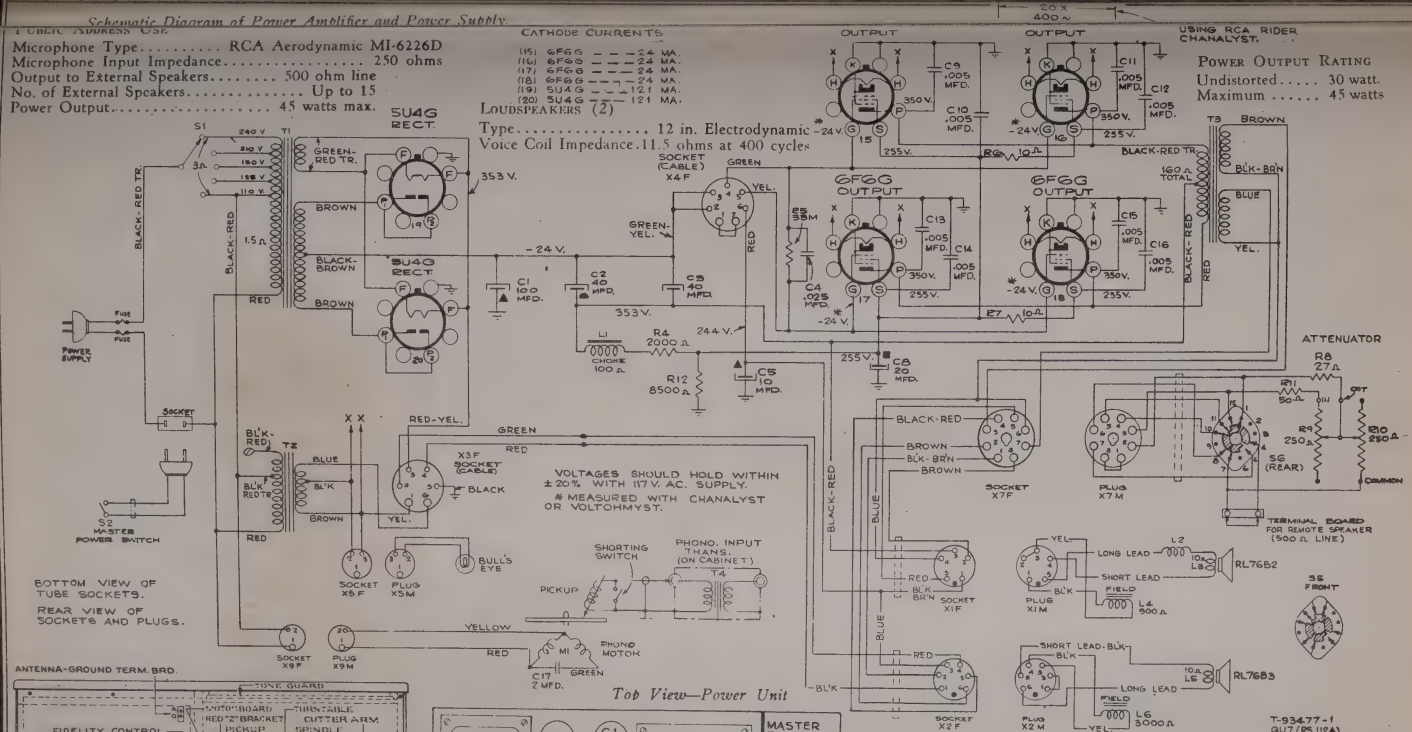
Microphone Type..... RCA Aerodynamic MI-6226D
Microphone Input Impedance..... 250 ohms
Output to External Speakers..... 500 ohm line
No. of External Speakers..... Up to 15
Power Output..... 45 watts max.

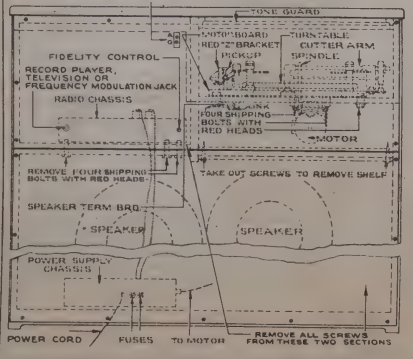
CATHODE CURRENTS

(15) 6F6G — — — 24 MA.
(16) 6F6G — — — 24 MA.
(17) 6F6G — — — 24 MA.
(18) 6F6G — — — 24 MA.
(19) 5U4G — — — 121 MA.
(20) 5U4G — — — 121 MA.

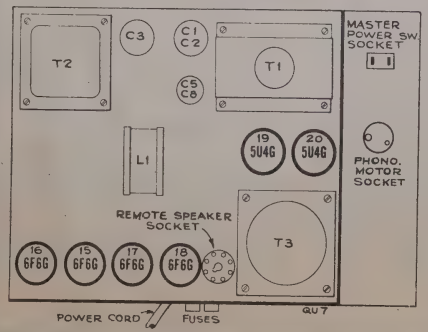
LOUDSPEAKERS (2)

Type..... 12 in. Electrodynamic
Voice Coil Impedance..11.5 ohms at 400 cycles





Top View—Power Unit



Power Output Rating

Undistorted..... 30 watt.
Maximum..... 45 watts

Phonograph

Type..... Automatic
Record Capacity.... Eight "10" or Seven "12" inch Records
Turntable Speed..... 78 r.p.m
Type Pickup..... Magnetic
Pickup Impedance..... 96 ohms at 1,000 cycles
Watts Phono Motor 60 cycle..... 27
50 cycle..... 33
25 cycle..... 30

Power Supply Rating

100-130, 140-160, 195-250 volts. 50-60 cycles..... 400 watts

Recorder

Cutter Head..... Magnetic
Impedance of Cutter at 1,000 cycles,.. 6 ohms
Turntable Speed..... 78 r.p.m.
Grooves Cut Per Inch..... 96
Inches Cut Per Minute..... 81

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Operation

The "Power" Switch above the Master Control Indicator controls the power for all functions of this instrument. The "Master Control" chooses the type of function desired: the full counter-clockwise position of this switch being the "Radio" position, and successively clockwise the positions are: "Phonograph"; "Radio Recording"; "Microphone Recording"; "Radio Recording" *and* "Microphone Recording"; and "Public Address." These functions are indicated on the "Master Control Indicator" as the "Master Control" switch is turned.

Radio Operation:—

Turn Power Switch "ON," set Master Control to "Radio," set "Range Selector" to band desired, and tune in station desired. Volume is controlled by Volume control on Radio Panel. Adjust Bass and Treble controls as desired. For high-fidelity reception of local stations the Treble Tone control should be turned completely clockwise until the fidelity switch functions.

Phonograph Operation:—

Manual Operation:—Turn Power Switch "ON." Set Master Control for "Phonograph." If mechanism is in cycle, wait until cycle is completed. Set Index Lever to "Manual" position. Set "Recording Turntable Switch" to "OFF." Place pickup on pickup support posts. Make sure there is a good needle in pickup. Lift the knobs on top of the record shelves and rotate the shelves back, away from the turntable. Push back the vertical lever at left of the rear record post. Place record on turntable. Place pickup on record, motor switch on pickup arm will start turntable motor. Adjust "Volume" and "Tone" Controls for desired reproduction. The turntable should stop when pickup reaches inner groove of record.

Automatic Operation:—Turn "Power Switch" "ON." Turn "Master Control" to Phonograph. If mechanism is in cycle, wait until cycle has been completed. Set pickup on pickup support posts. See that Recording Turntable switch is "OFF." Check to see if a good needle is in pickup head.

Push index lever to "manual," lift the knobs on the top of the record shelf posts and rotate the shelves back, away from the turntable. Push back the vertical lever at left of the rear record post.

Select a series of eight 10-inch records, or seven 12-inch records, and place the first one on the turntable. Swing the record shelves into position and place the remainder of the series of records on the shelves as shown in the illustration.

Push the index lever to "10" for a series of 10-inch records, or to "12" for a series of 12-inch records.

Lift the pickup and lower it gently on the record, so that the needle point enters the outside groove. The motor switch under pickup arm will start turntable.

Adjust the radio-phonograph volume control for the desired volume, and adjust the tone controls for desired reproduction.

Close the lid of the cabinet to eliminate mechanical sound. The whole series of records will play without further attention, and the last record will repeat until either pickup is lifted off record and placed on record support posts, or Power Switch is turned off.

To reject a record being played, or to start the record-changing cycle in case the record just played does not have the standard eccentric or spiral stopping groove, simply push the index lever to the "reject" position and let go. The pick-up will raise up and swing outwards and the next record will drop down. Upon releasing the index lever, it will automatically return to the "10" position. If playing a series of 12-inch records, the lever should be returned to the "12" position after rejecting a record. Keep the lever in at "manual" when not actually playing records automatically.

To stop the mechanism while a record is being played, push the index lever to "manual," place the pickup on its rest, and turn off the turntable switch.

To stop the mechanism at the completion of a record, first allow the pickup to complete its cycle (the cycle is completed when the pickup comes down on the record). Then push the index lever to "manual," place the pickup on its rest.

To remove a record from the turntable, lift the knobs on top of the record-holder posts, swing the shelves back clear of the records, and push back the vertical lever at left of the rear record post.

Cycle of Operation

In automatic operation (index lever set to "10" or "12"), when the pickup needle enters the eccentric or spiral groove at the inside of the record, the pickup arm swings in the groove, and this motion acts through a friction clutch to "trip" or start the cycle of the automatic record changer mechanism which:

1. Lifts up the pickup arm and swings it out clear of the records.
2. Turns the two record-holder posts, each of which has a "knife" and a "shelf": The knives enter between the bottom record and the rest of the stack. Continuing to turn, the shelves move from under the bottom record and it drops on the turntable, while the rest of the stack of records are supported by the "knives."
3. The pickup arm is then moved to correct position and lowered on the record, while—
4. The record-holder posts are turning back to their original positions, so that the records rest on the shelves, and the knives are in correct position to separate the next record from the stack.

The cycle is completed when the pickup comes down on the record. The pickup arm should not be moved while "in cycle."

Record-Separating Knives. 12-inch records are thicker than 10-inch records: To accommodate this difference, the "knife" or record-separating lever on each record post is raised slightly when a 12-inch record presses down against the ball-point screw that projects through a hole in the record-holder shelf on each post. (10-inch records do not rest on these screws, and the knife clearance is then correct for a 10-inch record.)

"Record Discriminating Lever." In playing a mixed group of 10-inch and 12-inch records, the index lever is set at "10." When the pickup arm moves out during the cycle of operation, the record discriminating lever (at left of the rear record-holder post) is moved to its forward position, toward the spindle, and sets the correct landing position of the pickup needle for a 10-inch record. If a 12-inch record drops down, it pushes the record discriminating lever back, and sets the correct landing position for the 12-inch record.

Caution:—

1. This instrument is not recommended for playing 10-inch and 12-inch records in **mixed sequence.**
2. **Never use force** to start or stop the motor or any part of the record-changing mechanism or pickup arm.
3. **Warped or damaged records** may cause the mechanism to jam.
4. **Warped records** may slide on one another when playing, resulting in unsatisfactory reproduction.
5. **Do not leave records on the record-holder posts** as they may warp, particularly in warm climates. Warped records may be flattened by placing them on a flat surface with a flat heavy article placed on top of them for a few days.
6. **Do not leave pickup needle resting on a record** or on the turntable. Always place it on the pickup rest.
7. **Do not insert a used needle in the pickup,** and avoid turning a needle after it has been used.
8. If for any reason the phonograph stalls, turn off the turntable switch and remove the records from the record holder shelves. Start the turntable and allow the pickup arm to complete its cycle.

Recorder Operation:—

Recorder Set Up:—Turn Master Power Switch "ON." Make sure that Phono. Mechanism is not "in cycle." Place the recording blank on the turntable so that the three holes in the blank line up with the holes in the recording-turntable. Place the Recording arm in position, with the hinged mounting spindle in the bearing on the phonograph shelf, and the drive pins in the holes in the recording blank and turntable. The cutter head bracket should be locked in position under the catch at the drive end of the recording arm until used. Place a cutting stylus fully in the cutter head so that the flat side of the stylus is toward the needle screw.

While recording, use a fine hair brush to keep the area ahead of the stylus free from chips and threads.

Before making each recording tighten the screw on the front of the cutting head that holds the cutting stylus. Do not use pliers or wrench.

Radio Recording:—Tune in desired radio program. Turn Master Control to "Radio Recording." Set "Bass Tone Control" fully clockwise and "Treble Tone Control" fully clockwise. Adjust receiver "Volume Control" so that the "Recorder Magic Eye" in the "Master Control Indicator Panel" closes to about a ¼ inch opening at minimum width for normal volume. When the desired program comes on, pull down cutter bracket from its catch, move it to opposite end of "Recorder Arm" and place cutting stylus gently on record blank about ¼ inch from outer rim.

The speaker and "Recorder Magic Eye" both monitor the recording, so that it is possible to hold the necessary recording level during the program. Lift the cutter from the record before it reaches the inner limit of the record, and lock cutter bracket under the cutter catch.

Microphone Recording:—

Set up Recorder.
Turn "Master Control" to "Microphone Recording."
Set "Microphone Volume Control" to the correct level by testing on some of the sound to be recorded. Set control so that the "Recorder Magic Eye" closes to about a ¼ inch opening at minimum width for normal Volume. The "Microphone Volume Limiter" tube will keep excessively loud sounds to a safe limit. Start turntable. Remove cutter bracket from catch and proceed with recording. Keep "Bass Tone Control" and "Treble Tone Control" maximum clockwise.

Re-Recording:—

Set up Recorder.
Turn "Master Control" to "Radio Recording."
Connect an "RCA Victrola Phonograph Attachment" by plugging an adapter plug into the "Television, FM" jack at the rear of the radio chassis. Turn the attachment volume control full "ON." Place the record it is desired to duplicate on the attachment turntable, and play a portion of it, meanwhile adjusting the "Radio Volume Control" to give the correct recording level in the "Recording Magic Eye." After the correct level has been set, proceed with the recording.

Mixed Radio and Microphone Recording:—

Set up for Recording.
Set "Master Control" so that both "Radio Recording" and "Microphone Recording" are indicated.
Tune in desired radio program.
Set program level same as in "Radio Recording."
Set Microphone Volume Control same as in "Microphone Recording."
Proceed with recording.

Mixed Microphone and Record Recording or Re-Recording:—

Set up for Recording.
Set "Master Control" so that both "Radio Recording" and "Microphone Recording" are indicated.
Proceed as stated in "Microphone Recording" and "Re-recording.

Playback:—

To play back after recording, remove the drive and recorder arm from the turntable-spindle, and place on the pin at the right front of the cabinet. Remove the "Auxiliary Recording Turntable." Proceed as under "Manual" Phonograph operation.

IMPORTANT: Before playing the Automatic Phonograph after recording, make sure the Recording Turntable plate is removed.

If Automatic Mechanism jams during cycle for any reason, throw "Master Power Switch" "OFF," as the turntable "Motor Switch" will not cut off current to motor, while mechanism is in cycle.

Acoustic Adaptor:—An "Acoustic Adaptor" switch located at the right rear corner of the radio chassis can be used to adapt the instrument to different types of locations for phono reproduction, by varying the balance between high and low frequency response as desired.

Public Address Use:—

Microphone Pickup:—Turn Power Switch "ON."
Turn "Master Control" to Public Address position.
If external speakers are connected, turn External Speaker Switch, located at the right hand rear corner of phonograph compartment, clockwise, to put these in operation.
Set "Microphone Volume Control" to give desired Volume in Speakers. If the Speakers in the cabinet are too loud and "Feedback" occurs, the volume on these speakers can be reduced by turning down the "Instrument Speaker Volume Control" located in back of the "External Speaker" switch.

Radio or Record Program:—If it is desired to send Radio programs or Record programs over the External Speaker system, the instrument is operated in the normal manner for "Radio" or "Phonograph" operation, and the "External Speaker" switch is then turned for "External Speaker" operation.

Record Changer Service Data

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc., are in good order and are correctly assembled.

The changer can be rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction. **The 10- and 12-inch records must be absolutely flat for smooth operation.**

A pickup shorting switch, located under the motorboard, operates when the pickup is moved outward to the pickup rest.

The turntable can be removed by tapping smartly on the top of the spindle while pulling upward on opposite sides of the turntable.

Lubrication.—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, lead screw and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, motor bearing, record post bearings, and all other bearings of various levers and pulleys on underside of motorboard and underneath turntable.

RCA MFG. CO., INC.

MODEL QU7
Ch.RC-551

MODEL QU7 HAS THE SAME RADIO CHASSIS AS MODEL QU8, THE DATA FOR WHICH WILL BE FOUND IN RIDER'S VOL. XII, PAGES 12-71 to 12-74 and 12-77 and 12-78. THE POWER AMPLIFIER AND POWER SUPPLY ARE DIFFERENT IN MODEL QU7 AND ALSO THE RECORD CHANGER AND THE P-A PORTION OF THE SET. SEE PAGE 430 IN RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS" FOR RECORD CHANGER ADJUSTMENTS AND PAGE 12-79 IN RIDER'S VOL. XII FOR PICKUP DATA. SEE PAGE 12-82 FOR RECORDER DATA.

Public Address

External speakers may be connected to the terminal board located at the rear of the cabinet under the phono compartment. The total impedance of all the speakers connected to the instrument in parallel or series should be approximately 500 ohms.

Speakers recommended for use with this instrument are RCA MI-6320, MI-6319, MI-6249, MI-6233A or MI-6310 Speakers. The MI-6320 Speaker is rated about 10 watts. The MI-6233A Speaker is rated about 4 watts. These are speakers for handling low power in small rooms. For larger auditoriums and larger installations consult your local RCA Commercial Sound Distributor.

For outdoor, high volume applications the RCA MI-6260A (20 watts) or MI-6256 (100 watts) Speakers are recommended. As all these speakers are 15 ohm impedance, a matching transformer will be needed to match them to the 500 ohms output of the instrument (MI-4603 Transformer).

The following tables show the impedances of the speakers listed above:

AVAILABLE IMPEDANCES

MI-12315 Coupling Transformer

(Used in MI-6233A, MI-6249 Permanent-magnet Speakers)

Impedance	Leads
2	Blue—Green with Red tr.
6	Yellow—Green with Red tr.
15	Yellow—Blue
35	Black—Green with Red tr.
60	Black—Blue
225	Black—Red
340	Yellow—Red
430	Red—Green with Red tr.
500	Red—Blue

Note: As shipped from factory, MI-6233 Speakers have red and blue leads connected to terminal board.

AVAILABLE IMPEDANCES

RCA MI-6320, MI-6319 and MI-6310 Permanent-magnet Dynamic Speakers

Impedance	Leads
2	Blue—Green with Red tr.
6	Blue—Yellow
400	Black—Yellow
500	Black—Blue
1080	Yellow—Black with Red tr.
1250	Blue—Black with Red tr.
2400	Red—Black
4500	Red—Yellow
5000	Red—Blue

Example: To match 2 MI-6233A Speakers to the instrument, connect each of the speakers for 342 ohms impedance as shown in the table above, and then connect the speakers in series.

To match 3 MI-6233 Speakers, connect each speaker for 225 ohms, then connect the three speakers in series.

To match 2 MI-6260A Speakers choose the 225 ohm impedance, and connect the primaries of the transformers in series.

To match 3 MI-6260A Speakers, choose the 1,250 ohm impedance and connect the speakers in parallel.

LOCATING LOUDSPEAKERS

When installing loudspeakers, either temporarily or permanently, the installation will be simplified if one considers the loudspeaker to be similar to a search light. The sound waves from the loudspeaker are distributed in much the same manner as light rays from a search light. If a sufficient amount of the sound waves, either direct from the loudspeakers or reflected from hard surfaces, reach the microphone the system will howl. This is technically termed acoustic feedback, because the amplified sound from the loudspeakers is picked up by the microphone and fed back through the amplifier, where it adds to the original sound until a continuous whistle or howl is produced. Directional projectors, such as the 20-watt loudspeaker (MI-6260A) will, to a great extent, prevent howling by directing the sound waves to a restricted area and the amplifier can then be operated at much greater volume. When two speakers are used in an auditorium, hall, etc., the speakers and microphone should be so located that the speakers will be slightly in front of the microphone. Locate one speaker on each side of the microphone and as far from it as possible without destroying the allusion that the sound being heard is actually coming from the individual speaking. The speakers should be pointed in the direction of and at the proper angle to the audience so that as little of the sound waves as possible will be reflected from the side walls and hard surfaces.

It is not recommended that loudspeakers be located in the rear of the auditorium to provide coverage for this area, but rather that directional sound projectors be used from the front and raised to a sufficient height to be directed into the audience at the rear of the seating area. The horns should be located so that the center of the sound beam will strike the floor at a point slightly more than two-thirds of the length of the room. There are occasions, however, where this is not practical, because of the high reverberation or poor acoustical conditions of the building. In this condition better results can be obtained by using a number of speakers operating at comparatively low volume. In an installation of this type a sufficient number of loudspeakers should be used and so located that the sound will be evenly distributed over the entire area in such a manner that an individual will hear the sound only from the speaker nearest him.

The RCA MI-6292, MI-6294, MI-6233A and MI-6310 loudspeaker housings are tilted downward twenty degrees for correct sound distribution.

MI-6292 and MI-6294 are tilted loudspeaker cabinets for MI-6319, MI-6249 and MI-6320 Speakers respectively.

The height of the loudspeaker should be such that the center axis points toward seats about two-thirds of the room length away from the speaker.

In a large room, it may be necessary to use two or more loudspeakers connected in parallel and correctly phased, and located so as not to buck each other.

In an auditorium, RCA auditorium-type loudspeakers of correct type should be used. The auditorium speaker should be centered on the front wall, with its center axis pointing toward seats about two-thirds of the room length away from the speaker. If the speaker cannot be centered laterally on the front wall, it is advisable to use two speakers, one on each side of the proscenium arch. The height of the speaker or speakers should be sufficient to ensure good coverage of all seats, including the balcony

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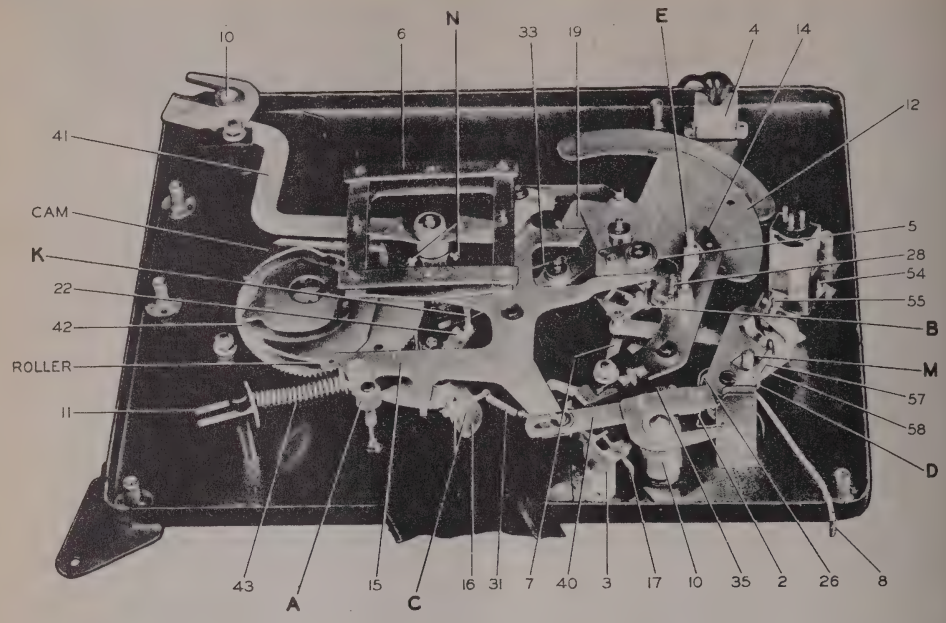
RCA MFG. CO., INC.



Names of Mechanism Parts

2	Guide	—Pickup-lift-cable guide.
3	Bracket	—Record-discriminating-lever bracket.
4	Switch	—Turntable motor switch.
5	Clutch	—Trip-lever friction clutch.
6	Coupling	—Flexible coupling.
7	Finger	—Trip-lever friction finger.
8	Cable	—Pickup shielded cable.
9	Spring	—Record-discriminating-lever spring (flat)
10	Gear	—Record-separator-shaft gear.
11	Guide	—Main-lever-spring guide.
12	Lever	—Index lever.
14	Lever	—Locating lever and pawl.
15	Lever	—Main lever.
16	Lever	—Pickup lift-cable lever.
17	Lever	—Record-discriminating lever and pawl.
18	Lever	—Record-separator elevating lever.
19	Lever	—Trip-detaining lever.
22	Pawl	—Trip pawl.
23	Pin	—Separator-shaft pin (engages gear).
25	Separator	—Record-separator knife.
26	Spring	—Pickup-arm starting spring.
27	Shelf	—Record-support shelf.
28	Spring	—Record-discriminating-lever pawl spring, or locating-lever pawl spring.
31	Spring	—Pickup lift-cable spring.
33	Spring	—Trip-detaining lever spring.
34	Shaft	—Record-separator shaft.
35	Spring	—Locating-lever spring.
40	Gear	—Short arm and rack gear.
41	Gear	—Long arm and rack gear.
42	Cam	—Cam and drive gear assembly.
43	Spring	—Main-lever spring.
54	Switch	—Automatic switch.
55	Pin	—Switch plunger pin.
57	Spring	—Trip lever cam spring.
58	Cam	—Trip-lever cam and link.

Names of Mechanism Adjustments

"A" Rubber Bumper.—Maintains 1/10-inch clearance between roller (on end of main lever) and cam plate.

"B" Friction Clutch Adjustment.—Regulates tripping of record-changing cycle when pickup swings in eccentric groove.

"C" Pickup Lift-Cable Adjustment.—Regulates height that pickup arm is lifted during record-changing cycle.

"D" Needle Landing Position for 10-inch Records.—The relation between pickup shaft and trip lever "58," which are fastened by set screws "D," determines needle landing position for 10-inch records.

"E" Needle Landing Position for 12-inch Records.—Eccentric stud "E" adjusts position of lever "14" which determines landing position for 12-inch records.

"F" Record separator knife adjustment for 10-inch records, adjusts spacing of knife with relation to record shelf so knife will accurately slice in between the bottom 10-inch record and the rest of the stack.

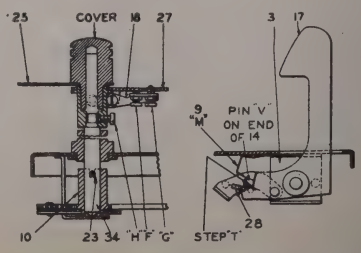
"G" Record separator knife adjustment for 12-inch records, adjusts movement of elevating lever which raises knife to compensate for greater thickness of 12-inch records.

"H" Record support shelf set screws, to adjust record support shelf on each record post, so the shelves move out from under the bottom record at the same instant, permitting record to drop properly.

"K" Trip-pawl stop pin, regulates point at which the roller on main lever enters the cam.

"M" Eccentric stud, regulates automatic-switch release.

"N" Spindle clutch adjustment.



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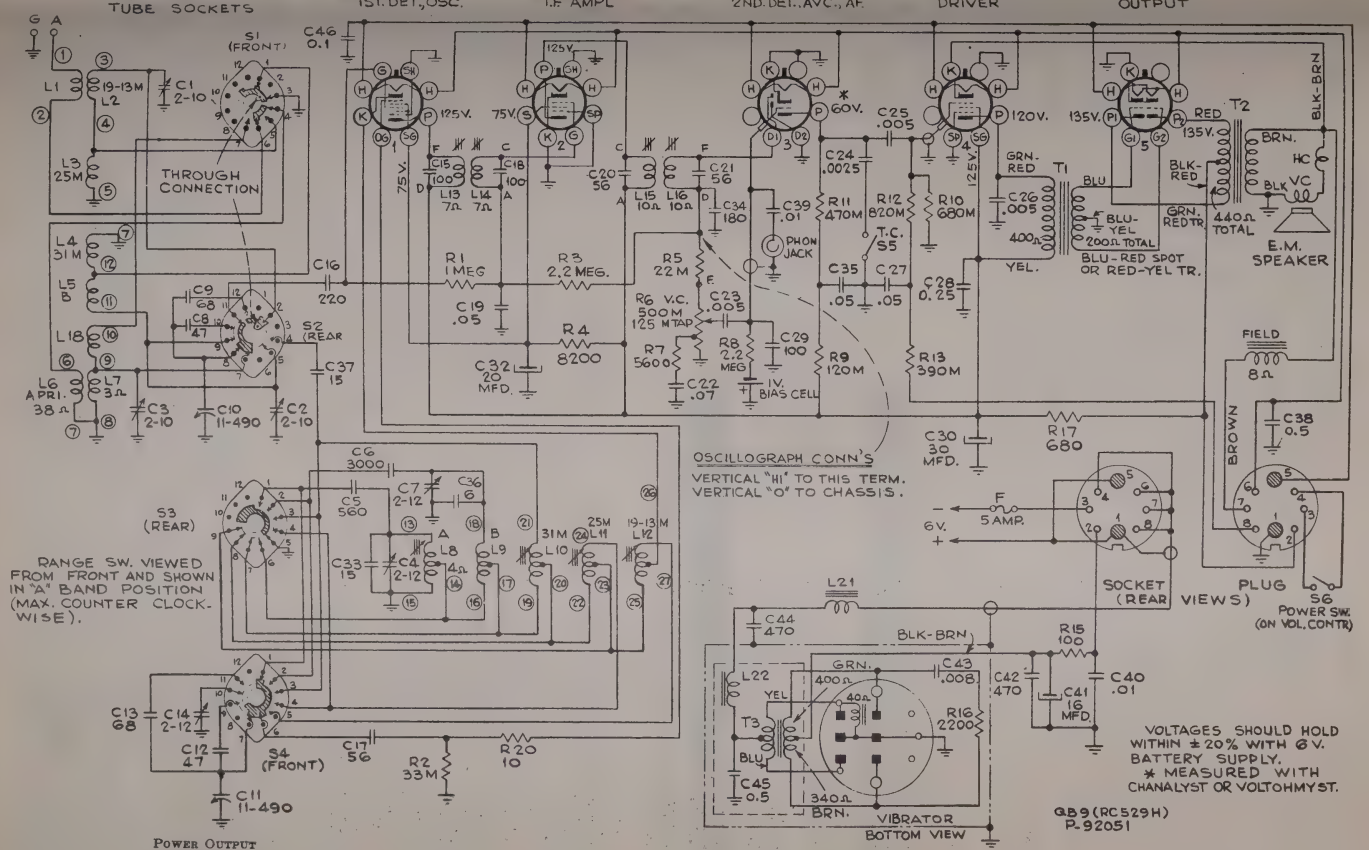


Power Output

Undistorted	1.4 watts
Maximum	2.1 watts

Power Supply Ratings

With vibrator power supply unit (RS-115B):
6.3 volts, total current drain ..... 2.7 amperes

Loudspeaker (RL-79C3)

Type	6-inch, electrodynamic
Voice-coil Impedance at 400 cycles	3.4 ohms

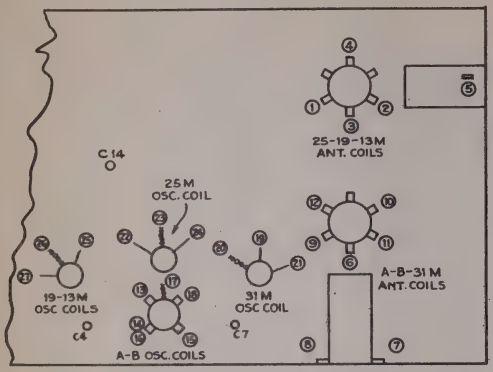
Frequency Ranges

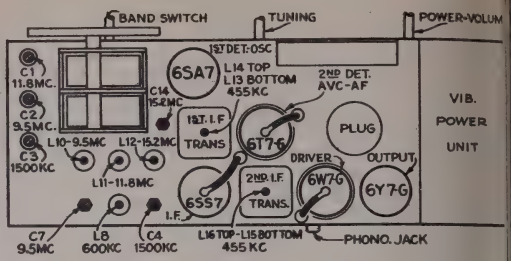
Standard Broadcast ("A" Band)	540-1,720 kc (555-174 m)
Medium Wave ("B" Band)	2.9-9.5 mc (103-31.5 m)
Short Wave	9.5-11.8 mc (31.5-25.4 m)
Short Wave	11.7-15.2 mc (25.6-19.7 m)
Short Wave	15.1-22.5 mc (19.9-13.3 m)

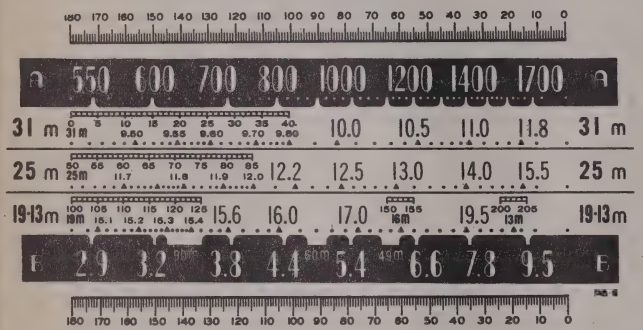
Intermediate Frequency ..... 455 kc

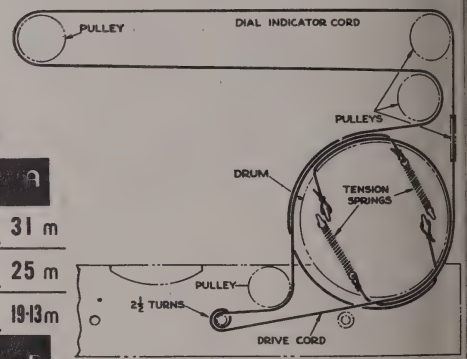
MODEL QB9
Ch.RC-539H

RCA MFG. CO., INC.









As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of the test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator (RCA Stock No. 9572), or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
	On oscillator-circuit cores and trimmers, if two peaks can be obtained, use the one of minimum inductance or minimum capacity.				
1	1st I-F grid cap, in series with .01 mfd.	455 kc	A	Quiet point near 180°	L15 and L16 2nd I-F transformer
2	1st Det. grid, in series with .01 mfd.				L13 and L14 1st I-F transformer
3	Ant. lead in series with 300 ohms	11.8 mc	25M	138.5°	L11 (osc.) C1 (ant.)
4		15.2 mc		17°	C14 (osc.)*
5		Repeat steps 3 and 4.			
6		15.2 mc	19-13M	156°	L12 (osc.)
7		9.5 mc	31M	156°	L10 (osc.) C2 (ant.)
8		9.5 mc	B	11.5°	C7 (osc.)
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C4 (osc.) C3 (ant.)
10		600 kc		150°	L8 (osc.) (Rock gang)
11	Repeat steps 9 and 10.				

* Use minimum capacity peak if two can be obtained. Check image to determine that C14 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

NOTE: Oscillator tracks above signal on all bands.

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STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-859D)	
34502	Arm—Range switch actuating arm	.25
18717	Board—Phono input terminal board	.35
37090	Calibrator—Printed chart for Stock No. 37090 drum	.10
18714	Capacitor—Plunger type air-trimmer	.50
37089	Capacitor—3 section mica trimmer 2.5 to 10 mfd. each section	.60
33097	Capacitor—4.7 mmfd.	.35
35646	Capacitor—8 mmfd.	.25
18800	Capacitor—10 mmfd., moulded	.35
31580	Capacitor—15 mmfd.	.30
35644	Capacitor—47 mmfd., ceramic	.35
37589	Capacitor—47 mmfd., silvered mica	.35
18732	Capacitor—68 mmfd.	.35
35645	Capacitor—68 mmfd., ceramic	.35
18087	Capacitor—68 mmfd., silvered mica	.35
30904	Capacitor—100 mmfd., mica	.25
30949	Capacitor—130 mmfd.	.25
18008	Capacitor—180 mmfd.	.25
18894	Capacitor—220 mmfd., moulded	.25
31635	Capacitor—560 mmfd.	.25
35643	Capacitor—3,000 mmfd.	.55
34499	Capacitor—.0025 mfd.	.20
33584	Capacitor—.005 mfd.	.25
5148	Capacitor—.007 mfd.	.20
4897	Capacitor—.01 mfd.	.25
11818	Capacitor—.015 mfd.	.20
37787	Capacitor—.03 mfd.	.20
4899	Capacitor—.04 mfd.	.20
13484	Capacitor—.25 mfd. (C89)	.30
13484	Capacitor—.25 mfd. (C42)	.30
13741	Capacitor—.5 mfd.	.30
38538	Capacitor—Electrolytic comprising 2 sections of 15 mfd., 450 volts each	1.05
37093	Coil—A-B band oscillator coil	.85
37085	Coil—A-B and 31 meter band antenna coil	1.80
37087	Coil—A-B and 91 meter band R.F. coil	1.60
31251	Socket—Eight prong tube socket	.25
34864	Socket—Tuning tube socket	.25
31418	Spring—Dial cord spring	.05
13638	Spring—Dial cord tension spring	.50
37050	Switch—Range switch	3.50
36636	Transformer—First I.F. transformer	1.70
36632	Transformer—Second I.F. transformer	1.85
37898	Transformer—Driver transformer	2.70
	POWER SUPPLY UNIT ASSEMBLIES (MI-8122)	
18730	Capacitor—100 mmfd.	.35
31796	Capacitor—.02 mfd.	.20
13484	Capacitor—.25 mfd.	.30
33979	Capacitor—Electrolytic 10 mfd., 300 volts	.90
14289	Clip—Battery clips—one marked "/" and one unmarked	.30
12819	Coil—Choke coil	.55
31794	Coil—Choke coil	.65
5140	Fuse—5 amp.	.10
14409	Plug—7 contact female plug for power cable	.45
18282	Resistor—680 ohms, ½ watt	.20
4786	Socket—Vibrator socket	.25
31793	Transformer—Vibrator power transformer	5.30
31796	Vibrator—Plug-in vibrator	4.15
	SPEAKER ASSEMBLIES (RL-90-5)	
31825	Cap—Dust cap	.02
36192	Cone—Speaker cone complete with voice coil	1.50
12567	Plug—6 prong male plug for speaker	.22
37699	Transformer—Output transformer	2.25

STOCK No.	DESCRIPTION	Unit List Price
35684	Coil—13 and 19 meter band oscillator coil	.45
37086	Coil—16-19 and 25 meter band antenna coil	1.00
37088	Coil—13-19 and 25 meter band R.F. coil	1.60
35625	Coil—25 meter band oscillator coil	.50
35626	Coil—31 meter band oscillator coil	.45
37086	Condenser—3 gang variable tuning condenser	6.75
37926	Control—Tone control and power switch	1.50
37927	Control—Volume control and dial lamp switch	2.00
32634	Cord—Drive or pointer cord (approx. 80 in. lg.)	.10
37090	Drum—Tuning condenser drum—less calibration chart	.60
17091	Flywheel—Wheel and tuning shaft assembly	1.85
17094	Link—Link, arm and bushing assembly	.60
14038	Nut—Clamping nut for Stock No. 13714 capacitor	.03
31417	Plate—Cushion socket mounting plate	.10
13483	Plug—8 contact female plug for speaker cable	.20
14404	Plug—7 contact male plug	.35
35641	Pulley—Drive cord pulley	.10
37089	Pulley—Left hand dial cord pulley and bracket	.20
37088	Pulley—Right hand dial cord pulley and bracket	.20
3153	Resistor—1,500 ohms, 1 watt	.22
34767	Resistor—6,800 ohms, ½ watt	.20
30758	Resistor—6,700 ohms, 1 watt	.22
13998	Resistor—22,000 ohms, ½ watt	.20
13758	Resistor—27,000 ohms, ½ watt	.20
12454	Resistor—33,000 ohms, ½ watt	.20
30850	Resistor—56,000 ohms, ½ watt	.20
13715	Resistor—68,000 ohms, ½ watt	.20
12564	Resistor—220,000 ohms, ½ watt	.20
30648	Resistor—470,000 ohms, ½ watt	.20
30963	Resistor—820,000 ohms, ½ watt	.20
12013	Resistor—1 meg., 1/10 watt	.15
13730	Resistor—1 meg., ½ watt	.20
30208	Resistor—1.3 meg., ½ watt	.20
11769	Resistor—1.8 meg., ½ watt	.20
12679	Resistor—2.3 meg., ½ watt	.20
37096	Shaft—Indicator shaft	.30
37095	Shaft—Range switch actuating shaft	.25
31364	Socket—Dial lamp socket	.20
	MISCELLANEOUS ASSEMBLIES	
37900	Back—Cabinet back cover	.80
37718	Clip—Tuning tube clip and thumb screw	.25
37921	Crystal—Tuning tube crystal	.90
35389	Decalcomania—Range switch decal	.05
35392	Decalcomania—Trade mark decal	.05
35391	Decalcomania—Tuning decal	.05
35649	Decalcomania—Volume control decal	.05
37883	Dial—Glass dial scale	4.00
37922	Indicator—Station selector indicator	.50
35652	Knob—Range indicator knob	.40
35651	Knob—Range switch knob	.40
35650	Knob—Tone switch knob	.25
35655	Knob—Tuning or volume control knob	.40
31480	Lamp—Dial lamp (#40)	.20
33438	Screw—Thumb screw for clip Stock No. 30716	.05
14379	Spring—Retaining spring for knobs Stock Nos. 35650, 35955, and 35651	.05
4982	Spring—Retaining spring for knob Stock No. 35652	.05
	CV-110 A-C POWER SUPPLY UNIT	
32015	Capacitor—1 mfd. (C2)	.80
32013	Capacitor—Comprising 2 sections 16 mfd. each (C1, C3)	2.10
14409	Plug—7-contact plug for power output cable	.45
32014	Reactor—Filter reactor (L1)	1.50
30880	Resistor—150 ohms, ½ watt (R1)	.20
31251	Socket—Rectifier tube socket	.25
31998	Transformer—Power transformer, 105-130, 140-160, 200-250 volts, 25-60 cycles (T1)	12.00

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-529H)	
37976	Bracket—Tone control bracket	.25
35642	Calibrator—Drive drum calibrator	.10
37250	Capacitor—Electrolytic, 20 mfd., 250 volts	.60
37867	Capacitor—Electrolytic, 30 mfd., 250 volts	.60
13714	Capacitor—Air trimmer, medium, 2-12 mmf.	.50
34654	Capacitor—Mica trimmer comprising 3 sections of 2.5-10 mmf. each	.60
35646	Capacitor—6 mmf., ceramic	.35
36012	Capacitor—15 mmf., ceramic	.35
39608	Capacitor—15 mmf., silvered mica	.35
35644	Capacitor—47 mmf., ceramic	.35
39620	Capacitor—47 mmf., silvered mica	.35
12723	Capacitor—56 mmf., moulded	.35
30949	Capacitor—56 mmf., unmoulded	.35
35645	Capacitor—68 mmf., ceramic	.35
36624	Capacitor—68 mmf., silvered mica	.30
39626	Capacitor—100 mmf., moulded	.35
30904	Capacitor—100 mmf., unmoulded	.25
13003	Capacitor—180 mmf., moulded	.35
39636	Capacitor—220 mmf., moulded	.35
39646	Capacitor—560 mmf., silvered mica	.35
35643	Capacitor—3,000 mmf., tubular	.55
34459	Capacitor—.0025 mfd., 1,400 volts	.20
4838	Capacitor—.005 mfd., 500 volts	.25
4937	Capacitor—.01 mfd., 1,000 volts	.25
4886	Capacitor—.05 mfd., 400 volts	.20
14626	Capacitor—.07 mfd., 400 volts	.20
32786	Capacitor—.1 mfd., 400 volts	.25
37801	Capacitor—.25 mfd., 300 volts	.30
12741	Capacitor—.5 mfd., 150 volts	.30
31081	Coil—Bias coil	.25
35632	Coil—Antenna coil, "A" band	1.10
35631	Coil—Antenna coil, spread band	.75
35623	Coil—Oscillator coil, "A" and "B" band	.80
35624	Coil—Oscillator coil, 19-13 meter band	.45
35625	Coil—Oscillator coil, 25 meter band	.50
35626	Coil—Oscillator coil, 31 meter band	.45
35619	Condenser—Variable tuning condenser	2.80
38412	Control—Volume control and power switch	2.00
32634	Cord—Drive cord (approx. 28-in. overall length)	.10
34662	Cord—Indicator cord (approx. 53-in. overall length)	.25
35788	Core—Adjustable core and stud for "A" and "B" bands oscillator coil	.15
12006	Core—Adjustable core and stud for I.F. transformers	.15
31259	Core—Adjustable core and stud for 19-13 meter, 25 meter and 31 meter bands oscillator coils	.15
35627	Drum—Drive drum—less calibrator	.55
35638	Flywheel—Tuning shaft flywheel	1.10
31580	Holder—Bias cell holder	.15
5119	Plug—3-contact plug for speaker cable	.25
35789	Plug—8-prong male plug for power input cable	.35
35641	Pulley—Drive cord pulley	.10
35630	Pulley—Drive cord pulley located between knob shafts	.10
34761	Resistor—10 ohms, ½ watt	.20
12262	Resistor—680 ohms, ½ watt	.20
13714	Resistor—5,600 ohms, ½ watt	.20
30149	Resistor—8,200 ohms, 1 watt	.22
30492	Resistor—22,000 ohms, ½ watt	.20
12454	Resistor—33,000 ohms, ½ watt	.20
13734	Resistor—120,000 ohms, ½ watt	.20
13479	Resistor—390,000 ohms, ½ watt	.20
30648	Resistor—470,000 ohms, ½ watt	.20
30562	Resistor—680,000 ohms, ½ watt	.20
30963	Resistor—820,000 ohms, ½ watt	.20
30652	Resistor—1 megohm, ½ watt	.20

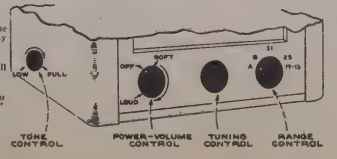
STOCK No.	DESCRIPTION	Unit List Price
30649	Resistor—2.2 megohm, ½ watt	.20
14350	Screw—No. 8-32 square head set screw	.03
35949	Shaft—Tuning knob shaft	.25
35787	Socket—Phono input socket	.15
31251	Socket—Tube socket	.25
13638	Spring—Drive cord spring	.08
31418	Spring—Indicator cord spring	.05
31261	Spring—Retaining spring for adjustable core and studs	.01
12007	Spring—Retaining spring for I.F. transformers—core and stud	.02
35640	Support—Pulley support complete with pulley	.35
35639	Support—Pulley support complete with three (3) pulleys	.55
35622	Support—Tuning shaft and flywheel support	.20
35947	Switch—Range switch	1.75
39738	Switch—Tone control switch	.75
35636	Transformer—First I.F. transformer	1.70
35633	Transformer—Second I.F. transformer	1.85
37898	Transformer—Driver transformer	2.70
37924	Transformer—Output transformer	1.90
33726	Washer—"C" washer for pulley No. 35630	.02
2917	Washer—"C" washer for tuning shaft	.03
	VIBRATOR POWER SUPPLY ASSEMBLIES (RS-115B)	
32405	Capacitor—Electrolytic, 16 mfd., 350 volts	.85
30433	Capacitor—470 mmf., moulded	.35
35573	Capacitor—.008 mfd., 1,200 volts	.25
37514	Capacitor—.01 mfd., 1,000 volts	.25
14289	Clip—Battery clip (1 set)	.30
37920	Coil—Choke coil	.35
5140	Fuse—5 amp.	.10
33969	Plug—Female plug for power supply cable	.60
34765	Resistor—100 ohms, ½ watt	.20
34767	Resistor—2,200 ohms, ½ watt	.20
12241	Socket—Vibrator socket	.30
39739	Transformer—Vibrator transformer	5.00
35543	Vibrator—Plug-in vibrator	4.00
	SPEAKER ASSEMBLIES (RL-79C3)	
31825	Cap—Dust cap	.02
39741	Coil—Field coil (8 ohms)	3.75
39908	Coil—Neutralizing coil	.25
38392	Cone—Cone complete with voice coil	1.25
5118	Plug—3-prong male plug for speaker	.35
	NOTE: If the stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker, and full description of part required.	
	MISCELLANEOUS ASSEMBLIES	
36103	Decalcomania—Power switch decal	.05
37839	Decalcomania—Range switch decal	.15
35392	Decalcomania—Trade mark decal	.05
35391	Decalcomania—Tuning decal	.05
39744	Dial—Glass dial scale	2.00
39743	Indicator—Station selector indicator	.40
35650	Knob—Tone control knob	.25
37956	Knob—Tuning knob	.35
38336	Knob—Volume control or range switch knob	.35
39742	Plate—Dial plate complete with pointer guide	1.00
14270	Spring—Retaining spring for knob No. 35650	.05
30900	Spring—Retaining spring for knobs No. 37956 and 38336	.05

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

MODEL QB9

Precautionary Lead Dress.—

1. All oscillator coil leads must be kept apart from each other as well as other leads and parts. No two leads may be less than ½ inch apart.
2. Oscillator grid coupling condenser, C17, must bear tightly against switch or other condensers, and the green gang lead must bear against C17 from the other side. Cement with "amberoid."
3. C5 (500 mmf.) must be placed exactly midway between the two (19-13M and 25M) coils; it must be at least ½ inch away from any coil leads.
4. C12 (47 mmf.) condenser must be at least ½ inch away from all parts and leads.
5. C13 (68 mmf.) condenser must bear against the switch and/or C17, grid coupling condenser and be cemented with "amberoid," or else clear all parts and leads by at least ½ inch.



6. Antenna grid coupling condenser must be as far away from all metal parts as possible.
7. Braids between gang and chassis must be as soldered as to be as far away from stator lugs as possible.
8. Both condensers on the front switch lug No. 8 (with green antenna gang lead) must be as far away from metal shields of the switch and all other metal as possible.
9. AVC by-pass condenser (C19) must clear the tuning flywheel by at least ½ inch.
10. Make sure the bias cell polarity is correct.

Jon F. Rider

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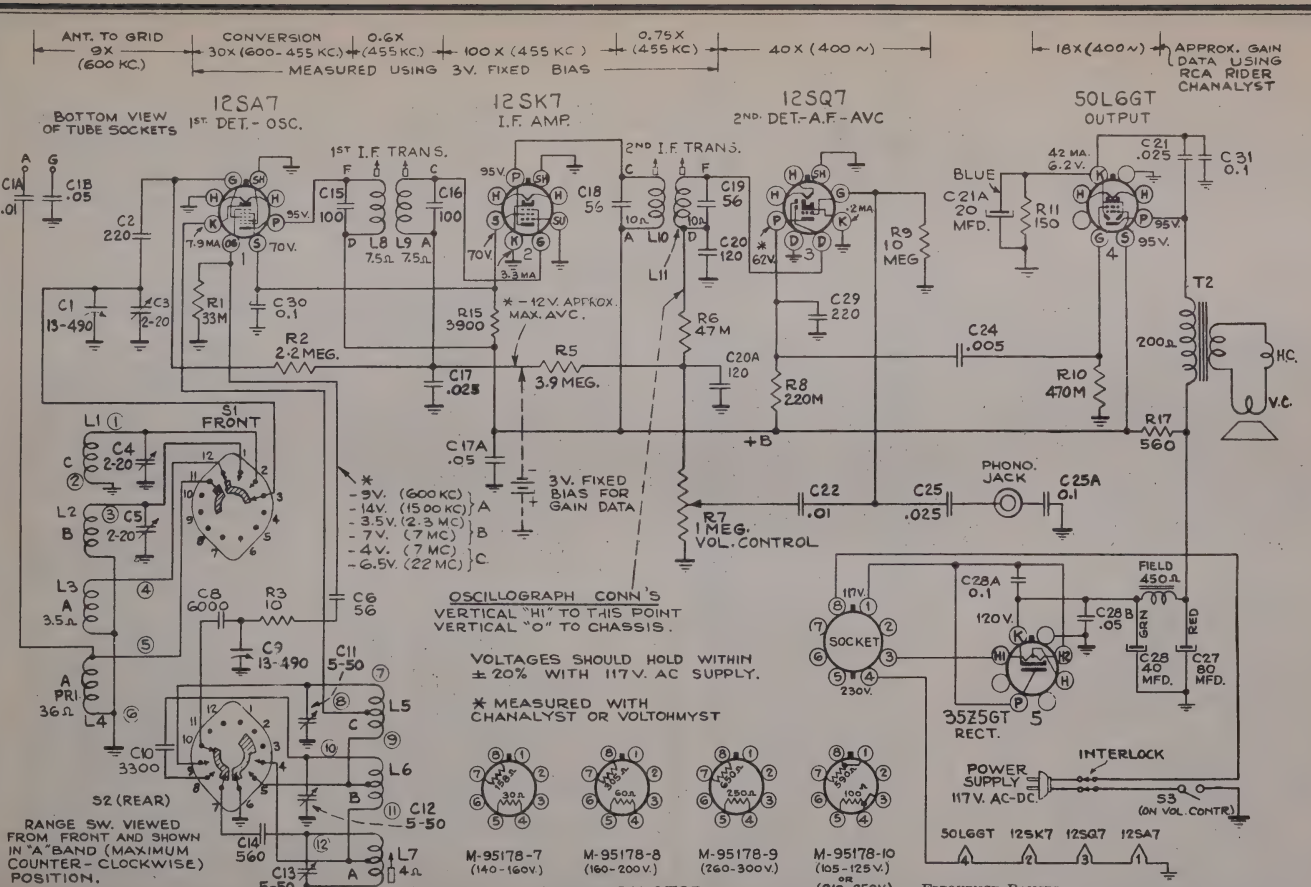

FOR PARTS LIST, SEE INDEX

Model Q11 (RC-563E) Schematic Diagram

Model Q11 (RC-563F) does not use ballast resistor, and field and output circuits are as shown in the diagram

The standard Ballast Resistor M-95178-10, supplied with the Model Q11 (RC-563E), 105-125, 210-250 volt model, may be replaced with other types for operation on other voltage ranges The Ballast Resistor must be installed in place of the M-95178-10 with the lug at the 230 volt mark (see top view of chassis). For 140-160 volts—Ballast Resistor M-95178-7; for 160-200 volts—Ballast Resistor M-95178-8; and for 260-300 volts—Ballast Resistor M-95178-9.

FREQUENCY RANGES

Standard Broadcast ("A" Band)	540-1,720 kc (555-174 m)
Medium Wave ("B" Band)	2.3-7.0 mc (130-42.8 m)
Short Wave ("C" Band)	7.0-22.0 mc (42.8-13.6 m)

INTERMEDIATE FREQUENCY ..... 455 kc

LOUDSPEAKERS

	RL-86A-3	RL-86B-2
Type	5-inch EM	5-inch EM
V.C. Impedance at 400 cycles	4 ohms	4 ohms
Field Resistance	450 ohms	3,300 ohms

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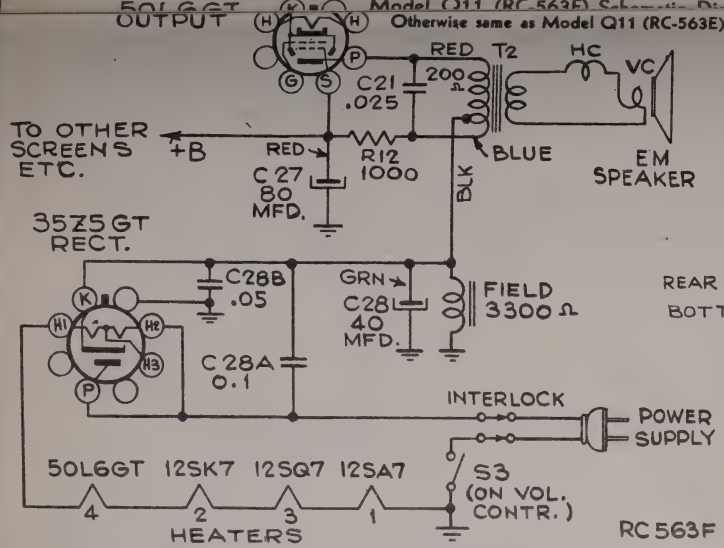
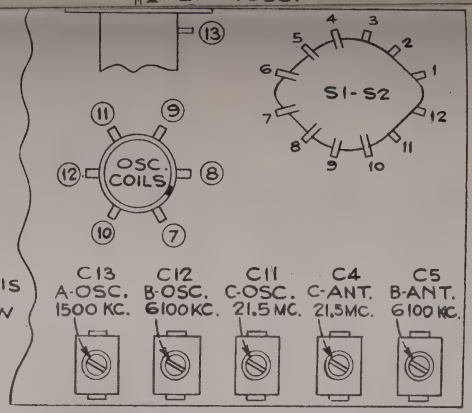
Model Q11 (RC-563E) Schematic Di...

Otherwise same as Model Q11 (RC-563E)





Power Supply Ratings (DC or 40-100 cycles AC)

Chassis	Ballast Resistor	Voltage	Watts
RC-563E	M-95178-10	105-125	40
RC-563E	M-95178- 7	140-160	50
RC-563E	M-95178- 8	160-200	65
RC-563E	M-95178-10	210-250	80
RC-563E	M-95178- 9	260-300	95
RC-563F		105-125	40

Power Output Ratings

Chassis	Voltage	Maximum
RC-563E	117	2.4
RC-563E	234	4.1
RC-563F	117	2.2

Steps	Range Switch	Connect high side test osc. to—	Tune test osc. to—	Turn radio dial to	Adjust following for max. peak output
1	"A"	12SK7 I-F grid in series with .01 mfd.	455 kc	"A" band quiet point at high-freq. end.	L10, L11 (2nd I-F trans.)
2		12SA7 1st det. grid, in series with .01 mfd.			L9, L8 † (1st I-F trans.)
3		Antenna lead in series with 200 mmf.	1,500 kc (200 m)	1,500 kc mark (5th mark)	C13, C3
4			600 kc (500 m)	600 kc mark (2nd mark)	L7** Rock gang
5			Repeat steps 3 and 4		
6	"B"	Antenna lead in series with 300 ohms	6.1 mc	6.1 mc mark (5th mark)	C12* (osc.) C5 (ant.)
7	"C"		21.5 mc	21.5 mc mark (6th mark)	C11* C4

* Use minimum capacity peak if two peaks can be obtained.

** Rock gang slightly for peak output.

† Do not readjust **L11** or L10 when test oscillator is applied to the 12SA7 Grid.

NOTE: Oscillator tracks above signal on all bands.

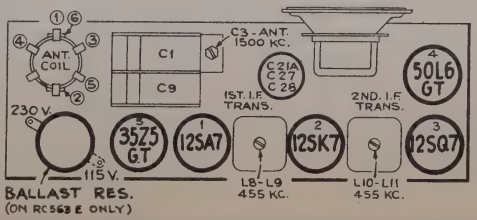
Pre-Setting Dial.—With gang condenser in full mesh, the pointer should be 1/16 inch to the left of first mark on dial backing plate.

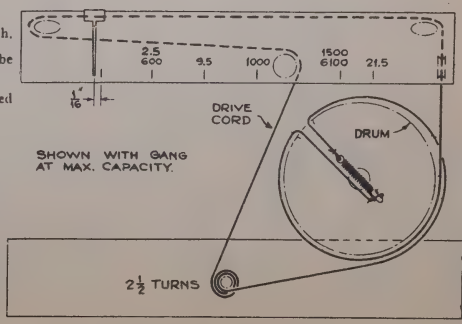
Precautionary Lead Dress.—

Dress 0.01 capacitor from volume control away from power switch.

Yellow cathode lead from 12SA7 socket to oscillator coil must be dressed around coil form.

Yellow lead from band switch to antenna coil must be dressed around coil form.





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MODEL Q11
Ch. RC-563E, RC-563F

RCA PAGE 14-17

MODEL Q12
Ch.RC-563,RC-563B,
RC-563C,RC-563D

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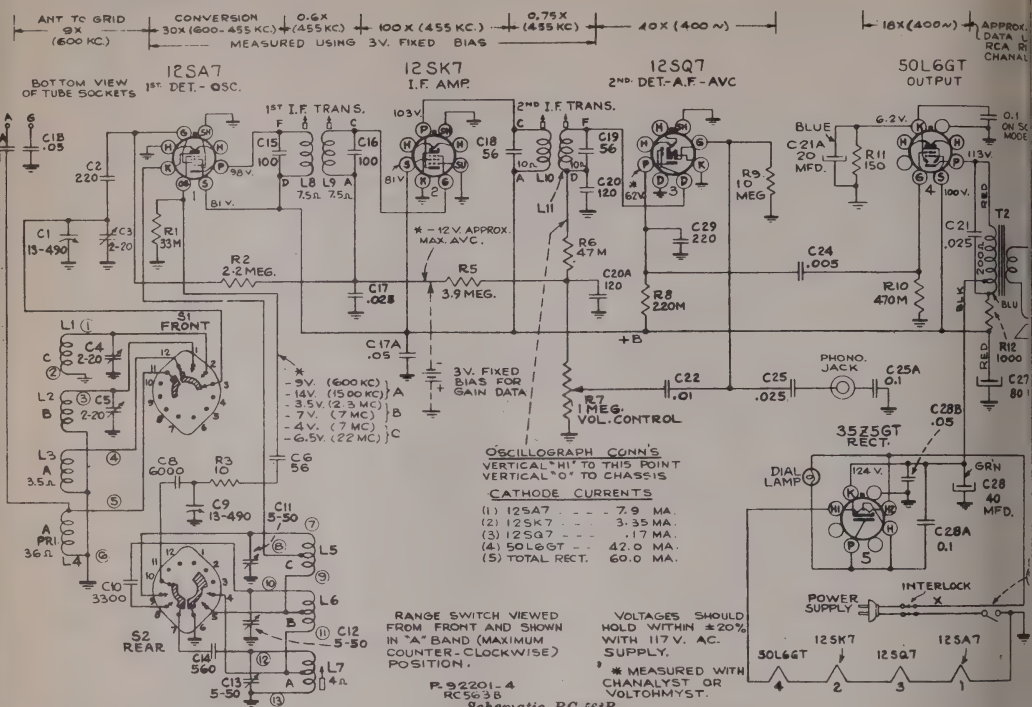
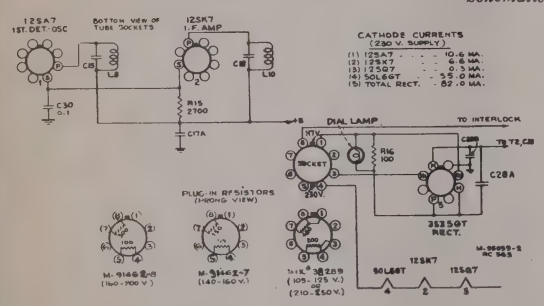
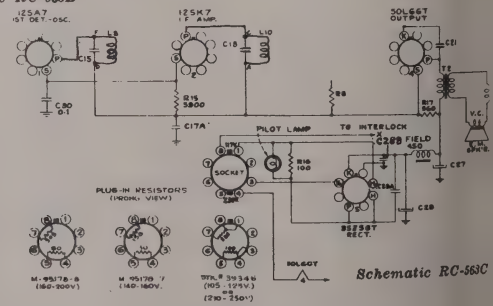
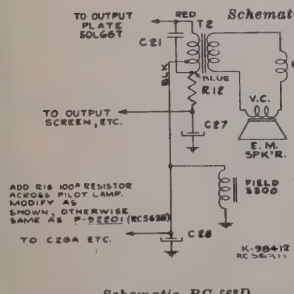


Schematic RC-563B





Schematic RC-563C



Schematic RC-563

Schematic RC-563D

Frequency Ranges

Standard Broadcast ("A" Band)	540-1,720 kc (555-174 m)
Medium Wave ("B" Band)	2.3-7.0 mc (130-42.8 m)
Short Wave ("C" Band)	7.0-22.0 mc (42.8-13.6 m)

Intermediate Frequency ..... 455 kc

Power Supply Ratings (DC or 40-100 cycles AC)

Chassis	Ballast Resistor	Voltage	Watts
RC-563	Stock No. 38289	105-125	85
RC-563	Stock No. 38289	210-250	70
RC-563	M-91462-7	140-160	48
RC-563	M-91462-8	160-200	55
RC-563B	——	110	35
RC-563C	Stock No. 39346	105-125	87
RC-563C	Stock No. 39346	210-250	85
RC-563C	M-95178-7	140-160	54
RC-563C	M-95178-8	160-200	67
RC-563D	——	110	37

Power Output Ratings

Chassis	Voltage	Maximum
RC-563	117	2.4
RC-563	234	4.1
RC-563B	117	2.2
RC-563C	117	1.6
RC-563C	234	4.1
RC-563D	117	2.2

Loudspeakers

	RL-81B-2	RL-86A-3	RL-86B-2
Type	5-inch PM	5-inch PM	5-inch EM
V.C. Impedance at 400 cycles	4 ohms	4 ohms	4 ohms
Field Resistance	——	——	3,300 ohms

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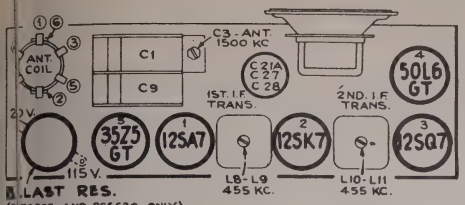
MODEL Q12
Ch.RC-563,-B,-C,-D



Setting Dial.—With gang condenser in full mesh, the pointer hou be 1/16 inch to the left of first mark on dial backing plate.

Cautionary Lead Dress.—

Dress 0.01 capacitor from volume control away from power switch.

Yiow cathode lead from 12SA7 socket to oscillator coil must be rest around coil form.

Yiow lead from band switch to antenna coil must be dressed rou coil form.

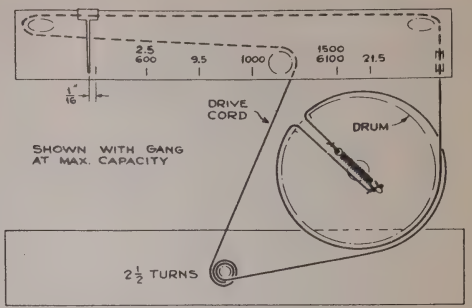
Step	Range Switch	Connect high side test osc. to—	Tune test osc. to—	Turn radio dial to	Adjust following for max. peak output
1	"A"	12SK7 I-F grid in series with .01 mfd.	455 kc	"A" band quiet point at high freq. end.	L10, L12 (2nd I-F trans.)
2		12SA7 1st det. grid, in series with .01 mfd.			L9, L8 † (1st I-F trans.)
3		Antenna lead in series with 200 mmf.	1,500 kc (200 m)	1,500 kc mark (5th mark)	C13, C3
4			600 kc (500 m)	600 kc mark (2nd mark)	L7** Rock gang
5			Repeat steps 3 and 4		
6	"B"	Antenna lead in series with 300 ohms	6.1 mc	6.1 mc mark (5th mark)	C12* (osc.) C5 (ant.)
7	"C"		21.5 mc	21.5 mc mark (6th mark)	C11* C4

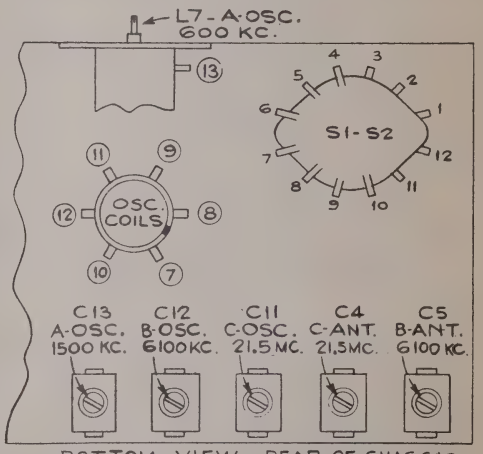
Use minimum capacity peak if two peaks can be obtained.

Rock gang slightly for peak output.

Do not readjust L12 or L10 when test oscillator is applied o th 12SA7 Grid.

NOTE: Oscillator tracks above signal on all bands.





BOTTOM VIEW -REAR OF CHASSIS

STOCK NO.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-563 110/220 AC-DC) (RC-563B 110 AC-DC)	
3189	Ballast—Ballast tube resistor for 220 volts operation	1.75
3638	Bracket—Dial lamp bracket	.15
3827	Capacitor—Electrolytic, comprising 1 section of 80 mfd., 250 volts, and 1 section of 40 mfd. 250 volts, and 1 section 20 mfd., 25 volts	1.10
3690	Capacitor—Mica trimmer comprising 3 sections of 5-50 mmfd., and 2 sections of 2-20 mmfd.	.85
1223	Capacitor—56 mmfd., moulded	.35
3019	Capacitor—56 mmfd., unmoulded	.25
3004	Capacitor—100 mmfd.	.25
1224	Capacitor—120 mmfd.	.35
1204	Capacitor—220 mmfd.	.35
1207	Capacitor—560 mmfd.	.35
3103	Capacitor—3300 mmfd.	.60
3105	Capacitor—6000 mmfd.	.75
3304	Capacitor—.005 mfd.	.25
470	Capacitor—.025 mfd.	.20
468	Capacitor—.01 mfd., 500 volts	.25
467	Capacitor—.01 mfd., 1000 volts	.25
466	Capacitor—.05 mfd., 400 volts	.20
3286	Capacitor—0.1 mfd., 300 volts (220/110 AC DC only)	.25
469	Capacitor—0.1 mfd., 400 volts	.30
3231	Coil—Antenna coil	1.35
3802	Coil—Oscillator coil	1.00
3817	Condenser—Variable tuning condenser	2.50
3816	Control—Volume control and power switch	1.50
3214	Cord—Drive cord (approx. 50-inch overall length)	.10
3213	Core—Adjustable core and stud for oscillator coil	.35
37068	Indicator—Station selector indicator	.20
37982	Insulator—Phono input socket insulator	.04
38288	Plate—Dial back plate complete with pulleys and bracket—less dial	1.00
33825	Plug—2 Prong male plug for power input	.10
36230	Pulley—Drive cord pulley	.04
36237	Pulley—Tuning condenser pulley	.25
38289	Resistor—Ballast tube resistor for 220 volts operation	1.75
13988	Resistor—10 ohms, ½ watt	.20
35711	Resistor—100 ohms, ½ watt (220/110 AC DC only)	.30
30880	Resistor—150 ohms, ½ watt	.20
30730	Resistor—2700 ohms, ½ watt (220/110 AC DC only)	.20
34766	Resistor—1000 ohms, ½ watt	.20
12454	Resistor—33,000 ohms, ½ watt	.20
12412	Resistor—47,000 ohms, ½ watt	.20
14583	Resistor—220,000 ohms, ½ watt	.20
30648	Resistor—470,000 ohms, ½ watt	.20
12679	Resistor—2.2 meg., ½ watt	.20
32809	Resistor—3.9 meg., ½ watt	.20
30992	Resistor—10 meg., ½ watt	.20
36897	Shaft—Tuning knob shaft	.10
34449	Socket—Dial lamp socket	.30
33742	Socket—Phono input socket	.20
31251	Socket—Tube socket	.25
31418	Spring—Drive cord spring	.05
38291	Switch—Range switch	1.10
36800	Transformer—Audio transformer for models using speaker stamped RL81B2 or RL86B2	1.30
35636	Transformer—First I.F. transformer	1.70
35628	Transformer—Second I.F. transformer	1.85
38289	Tube—Ballast tube resistor for 220 volt operation	1.75
33726	Washer—"C" washer for tuning shaft	.02

Parts List Continued on next page

MODEL Q11
MODEL Q12

RCA MFG. CO., INC.

MODEL Q12 (Continued)

STOCK NO.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-563C 110/220 AC-DC) (RC-563D 110 AC-DC) Same as Models RC-563 & RC-563B	
	EXCEPT:	
39346	Ballast—Ballast tube resistor for 110/220 AC-DC Models	1.75
39346	Resistor—Ballast tube resistor for 110/220 AC-DC Models	1.75
39346	Tube—Ballast tube resistor for 110/220 AC-DC Models	1.75
	ADD:	
30735	Resistor—560 ohms, 1 watt (for 220/110 AC-DC)	.20
30694	Resistor—3,900 ohms, ½ watt (for 220/110 AC-DC)	.20
39345	Transformer—Audio transformer for models using speaker stamped RL86A3	1.35
	DELETE:	
30730	Resistor—2,700 ohms, ½ watt (for 220/110 AC-DC)	.20
	SPEAKER ASSEMBLIES (RL81B2)	
35570	Cone—Cone complete with voice coil	1.20
37612	Speaker—5-inch permanent magnet speaker complete with cone and coil—less output transformer	3
	SPEAKER ASSEMBLIES (RL-86A-3)	
32907	Cap—Dust cap	
39543	Coil—Field coil—450 ohms	
35570	Cone—Cone complete with voice coil	1
	SPEAKER ASSEMBLIES (RL-86B-2)	
32907	Cap—Dust cap	
39348	Coil—Field coil—3,300 ohms	1
35570	Cone—Cone complete with voice coil	1
	MISCELLANEOUS ASSEMBLIES	
38293	Back—Cabinet back—less power cord	
36890	Clamp—Dial clamp—L.H.	
36891	Clamp—Dial clamp—R.H.	
32836	Cord—Power cord and plug	1
36103	Decalcomania—"Off-Volume" decal	
35480	Decalcomania—Range switch decal	
38328	Dial—Glass dial scale	
37831	Fastener—Push on fastener for back	
36886	Knob—Range switch or volume control knob	
36722	Knob—Tuning knob	
31480	Lamp—Dial lamp	
30900	Spring—Retaining spring for knobs	

MODEL Q11

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-563-E) (RC-563-F)	
39346	Ballast—Ballast tube resistor for 110/220 AC-DC Models	1.75
38327	Capacitor—Electrolytic, comprising 1 section of 80 mfd., 250 volts, and 1 section of 40 mfd., 250 volts, and 1 section of 20 mfd., 25 volts.	1.10
38290	Capacitor—Mica trimmer, comprising 3 sections of 5-50 mmfd., and 2 sections of 2-20 mmfd.	.85
12723	Capacitor—56 mmfd., moulded	.35
30949	Capacitor—56 mmfd., unmoulded	.25
30904	Capacitor—100 mmfd.	.25
12724	Capacitor—120 mmfd.	.35
12694	Capacitor—220 mmfd.	.35
12537	Capacitor—560 mmfd.	.35
31403	Capacitor—3,300 mmfd.	.60
31405	Capacitor—6,000 mmfd.	.75
33584	Capacitor—.005 mfd.	.25
4870	Capacitor—.025 mfd.	.20
4858	Capacitor—.01 mfd., 500 volts	.25
4937	Capacitor—.01 mfd., 1,000 volts	.25
4886	Capacitor—.05 mfd., 400 volts	.20
32786	Capacitor—0.1 mfd., 300 volts (220/110 AC-DC only)	.25
4839	Capacitor—0.1 mfd., 400 volts	.30
32821	Coil—Antenna coil	1.35
38292	Coil—Oscillator coil	1.00
38287	Condenser—Variable tuning condenser	2.50
38406	Control—Volume control and power switch	1.50
32634	Cord—Drive cord (approx. 50 inches overall length)	.10
32713	Core—Adjustable core and stud for oscillator coil	.35
37068	Indicator—Station selector indicator	.20
37982	Insulator—Phono input socket insulator	.04
38288	Plate—Dial back plate complete with pulleys and bracket—less dial	1.00
33825	Plug—2-prong male plug for power input	.10
36230	Pulley—Drive cord pulley	.04
36237	Pulley—Tuning condenser pulley	.25
39346	Resistor—Ballast tube resistor for 110/220 AC-DC Models	1.75
13988	Resistor—10 ohms, ½ watt	.20
35711	Resistor—100 ohms, ¼ watts (220/110 AC-DC)	.30
30880	Resistor—150 ohms, ½ watt	.20
30735	Resistor—560 ohms, 1 watt (220/110 AC-DC)	.20
34766	Resistor—1,000 ohms, ½ watt	.20
30694	Resistor—3,900 ohms, ½ watt (220/110 AC-DC)	.20
12454	Resistor—33,000 ohms, ½ watt	.20
12412	Resistor—47,000 ohms, ½ watt	.20
14583	Resistor—220,000 ohms, ½ watt	
30648	Resistor—470,000 ohms, ½ watt	
12679	Resistor—2.2 meg., ½ watt	
32809	Resistor—3.9 meg., ½ watt	
30992	Resistor—10 meg., ½ watt	
36897	Shaft—Tuning knob shaft	
33742	Socket—Phono input socket	
31251	Socket—Tube socket	
31418	Spring—Drive cord spring	
38291	Switch—Range switch	
39345	Transformer—Audio transformer for models using Speaker stamped RL-86A-3	
36800	Transformer—Audio transformer for models using Speaker stamped RL-86B-2	
35636	Transformer—First I.F. transformer	
35628	Transformer—Second I.F. transformer	
39346	Tube—Ballast tube resistor for 110/220 AC-DC Models	
33726	Washer—"C" washer for tuning shaft	
	SPEAKER ASSEMBLIES (110/220 AC-DC) (RL-86A-3)	
32907	Cap—Dust cap	
35570	Cone—Cone complete with voice coil	
39543	Coil—Field coil, 450 ohms	
	SPEAKER ASSEMBLIES (110 AC-DC) (RL-86B-2)	
32907	Cap—Dust cap	
39348	Coil—Field coil—3,300 ohms	
35570	Cone—Cone complete with voice coil	
	NOTE: If the stamping on speaker in instrument does not agree with above speaker, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.	
	MISCELLANEOUS ASSEMBLIES	
39696	Back—Cabinet back—less power cord and plug	
32836	Cord—Power cord and plug	
36103	Decalcomania—"Off-Volume" decal	
35480	Decalcomania—Range switch decal	
35392	Decalcomania—Trade mark decal	
39745	Dial—Glass dial scale	
38334	Knob—Range switch or volume control knob	
37256	Knob—Tuning knob	
31390	Mounting—One set chassis mounting screws and washers	
30900	Spring—Retaining spring for knobs	

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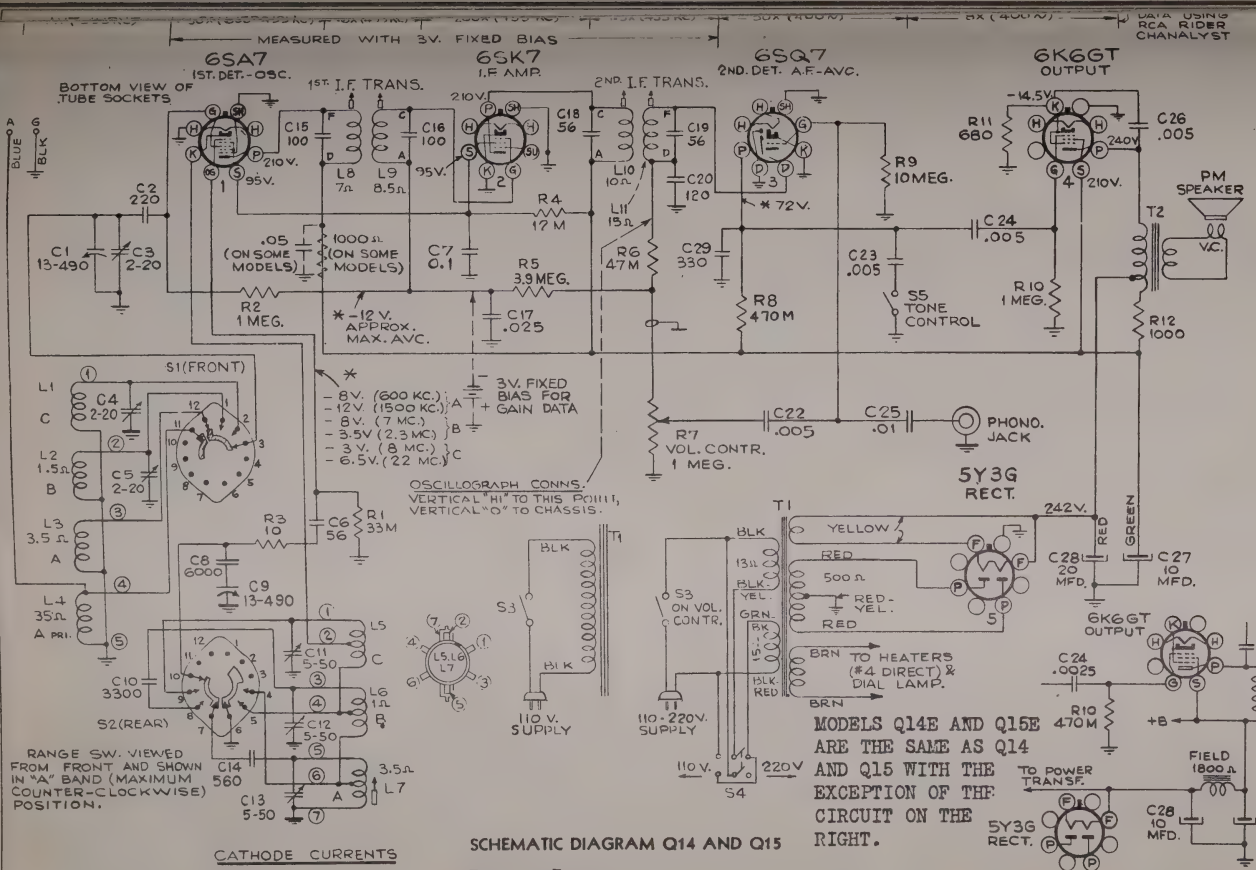


SCHEMATIC DIAGRAM Q14 AND Q15

CATHODE CURRENTS

(1) 6SA7	8.7 MA.
(2) 6SK7	15.1 MA.
(3) 6SQ7	0.3 MA.
(4) 6K6GT	22.6 MA.
(5) TOTAL RECT.	46.7 MA.

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH RATED SUPPLY VOLTAGE.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

D-92203-1
Q14 (RC566)

FREQUENCY RANGES

Standard Broadcast ("A" Band)	540-1,720 kc (555-174 m)
Medium Wave ("B" Band)	2.3-7.0 mc (130-42.9 m)
Short Wave ("C" Band)	7.0-22.0 mc (42.9-13.6 m)

INTERMEDIATE FREQUENCY ..... 455 kc

PILOT LAMP ..... Mazda 44

POWER SUPPLY RATINGS

105-125 volts, 50-60 cycles	50 watts
105-125 volts, 25-60 cycles	50 watts
105-125, 200-250 volts, 50-60 cycles	50 watts

Q14E and Q15E

POWER OUTPUT

Undistorted	1.4 watts
Maximum	2.3 watts

LOUDSPEAKERS	Q14, Q15	Q14E, Q15E
Speaker No.	RL-92A2	RL-79C1
Type	6-in. PM	6-in. EM
Field coil resistance	———	1,800 ohms
V.C. Impedance at 400 cycles	3.4 ohms	

MODELS Q14, Q15
Q14E, Q15E

RCA MFG. CO., INC.

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic drawing.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Pre-Setting Dial.—With gang condenser in full mesh, the pointer should be 1/16 inch to the left of first mark on dial backing plate.

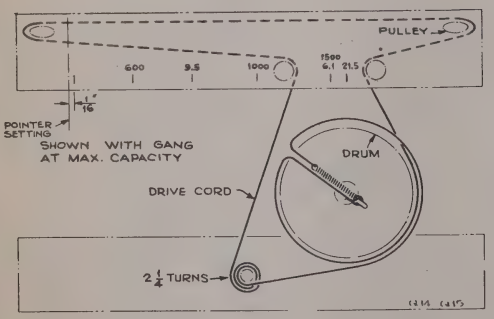
Steps	Range Switch	Connect high side test osc. to—	Tune test osc. to—	Turn radio dial to	Adjust following for max. peak output
1	"A"	I-F grid in series with .01 mfd.	455 kc	"A" band quiet point at high freq. end	L10, L11 (2nd I-F trans.)
2		1st det. grid in series with .01 mfd.			L9, L8 † (1st I-F trans.)
3		Antenna lead in series with 200 mmf.	1,500 kc (200 m)	1,500 kc mark (5th mark)	C13, C3
4			600 kc (500 m)	600 kc mark (2nd mark)	L7** Rock gang
5		Repeat steps 3 and 4			
6	"B"	Antenna lead in series with 300 ohms	6.1 mc	6.1 mc mark (5th mark)	C12* (osc.) C5 (ant.)
7	"C"		21.5 mc	21.5 mc mark (6th mark)	C11*, C4

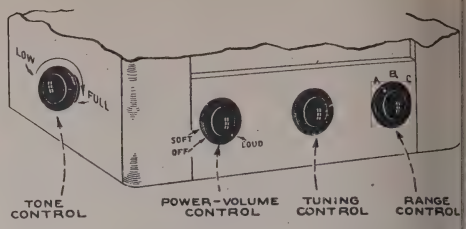
* Use minimum capacity peak if two peaks can be obtained.

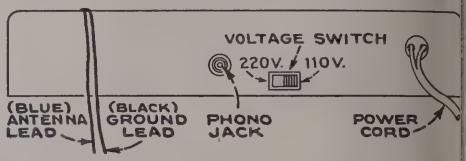
** Rock gang slightly for peak output.

† Do not readjust L11 or L10 when test oscillator is applied to the 6SA7 Grid.

NOTE: Oscillator tracks above signal on all bands.







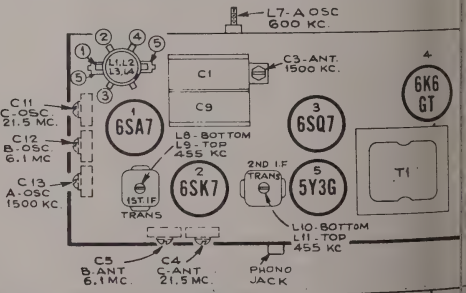
Precautionary Lead Dress RC566 and 566B.—

1. "B" and "C" band antenna trimmer leads to be dressed awa from "B" and "C" band oscillator trimmer leads.
2. Excess power transformer leads to be dressed between pow trans. bell and rear apron of chassis.
3. R9 1st Audio grid lead, dressed down to chassis.
4. "B" Band Antenna coil lead to be wired so that it is dresse around "B" band section in a clockwise direction to coil lu in order to obtain proper "B" band tracking.
5. "C" band oscillator cathode lead to be dressed around coil clockwise direction as shown in sample.
6. Dress tone control capacitor C23 up and away from A.C. swit leads.
7. Dress capacitor C25 from phono. socket to 6SQ7 socket up a away from all parts and leads.
8. Keep grid end of R2 (Pin No. 8 of 6SA7) short as possible.
9. Dress audio coupling C22 from volume control clear of A. wiring.
10. Red lead from A.C. switch to power switch to be dressed dow against base.
11. Drive front gang mounting screw first.

Precautionary Lead Dress RC566B.—

Same as RC566 plus the following:

1. "C" band oscillator cathode lead must be dressed closed to osc lator coil and above all parts as per sample.
2. Blue lead from band switch to oscillator coil must be dress towards back of oscillator coil.
3. Excess red Electrolytic lead must be dressed near trans.
4. Dress cap. to phono. socket away from 110/220 switch and lea
5. Dress 6,000 mmf. cap (C8) close to band switch.



STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES Q14, Q15—(RC566) Q14E, Q15E—(RC566B)	
35761	Capacitor—Electrolytic, comprising 1 section of 20 mfd., 350 volts, and 1 section of 10 mfd., 350 volts (Q14 and Q15)	.90
39195	Capacitor—2 sec., 10 mfd., 450 volts (Q14E and Q15E)	1.00
32830	Capacitor—Mica trimmer, comprising 2 sections of 2-20 mmfd. each	.40
32829	Capacitor—Mica trimmer, comprising 3 sections of 5-60 mmfd. each	.55
12723	Capacitor—56 mmfd., moulded	.3
30949	Capacitor—56 mmfd., unmoulded	.2
30904	Capacitor—100 mmfd.	.3
12724	Capacitor—120 mmfd.	.3
12694	Capacitor—220 mmfd.	.3
12952	Capacitor—330 mmfd.	.3
12537	Capacitor—560 mmfd.	.6
31403	Capacitor—3,300 mmfd.	.7
31405	Capacitor—6,000 mmfd.	.8
34459	Capacitor—.0025 mfd. (Q14E and Q15E)	.8
4838	Capacitor—.005 mfd., 1,000 volts	.8
33584	Capacitor—.005 mfd., 1,200 volts	.8
4858	Capacitor—.01 mfd.	

Continued on next page

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RCA MFG. CO., INC.

MODELS Q14, Q15, Q14E, Q15E
MODELS 15X, 36X

MODELS Q14, Q15, Q14E, Q15E (Continued)

STOCK No.	DESCRIPTION	Unit List Price
4870	Capacitor—.025 mfd.	.20
4839	Capacitor—0.1 mfd.	.30
32821	Coil—Antenna coil—"A," "B," and "C" bands	1.35
38292	Coil—Oscillator coil—"A," "B," and "C" bands	1.00
38287	Condenser—Variable tuning condenser	2.50
33630	Control—Tone control	1.00
38406	Control—Volume control and power switch	1.50
34662	Cord—Drive cord (approx. 53 in. overall lgth.)	.25
32713	Core—Adjustable core and stud for oscillator coil	.35
36237	Drum—Tuning condenser drive drum	.25
38331	Indicator—Station selector indicator	.25
38332	Plate—Dial back plate complete with pulleys—less dial	1.00
5119	Plug—3-contact female for speaker cable (Q14E and Q15E)	.25
36230	Pulley—Drive cord pulley	.04
13988	Resistor—10 ohms, ½ watt	.20
32686	Resistor—680 ohms, 1 watt	.22
30152	Resistor—1,000 ohms, 1 watt (Q14 and Q15)	.22
43765	Resistor—12,000 ohms, 2 watt	.35
12454	Resistor—33,000 ohms, ½ watt	.20
12412	Resistor—47,000 ohms, ½ watt	.20
30648	Resistor—470,000 ohms, ½ watt	.20
13730	Resistor—1 meg., ½ watt	.20
32809	Resistor—3.9 meg., ½ watt	.20
30992	Resistor—10 meg., ½ watt	.20
38333	Shaft—Tuning knob shaft	.20
35772	Shield—Bottom end shield for power transformer (Q14 and Q15)	.30
35709	Shield—Top end shield for power transformer (Q14 and Q15)	.30
36932	Socket—Dial lamp socket	.20
35787	Socket—Phono input socket	.15
31251	Socket—Tube socket	.25
31418	Spring—Drive cord spring	.05
38330	Switch—Range switch	1.15
32827	Switch—Voltage change switch	.35
35636	Transformer—First I.F. transformer	1.70
35628	Transformer—Second I.F. transformer	1.85
35758	Transformer — Power transformer — 105-125 volts, 25 cycle—less end shields (Q14 and Q15)	5.25
35757	Transformer—Power transformer—105-125 volts 50-60 cycle—less end shields (Q14 and Q15)	2.95
35759	Transformer—Power transformer—110-220 volts, 50-60 cycle (Q14 and Q15)	4.00
35588	Power Transformer—105-120 volts, 25 cycle (Q14E and Q15E)	6.30
32852	Power Transformer—110-220 volts, 50-60 cycle (Q14E and Q15E)	4.50
32911	Power Transformer—105-120 volts, 50-60 cycle (Q14E and Q15E)	4.10
33726	Washer—"C" washer for tuning shaft	.02
	Q14, Q15 SPEAKER ASSEMBLIES—P. M. (RL-92A2)	
31825	Cap—Dust cap	.02
38392	Cone—Cone complete with voice coil	1.25
31567	Plug—3-prong male plug for speaker	.15
37984	Transformer—Output transformer	1.75
	Q14E AND Q15E SPEAKER ASSEMBLIES (RL-79C1)	
31825	Cap—Dust cap	.02
32903	Coil—Field coil—1,800 ohms	1.25
38392	Cone—Cone complete with voice coil	1.25
5118	Plug—3 prong male plug for speaker	.25
32905	Transformer—Output transformer	1.35
	Note: If the stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker, and full description of part required.	
	MISCELLANEOUS ASSEMBLIES	
38335	Clamp—Dial clamp	.15
36103	Decalcomania—"Off-Volume" decal	.05
35480	Decalcomania—Range switch decal	.05
38336	Dial—Glass dial scale	.85
35650	Knob—Tone control knob	.25
37256	Knob—Tuning knob	.25
38334	Knob—Volume control or range switch knob	.25
11891	Lamp—Dial lamp	.17
14270	Spring—Retaining spring for knob, No. 35650	.05
30900	Spring—Retaining spring for knobs, No. 38334 and No. 37256	.05

MODELS 15X, 36X

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-1011)	
34506	Capacitor—.0018 mfd.	.25
4393	Capacitor—.01 mfd.	.30
36248	Capacitor—.02 mfd.	.20
5196	Capacitor—.035 mfd.	.20
32787	Capacitor—.05 mfd.	.20
4839	Capacitor—0.1 mfd.	.20
37359	Capacitor—Comprising 1 section of .0003 mfd. and 1 section of .005 mfd.	.25
35348	Capacitor—Electrolytic comprising 1 section of 30 mfd., 150 volts and 1 section of 20 mfd., 150 volts	.95
39824	Coil—Oscillator coil	.95
36226	Condenser—Variable tuning condenser	3.00
36242	Control—Volume control and power switch	1.50
34662	Cord—Drive cord (approx. 50-in. overall length)	.25
36237	Drum—Drive drum	.25
36236	Indicator—Station selector indicator	.35
1765	Lamp—Dial lamp	.15
39821	Loop—Antenna loop	1.43
36229	Plate—Dial back plate complete with drive cord pulleys	.85
36230	Pulley—Drive cord pulley	.04
30189	Resistor—120 ohms, ½ watt	.20
30654	Resistor—1,500 ohms, ½ watt	.20
32312	Resistor—3,300 ohms, ½ watt	.20
30492	Resistor—22,000 ohms, ½ watt	.20
34583	Resistor—220,000 ohms, ½ watt	.20
30648	Resistor—470,000 ohms, ½ watt	.20
32928	Resistor—3.3 megohms, ½ watt	.20
30271	Resistor—4.7 megohms, ½ watt	.20
38785	Resistor—15 megohms, ½ watt	.20
36897	Shaft—Tuning knob shaft	.10
34449	Socket—Dial lamp socket	.30
31251	Socket—Tube socket—wafer	.25
37605	Socket—Tube socket—moulded	.25
31418	Spring—Drive cord spring	.05
36228	Switch—Tone switch	.60
36232	Transformer—First I.F. transformer	1.50
37364	Transformer—Second I.F. transformer	1.35
38994	Transformer—Output transformer	1.30
33726	Washer—"C" washer for tuning shaft	.02
	SPEAKER ASSEMBLIES (RL-86B-1)	
32907	Cap—Dust cap	.02
39448	Coil—Field coil	1.30
39447	Cone—Cone complete with voice coil	1.20
	(RL-86B-4)	
32907	Cap—Dust cap	.02
39448	Coil—Field coil	1.30
39447	Cone—Cone complete with voice coil	1.20
	NOTE: If the stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker, and full description of part required.	
	MISCELLANEOUS ASSEMBLIES	
39777	Back—Back cover (36X—2nd Prod.)	.30
39953	Back—Back cover (15X—2nd Prod.)	.15
36890	Clamp—Dial clamp	.15
36891	Clamp—Dial clamp	.15
39826	Dial—Glass dial scale (36X—2nd Prod.)	2.25
39954	Dial—Glass dial scale (15X—2nd Prod.)	1.25
37831	Fastener—Push fastener for back (15X—2nd Prod.)	.10
38722	Knob—Control knob	.20
30900	Spring—Retaining spring for knobs	.05

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John F. Rider

MODELS 15X,36X(2nd Prod.)
Ch.RC-1011

RCA MFG. CO., INC.

FREQUENCY RANGE ..... 540-1,620 kc

INTERMEDIATE FREQUENCY ..... 455 kc

POWER OUTPUT
Undistorted ..... 0.9 watts
Maximum ..... 1.4 watts

TUBE COMPLEMENT
(1) RCA-12SG7 ..... Converter
(2) RCA-12SK7 ..... I.F. Amplifier
(3) RCA-12SQ7 ..... 2nd Det., A.V.C., and A.F. Amplifier
(4) RCA-35L6GT ..... Power Output
(5) RCA-12J5GT ..... Oscillator
(6) RCA-35Z5GT ..... Rectifier

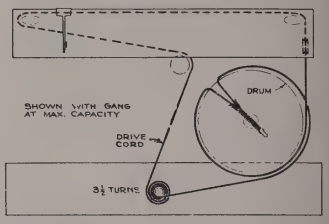
LOUDSPEAKER	(RL-86B-1)	(RL-86B-4)
Type	5-inch EM	5-inch EM
V. C. Impedance	3 ohms at 400 cycles	4 ohms at 400 cycles

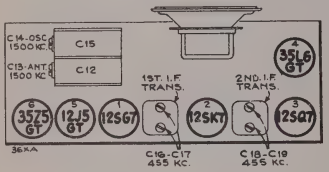
CABINET DIMENSIONS	Height	Width	Depth
15X—2nd Prod. (Mahogany, Plastic)	7⅞-in.	12-in.	7-in.
36X—2nd Prod. (Walnut, Wood)	8 11/16-in.	14¾-in.	7½-in.

POWER SUPPLY RATING
105 5 volts, AC, 50 or 60 cycles, or DC ..... 30 w

PILOT LAMP ..... Mazda No. 51, 6-8 volts, 0.2 a

Tuning Drive Ratio 1



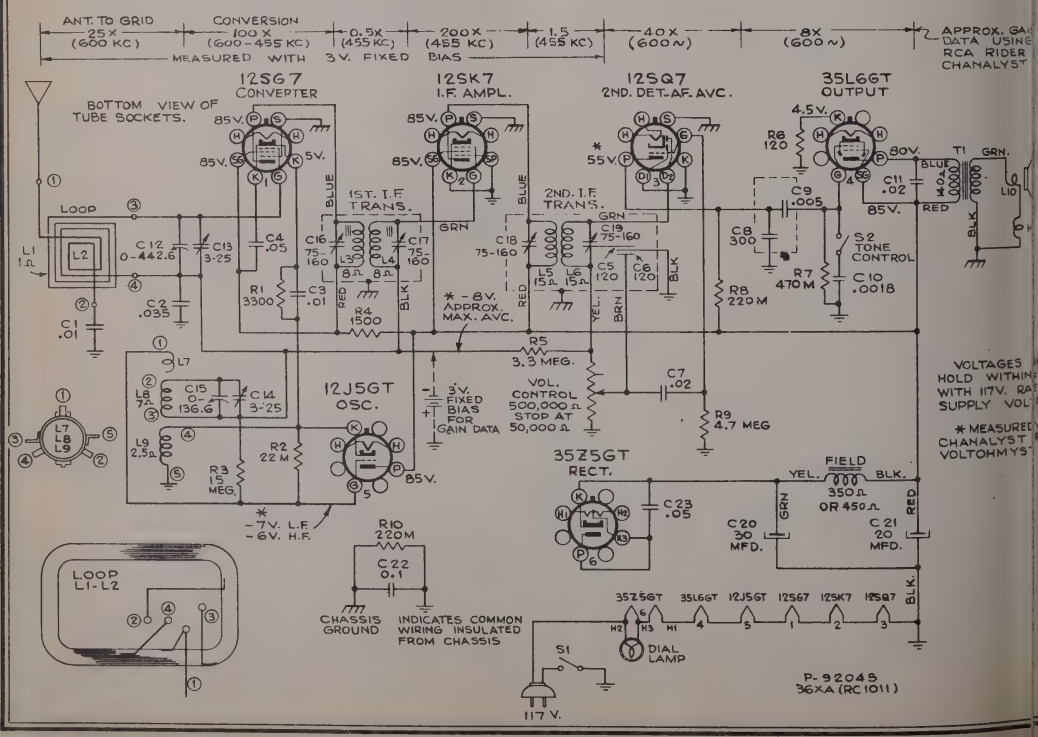


Alignment Procedure

Output Meter Alignment. — If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator. — For all alignment operations, keep the output as low as possible to avoid a-v-c action.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. pea output
1	I-F grid, in series with .01 mfd.	455 kc	Quiet point 1,600 kc end of dial	C18 and C19 2nd I-F transformer
2	1st Det. grid in series with .01 mfd.			C16 and C17 1st I-F transformer
3	Ant. terminal in series with 200 mmfd.	1,500 kc	1,500 kc	C14 (osc.) C13 (ant.)
4	Repeat step 3.			



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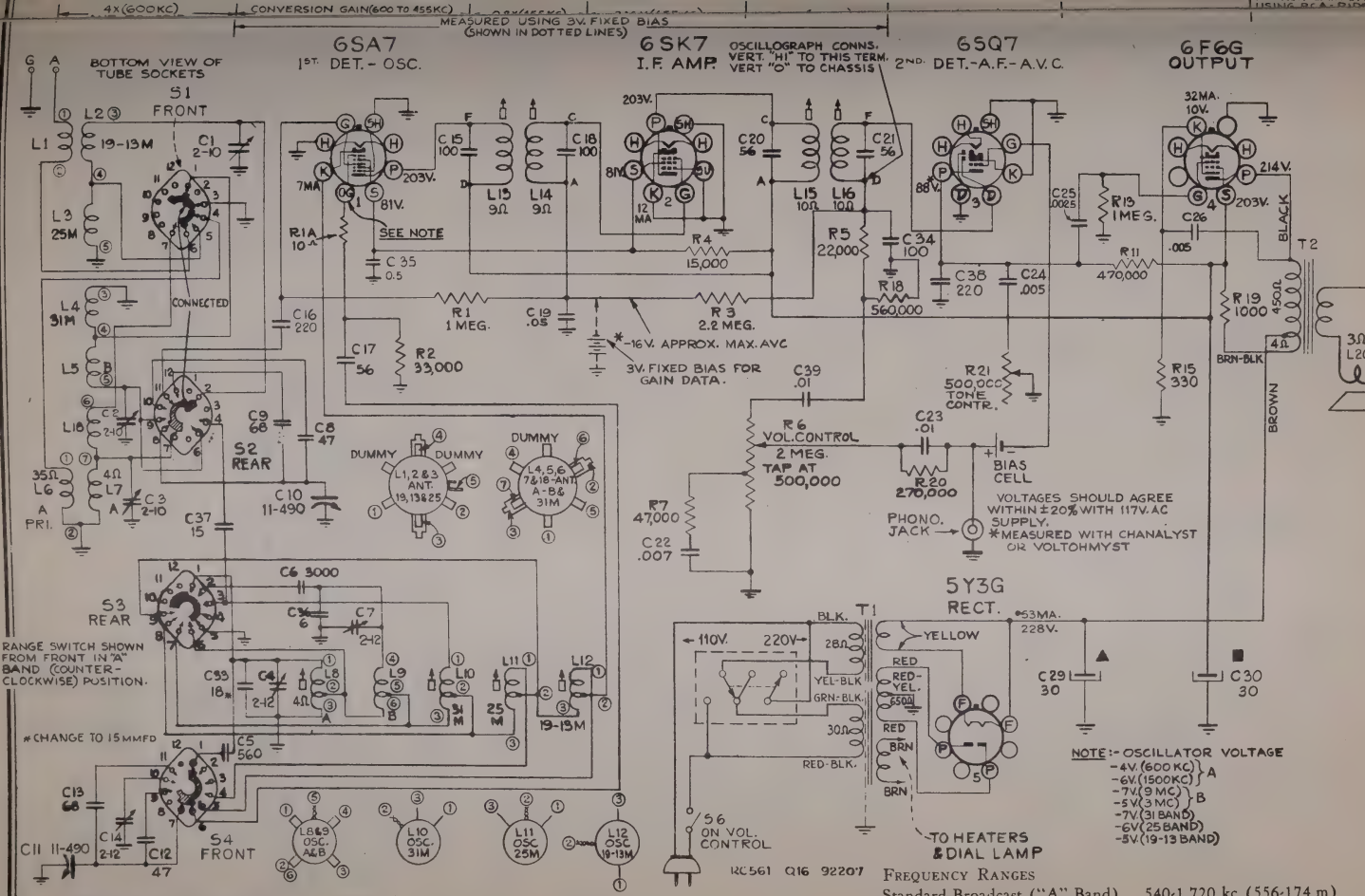


Contacts 2, 3 and 4 on switch S3 are connected to contacts 2, 3 and 4 on switch S4.

INTERMEDIATE FREQUENCY... 455 kc

POWER OUTPUT

Undistorted... 1.8 watts
Maximum.... 3.25 watts

Capacitor Change:

To reduce flutter in Q16 with "EM" speaker, the audio coupling capacitor C25 is changed from .0025 to .0015 mfd.

FREQUENCY RANGES

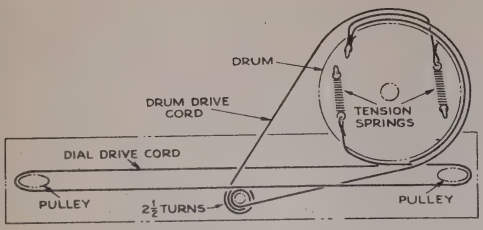
Standard Broadcast ("A" Band).. 540-1,720 kc (556-174 m)
Medium Wave ("B" Band)..... 3.0-9.5 mc (100-31.6 m)
"31" Meter Spread Band..... 9.5-11.7 mc (31.6-25.6 m)
"25" Meter Spread Band..... 11.7-15.1 mc (25.6-19.9 m)
"19-13" Meter Spread Band... 15.1-22.5 mc (19.9-13.3 m)

RCA MFG. CO., INC.

MODEL Q16
Ch. RC-561

MODEL Q16
Ch.RC-561

RCA MFG. CO., INC.



Dial-Indicator and Drive Mechanism

Precautionary Lead Dress.—

1. All leads between antenna coils and switch must be as short as possible, bunched together, and kept away from oscillator coils, leads and switches.
2. All oscillator coil leads must be kept apart from each other and other leads and parts.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment. — After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator (RCA Stock No. 9572), or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	I-F grid in series with .01 mfd.	455 kc	A	Quiet Point at high-frequency end	L15 and L16 2nd I-F Trans.
2	1st Det. grid in series with .01 mfd.				L13 and L14 1st I-F Trans.
3	Ant. lead in series with 300 ohms	11.8 mc	25M	138.5°	L11 (osc.) C1 (ant.)
4		15.2 mc		17°	C14 (osc.)***
5		Repeat steps 3 and 4			
6		* 15.2 mc	19-13M	156°	L12 (osc.)*
7		9.5 mc	31M	156°	L10 (osc.)* C2 (ant.)
8		9.5 mc	B	11.5°	C7 (osc.)**
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C4 (osc.) C3 (ant.)
10		600 kc		150°	L8 (osc.) (Rock gang)
11		Repeat steps 9 and 10			

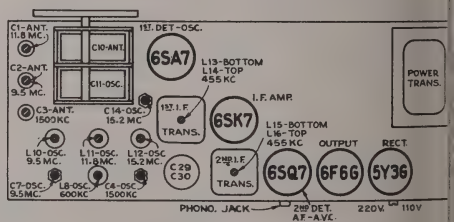
* Use minimum capacity peak if two can be obtained. Check image to determine that C14 has been adjusted to the correct point by tuning receiver to approximately 14.29 mc (29°) where the weaker signal should be received.

**Peak at minimum position of plunger if two peaks can be obtained.

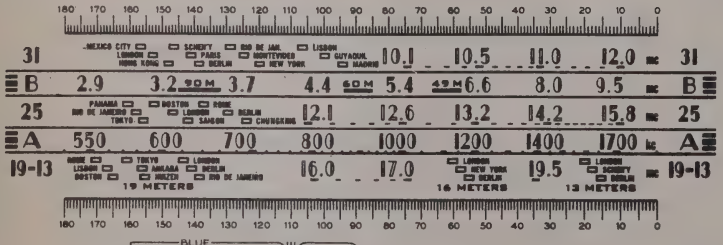
***Peak at minimum capacity if two peaks can be obtained.

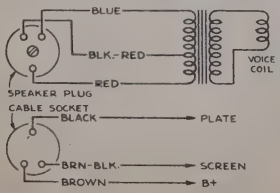
NOTE: Oscillator tracks above signal on all bands.

FOR PARTS LIST SEE INDEX



Tube and Trimmer Location



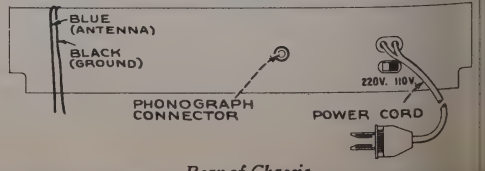


Connections and Colors of Loudspeaker and Cable

Calibration Scale

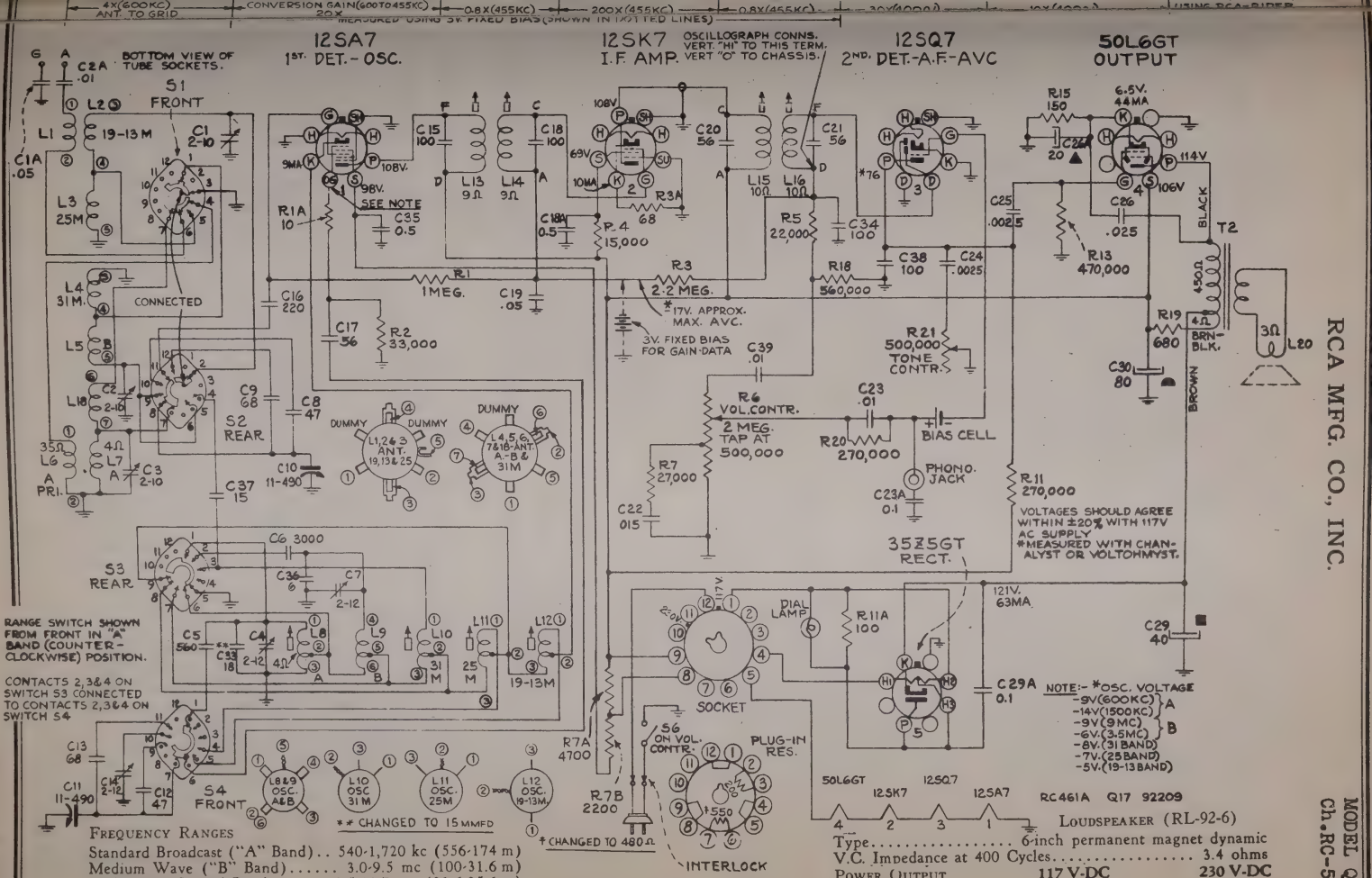
Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example, 150° on the calibration scale corresponds to approximately 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."



Rear of Chassis

©John F. Rider

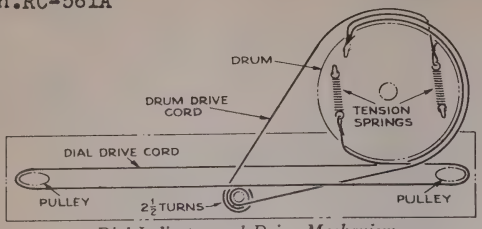


RCA MFG. CO., INC.

MODEL Q17
Ch. RC-561A

MODEL Q17
Ch.RC-561A

RCA MFG. CO., INC.



Dial-Indicator and Drive Mechanism

Precautionary Lead Dress.—

1. All leads between antenna coils and switch must be as short as possible, bunched together, and kept away from oscillator coils, leads and switches.
2. All oscillator coil leads must be kept apart from each other and other leads and parts.

To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment. — After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator (RCA Stock No. 9572), or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.

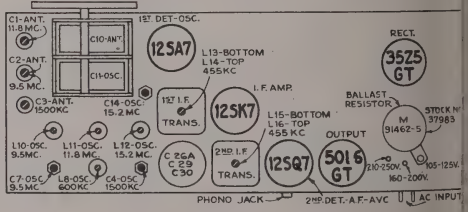
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the fo lowing for max. peak output
1	I-F grid in series with .01 mfd.	455 kc	A	Quiet Point at high-frequency end	L15 and L1 2nd I-F Trans.
2	1st Det. grid in series with .01 mfd.				L13 and L1 1st I-F Trans.
3	Ant. lead in series with 300 ohms	11.8 mc	25M	138.5°	L11 (osc.) C1 (ant.)
4		15.2 mc		17°	C14 (osc.)*
5		Repeat steps 3 and 4			
6		15.2 mc	19-13M	156°	L12 (osc.)**
7		9.5 mc	31M	156°	L10 (osc.)** C2 (ant.)
8		9.5 mc	B	11.5°	C7 (osc.)**
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C4 (osc.) C3 (ant.)
10		600 kc		150°	L8 (osc.) (Rock gang
11		Repeat steps 9 and 10			

* Use minimum capacity peak if two can be obtained. Che image to determine that C14 has been adjusted to the correct pe by tuning receiver to approximately 14.29 mc (29°) where weaker signal should be received.

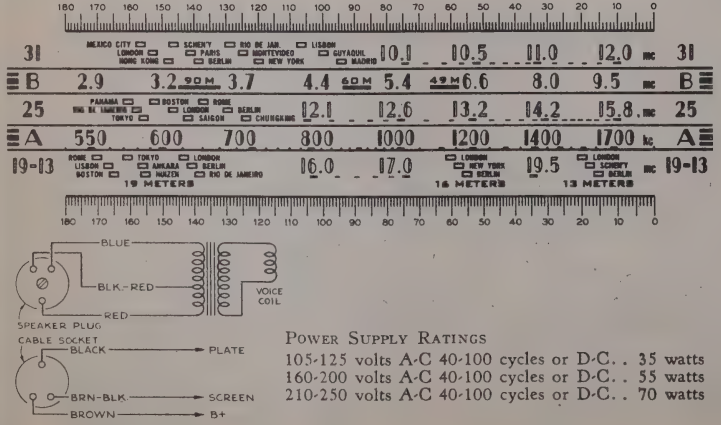
**Peak at minimum position of plunger if two peaks can obtained.

***Peak at minimum capacity if two peaks can be obtained.

NOTE: Oscillator tracks above signal on all bands.



Tube and Trimmer Location



Connections and Colors of Loudspeaker and Cable

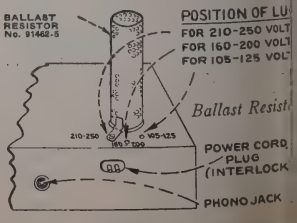
Power Supply Ratings

105-125 volts A-C 40-100 cycles or D-C . . 35 watts
160-200 volts A-C 40-100 cycles or D-C . . 55 watts
210-250 volts A-C 40-100 cycles or D-C . . 70 watts

Calibration Scale

Reduced Reproduction of Receiv Dial, and Corresponding 0-180° Calibration Scales

The corresponding position of the di indicator for any setting of the calibr tion scale can be determined by drawin a line from this point on the botto calibration scale to the same point the top calibration scale. For exampl 150° on the calibration scale correspon to approximately 600 kc on "A" ban etc. Read instructions under "Alignmer Procedure."



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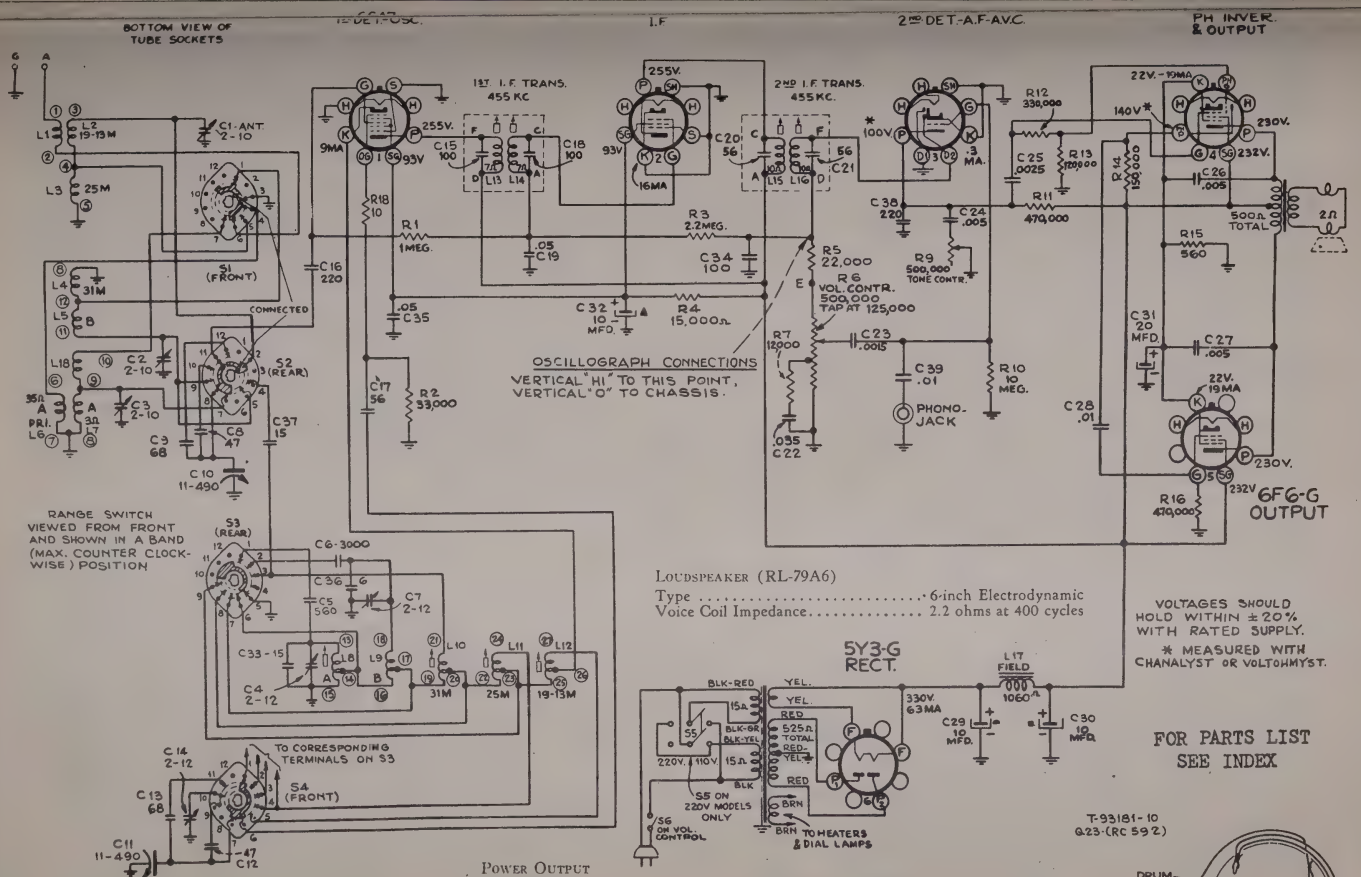

LOUDSPEAKER (RL-79A6)

Type ..... 6-inch Electrodynamic
Voice Coil Impedance ..... 2.2 ohms at 400 cycles

VOLTAGES SHOULD HOLD WITHIN ±20% WITH RATED SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

FOR PARTS LIST SEE INDEX

T-93181-10
Q23-(RC 592)

FREQUENCY RANGES

Standard Broadcast ("A" Band)	540-1,720 kc (556-174 m)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.6 m)
"31" Meter Spread Band	9.5-11.7 mc (31.6-25.6 m)
"25" Meter Spread Band	11.7-15.1 mc (25.6-19.9 m)
"19-13" Meter Spread Band	15.1-22.5 mc (19.9-13.3 m)
INTERMEDIATE FREQUENCY	455 kc

POWER OUTPUT

Undistorted	3 watts
Maximum	3.5 watts

POWER SUPPLY RATINGS

Symbol	Voltages	Frequency (cycles)	Watts
Rating A	105-125	50-60	65
Rating B	105-125	25-60	65
Rating C	105-125, 200-250	50-60	65

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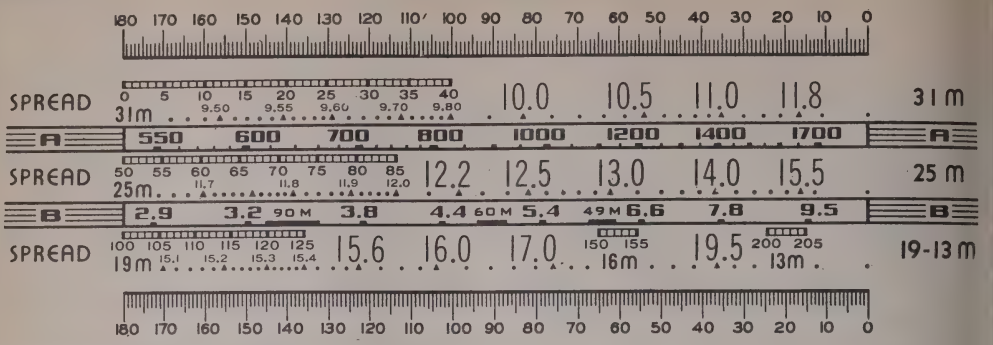
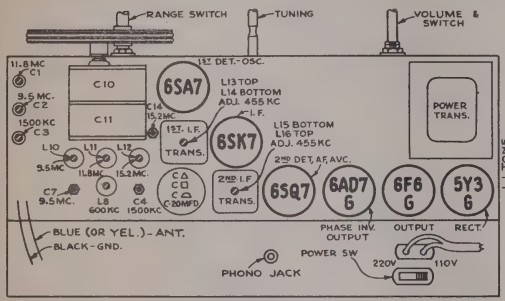
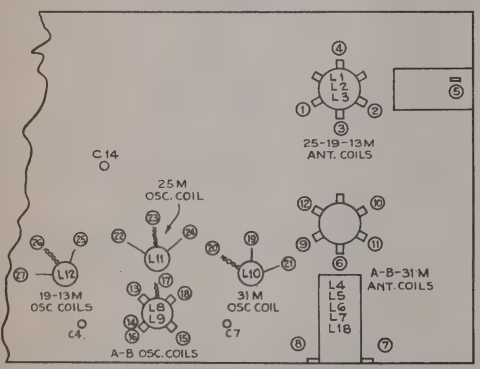
MODEL Q23
Ch.RC-592

RCA MFG. CO., INC.







Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
	On oscillator-circuit cores and trimmers, if two peaks can be obtained, use the one of minimum inductance or minimum capacity.				
1	1st I-F grid cap, in series with .01 mfd.	455 kc	A	Quiet point near 180°	L15 and L16 2nd I-F transformer
2	1st Det. grid, in series with .01 mfd.				L13 and L14 1st I-F transformer
3	Ant. lead in series with 300 ohms	11.8 mc	25M	138.5°	L11 (osc.) C1 (ant.)
4		15.2 mc		17°	C14 (osc.)*
5		Repeat steps 3 and 4.			
6		15.2 mc	19-13M	156°	L12 (osc.)
7		9.5 mc	31M	156°	L10 (osc.) C2 (ant.)
8		9.5 mc	B	11.5°	C7 (osc.)
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C4 (osc.) C3 (ant.)
10		600 kc		150°	L8 (osc.) (Rock gang)
11	Repeat steps 9 and 10.				

* Use minimum capacity peak if two can be obtained. Check image to determine that C14 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where weaker signal should be received.

NOTE: Oscillator tracks above signal on all bands.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of the test-oscillator, first checking the frequency settings on this range by means of a crystal calibrator (RCA Stock No. 9572), or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.

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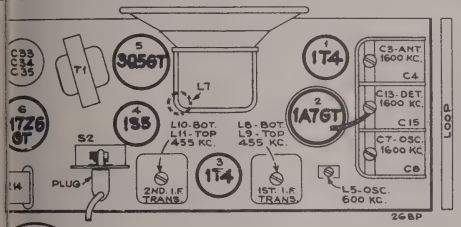
RCA MFG. CO., INC.

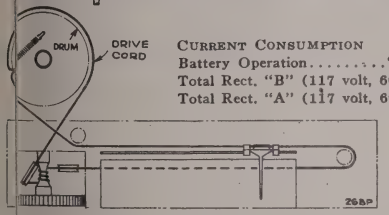
MODEL 26BP
Ch.RC-559

Alignment

ith gang in full mesh, the pointer should be 1/16-inch to the left e 550 kc dial mark.

Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
I-F grid, in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	L10, L11 (2nd I-F trans.)
1st-Det. grid cap, in series with .01 mfd.			L8, L9 (1st I-F trans.)
radiated signal at 1,600 kc	1,600 kc	1,600 kc	C7 (osc.) C3 (ant.) C13 (det.)
radiated signal 600 kc	600 kc	600 kc	L5 (Rock in)
Repeat steps 3 and 4			





SHOWN WITH GANG AT MAX. CAPACITY

Current Consumption

Battery Operation.....“A” 0.05 amperes, “B” 15 milliamperes
Total Rect. “B” (117 volt, 60 cycle).....16 mils.
Total Rect. “A” (117 volt, 60 cycle).....42 mils.

Power Output

Undistorted.....19 watt
Maximum.....32 watt

Intermediate Frequency..... 455 kc
110 to 125 volts, AC 50 or 60 cycles, or DC.. 30 watts

AC-DC Operation.—

This receiver will operate on 105 to 125 volts, AC 50 or 60 cycles, or DC.

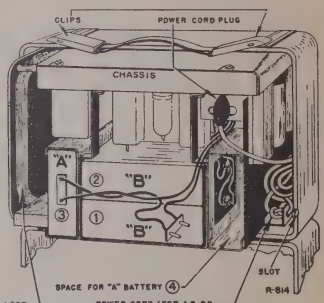
A power cord is housed in the bottom right hand corner looking inside the cabinet as shown in the illustration. Open the cabinet like a suit case, first pushing to one side the little pins under the handle ends to raise the clips. Then pull the power cord plug out of its socket in the top right hand corner as shown, and take out and unroll the power cord. A slot in the bottom allows the closing of the cabinet with the power cord passing through. Close the cabinet with the cord extending and insert the plug into a convenient electrical outlet.

When returning to battery operation, be sure to replace the power plug in its socket inside the case with the cord rolled up.

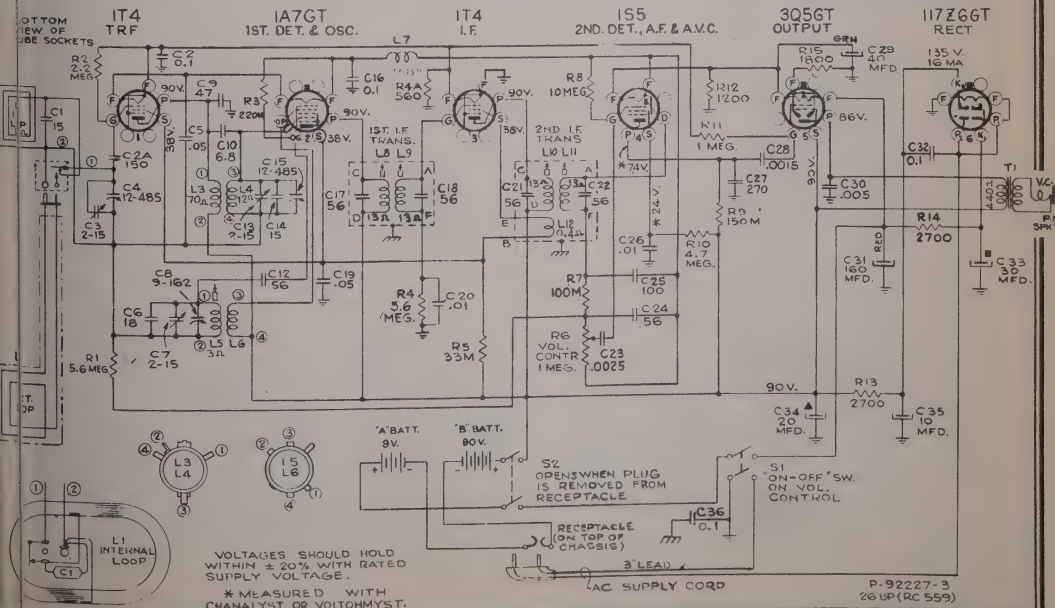
NOTE.—If reception is not obtained on DC, reverse plug in outlet receptacle. This may also reduce hum on AC operation.

Using External Loop.—

A loop antenna is housed inside the cabinet. Under normal conditions this will give satisfactory reception. If however the receiver is used in a location remote from broadcasting stations where signals are weak, or where interference is excessive, or in a shielded compartment such as an automobile, airplane or railroad train, an RCA Magic Wave Magnifier Antenna with suction cup fastener may be purchased from your dealer. This antenna has a strap connector cord ending in a two-prong plug for attachment to the loop antenna frame. Open the case, plug the antenna cord into the socket (it will only go in one way), bring the strap out at the slot in the case and attach the Antenna by means of the suction cup to any convenient vertical surface. The RCA Magic Wave Magnifier may be attached inside the back case, when not in use, by means of three snap fasteners.

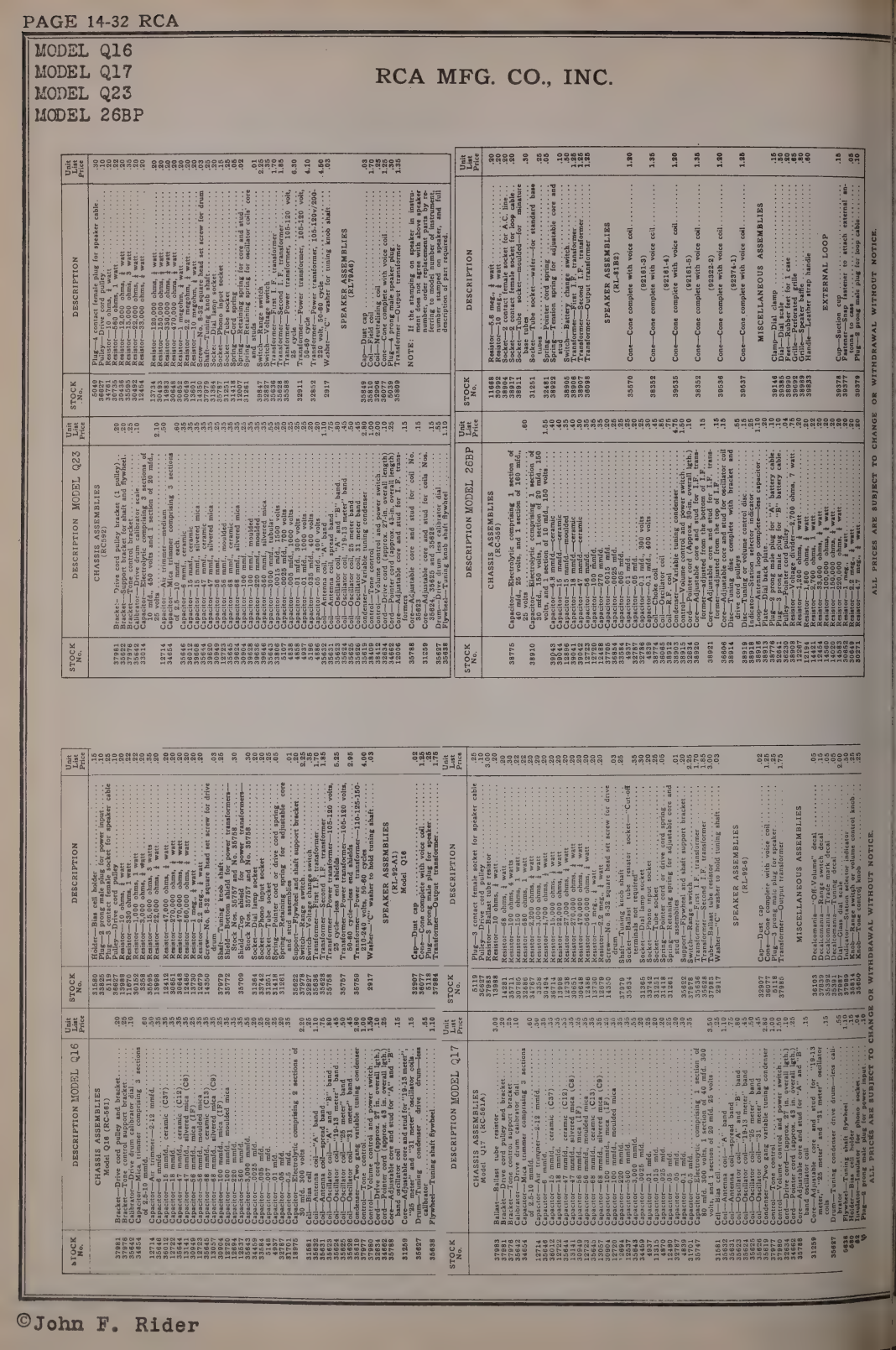


TWO 4.5 VOLT “A”— EVEREADY NO. 746 OR EQUIVALENT.
TWO 45 VOLT “B”— EVEREADY NO. 492 OR EQUIVALENT.



MODEL Q16
MODEL Q17
MODEL Q23
MODEL 26BP

RCA MFG. CO., INC.



DESCRIPTION MODEL Q16

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES	
	Model Q16 (RC-561)	
37981	Bracket—Drive cord pulley bracket	.20
37978	Bracket—Tone control support bracket	.20
35642	Calibrator—Drive drum calibrator dial	.10
35643	Calibrator—Drive drum calibrator scale of 2.5-19 mmfd. ceramic (C37)	.50
12714	Capacitor—6 mmfd.	.35
35648	Capacitor—8 mmfd. ceramic	.35
37732	Capacitor—15 mmfd. ceramic (C37)	.35
35644	Capacitor—17 mmfd. ceramic (C12)	.35
35645	Capacitor—18 mmfd. ceramic (C6)	.35
30949	Capacitor—18 mmfd. mica (IF)	.35
30950	Capacitor—18 mmfd. mica (C8)	.35
35646	Capacitor—18 mmfd. ceramic (C13)	.35
35647	Capacitor—18 mmfd. silvered mica (C8)	.35
12737	Capacitor—100 mmfd. mica	.35
12720	Capacitor—100 mmfd. moulded mica	.35
12736	Capacitor—150 mmfd. mica	.35
12727	Capacitor—500 mmfd. mica	.35
35649	Capacitor—.0025 mmfd.	.20
35650	Capacitor—.009 mfd.	.20
35651	Capacitor—.01 mfd.	.20
35652	Capacitor—.05 mfd.	.20
37701	Capacitor—.25 mfd.	.35
18975	Capacitor—Electrolytic comprising 2 sections of 8 mfd., 25 volts, and 1 section of 40 mfd., 25 volts	2.20
12714	Coil—Bias coil	2.80
35627	Coil—Antenna coil—"A" band	1.25
35631	Coil—Antenna coil—spread band	.75
35632	Coil—Antenna coil—"B" band	1.85
35634	Coil—Oscillator coil—19-13 meter band	.45
35635	Coil—Oscillator coil—"A" band	.40
35636	Coil—Oscillator coil—25 meter band	.40
35637	Coil—Oscillator coil—"B" band	.40
35639	Condenser—Two gang variable tuning condenser	4.00
35640	Control—Volume control and power switch	1.60
37980	Control—Tone control with switch	1.60
35641	Cord—Pointer cord (approx. 43 in. overall length)	.30
35788	Core—Adjustable core and stud for "A" and "B" bands	.15
31259	Cores—Adjustable cores and stud for "19-13 meter", "25 meter" and oscillator coils—two cadmium plated	.25
35627	Drum—Tuning drum—two gang variable tuning condenser drum—less calibrator	1.25
35638	Flywheel—Tuning shaft flywheel	1.25

STOCK No.	DESCRIPTION	Unit List Price
31580	Holder—Bias coil holder	.10
35639	Plug—3 prong male plug for power input	.10
37979	Plug—3 contact female socket for speaker cable	.10
35653	Resistor—100 ohms, ½ watt	.10
35654	Resistor—1,000 ohms, ½ watt	.10
35655	Resistor—10,000 ohms, ½ watt	.10
35656	Resistor—22,000 ohms, ½ watt	.10
30102	Resistor—47,000 ohms, ½ watt	.10
13998	Resistor—220,000 ohms, ½ watt	.10
35657	Resistor—470,000 ohms, ½ watt	.10
35811	Resistor—1 meg., ½ watt	.10
30948	Resistor—470,000 ohms, 1 watt	.20
35658	Resistor—1 meg., 1 watt	.20
13720	Resistor—2 meg., 1 watt	.20
35659	Screw—No. 8-32 x ¾ fillister head	.10
14350	Screw—No. 8-32 square head set screw for drum	.20
37979	Shaft—Tuning knob shaft	.05
35772	Shield—Bottom shield for power transformers—two gang variable tuning condenser	.30
35709	Shield—Top shield for power transformers—Part No. 35772 and No. 35788	
31364	Socket—Dial lamp socket	.20
37742	Socket—Phono input socket	.20
31418	Spring—Pointer cord or drive cord spring	.05
31361	Spring—Tension spring for adjustable core and stud assembly	.05
37979	Support—Flywheel and shaft support bracket	.30
37978	Support—Tone control bracket	
35709	Switch—Voltage change switch	.35
35627	Transformer—Output transformer	1.75
35628	Transformer—Second I.F. transformer	1.85
35708	Transformer—Power transformer—105-120 volts, 25 cycle—less end shields	5.25
35767	Transformer—Power transformer—105-120 volts, 50-60 cycle—less end shields	2.95
35769	Transformer—Power transformer—110-125-150-220 volts, 50-60 cycle	4.00
2917	Washer—"C" washer to hold tuning shaft	.03

SPEAKER ASSEMBLIES
Model Q16

32907	Cap—Dust cap	
35677	Cone—Cone complete with voice coil	1.25
35678	Plug—3 prong male plug for speaker	.25
37984	Transformer—Output transformer	1.75

DESCRIPTION MODEL Q17

STOCK No.	DESCRIPTION	Unit List Price
6119	Plug—3 contact female socket for speaker cable	.25
37983	Resistor—Ballast tube resistor	3.00
37983	Resistor—Ballast tube resistor	3.00
13998	Resistor—10 ohms, ½ watt	.10
37978	Bracket—Tone control support bracket	.20
35711	Resistor—100 ohms, ½ watts	.10
35712	Resistor—1,000 ohms, ½ watt	.10
35713	Resistor—2,200 ohms, ½ watt	.10
35714	Resistor—10,000 ohms, ½ watt	.10
31707	Resistor—22,000 ohms, ½ watt	.10
31708	Resistor—47,000 ohms, ½ watt	.10
31494	Resistor—220,000 ohms, ½ watt	.10
31738	Resistor—470,000 ohms, ½ watt	.10
30948	Resistor—1 meg., ½ watt	.10
13730	Resistor—2 meg., ½ watt	.10
13879	Resistor—Ballast tube resistor	.25
35634	Screw—No. 8-32 square head set screw for drive drum	.20
37979	Shaft—Tuning knob shaft	.05
31365	Socket—Dial lamp socket	.20
13732	Socket—Phono input socket	.20
31418	Spring—Pointer cord or drive cord spring	.05
31361	Spring—Tension spring for adjustable core and stud assembly	.05
37979	Support—Flywheel and shaft support bracket	.30
37978	Support—Tone control bracket	
35632	Switch—Voltage change switch	.35
35627	Transformer—Output transformer	1.75
35636	Transformer—First I.F. transformer	1.70
35628	Transformer—Second I.F. transformer	1.85
37983	Tube—Ballast tube resistor	3.00
2917	Washer—"C" washer to hold tuning shaft	.03

SPEAKER ASSEMBLIES
(RI-95-6)

32907	Cap—Dust cap	
35677	Cone—Cone complete with voice coil	1.25
37984	Transformer—Output transformer	1.75

MISCELLANEOUS ASSEMBLIES

35633	Decalcomania—"Volume" decal	.05
35634	Decalcomania—"Tone" decal	.05
35635	Decalcomania—Trade mark decal	.05
37987	Dial—Glass dial scale	2.00
35636	Knob—Control knob—volume control knob	.25
35814	Knob—Range switch or volume control knob	.25
35809	Knob—Tone control knob	.25

DESCRIPTION MODEL Q23

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES	
	(RC-562)	
37981	Bracket—Drive cord pulley bracket (1 pulley)	.20
35622	Bracket—Support bracket for shaft and flywheel	.20
35623	Calibrator—Drive drum calibrator scale	.10
35624	Calibrator—Drive drum calibrator dial	.10
12714	Capacitor—Mica trimmer comprising 3 sections of 25 volts	.60
35625	Capacitor—Mica trimmer comprising 3 sections of 25 volts	.60
34654	Capacitor—Air trimmer—section of tuning unit	2.10
35626	Capacitor—Mica trimmer comprising 3 sections of 25 volts	.60
34654	Capacitor—Air trimmer—section of tuning unit	2.10
35646	Capacitor—8 mmfd. ceramic	.35
35647	Capacitor—18 mmfd. silvered mica	.35
35648	Capacitor—18 mmfd. ceramic	.35
35649	Capacitor—.009 mfd.	.20
35650	Capacitor—.01 mfd.	.20
35651	Capacitor—.05 mfd.	.20
35652	Capacitor—.25 mfd.	.35
35653	Capacitor—Electrolytic comprising 2 sections of 8 mfd., 25 volts, and 1 section of 40 mfd., 25 volts	2.20
35654	Coil—Bias coil	2.80
35655	Coil—Antenna coil—"A" band	1.25
35656	Coil—Antenna coil—spread band	.75
35657	Coil—Antenna coil—"B" band	1.85
35658	Coil—Oscillator coil—19-13 meter band	.45
35659	Coil—Oscillator coil—"A" band	.40
35660	Coil—Oscillator coil—25 meter band	.40
35661	Coil—Oscillator coil—"B" band	.40
35662	Condenser—Two gang variable tuning condenser	4.00
35663	Control—Volume control and power switch	1.60
35664	Control—Tone control with switch	1.60
35665	Cord—Pointer cord (approx. 43 in. overall length)	.30
35666	Cord—Pointer cord (approx. 43 in. overall length)	.30
35667	Core—Adjustable core and stud for "A" and "B" bands	.15
35668	Cores—Adjustable cores and stud for coils Nos. 35655, 35656, 35657, 35658, 35659, 35660, 35661	.15
35627	Drum—Drive drum less calibrator dial	.35
35638	Flywheel—Tuning knob shaft flywheel	1.10

STOCK No.	DESCRIPTION	Unit List Price
35669	Holder—Bias coil holder	.10
36627	Plug—3 contact female plug for speaker cable	.10
35639	Plug—3 prong male plug for power input	.10
31731	Resistor—10 ohms, ½ watt	.10
35653	Resistor—100 ohms, ½ watt	.10
35436	Resistor—1,000 ohms, ½ watt	.10
35654	Resistor—2,200 ohms, ½ watt	.10
30482	Resistor—10,000 ohms, ½ watt	.10
14414	Resistor—22,000 ohms, ½ watt	.10
35655	Resistor—47,000 ohms, ½ watt	.10
30483	Resistor—100,000 ohms, ½ watt	.10
35656	Resistor—220,000 ohms, ½ watt	.10
30484	Resistor—330,000 ohms, ½ watt	.10
35657	Resistor—470,000 ohms, ½ watt	.10
30652	Resistor—1 megohm, ½ watt	.10
30653	Resistor—2 megohms, ½ watt	.10
13601	Resistor—10 megohm, ½ watt	.10
35658	Screw—No. 8-32 x ¾ fillister head	.10
37979	Shaft—Tuning knob shaft	.05
31365	Socket—Dial lamp socket	.20
35588	Socket—Tube socket	.35
31731	Socket—Tube socket—wafer—for standard base tube	.25
32881	Spring—Pointer cord spring	.05
30923	Spring—Tension spring for adjustable core and stud assembly	.10
38806	Switch—Battery change switch	1.65
35659	Switch—Voltage change switch	.35
38807	Transformer—Second I.F. transformer	1.85
38698	Transformer—Output transformer	1.35

SPEAKER ASSEMBLIES
(RI-81BZ)

35570	Cone—Cone complete with voice coil	1.90
35582	Cone—Cone complete with voice coil (92161-3)	1.35
39535	Cone—Cone complete with voice coil (92161-4)	1.90
38352	Cone—Cone complete with voice coil (92161-5)	1.35
38352	Cone—Cone complete with voice coil (92322-2)	1.35
39538	Cone—Cone complete with voice coil (92374-1)	1.90
38537	Cone—Cone complete with voice coil	1.35

MISCELLANEOUS ASSEMBLIES

39146	Clamp—Dial clamp	.15
39345	Dial—Dial scale	.10
39346	Grille—Perforated grille	.45
39347	Grille—Perforated grille	.45
39348	Handle—Lucite drop handle	.30

EXTERNAL LOOP

39374	Cap—Suction cup	.15
39375	Cord—Loop antenna to attach external antenna to case	.05
39376	Plug—3 prong male plug for loop cable	.05

DESCRIPTION MODEL 26BP

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES	
	(RC-568)	
38775	Capacitor—Electrolytic comprising 1 section of 40 mfd., 25 volts, and 1 section of 160 mfd., 25 volts	.60
38910	Capacitor—Electrolytic comprising 3 section of 8 mfd., 450 volts, 1 section of 20 mfd., 450 volts, and 1 section of 10 mfd., 150 volts	1.55
38681	Capacitor—.0025 mfd.	.20
38041	Capacitor—.15 mmfd.—ceramic	.40
38896	Capacitor—.15 mmfd.—mica	.35
38042	Capacitor—.47 mmfd.—ceramic	.30
38043	Capacitor—.47 mmfd.—mica	.30
38807	Capacitor—100 mmfd.	.35
38698	Capacitor—.001 mmfd.	.20
38681	Capacitor—.0025 mfd.	.20
38682	Capacitor—.01 mfd.	.20
38683	Capacitor—.05 mfd.	.20
38684	Capacitor—.1 mfd. 400 volts	.25
38685	Capacitor—.1 mfd. 600 volts	.30
38686	Capacitor—.25 mfd.	.35
38687	Capacitor—.5 mfd.	.45
38688	Capacitor—1 mfd.	.55
38689	Capacitor—2 mfd.	.75
38690	Capacitor—4 mfd.	.95
38691	Coil—Oscillator coil	.45
38692	Condenser—Variable tuning condenser	4.75
38693	Control—Volume control and power switch	1.60
38694	Control—Tone control with switch	1.60
38930	Core—Adjustable core and stud for I.F. transformers and oscillator coil	.15
38921	Core—Adjustable core and stud for I.F. transformers and oscillator coil	.15
38606	Core—Adjustable core and stud for oscillator coil	.15
38914	Dial—Tuning dial complete with bracket and pointer	.85
38819	Dial—Tuning or volume control disc	.15
38695	Drum—Drive drum less calibrator dial	1.10
38916	Inductance—Antenna loop complete—less capacitor	1.10
38917	Plate—Dial back plate	.10
38973	Plug—3 prong male plug for "A" battery cable	.10
38841	Plug—3 prong male plug for "B" battery cable	.10
38842	Plug—3 prong male plug for "C" battery cable	.10
38809	Resistor—Voltage divider—4,700 ohms, 7 watt	.75
38810	Resistor—17 meg., ½ watt	.10
12191	Resistor—1,800 ohms, 1 watt	.20
13421	Resistor—2,700 ohms, 1 watt	.20
38811	Resistor—5,600 ohms, 1 watt	.20
38580	Resistor—100,000 ohms, ½ watt	.10
38812	Resistor—150,000 ohms, ½ watt	.10
38983	Resistor—220,000 ohms, ½ watt	.10
38813	Resistor—2.2 meg., ½ watt	.10
38949	Resistor—4.7 meg., ½ watt	.10
38971	Resistor—17 meg., ½ watt	.10

STOCK No.	DESCRIPTION	Unit List Price
38972	Plug—7 contact female plug for speaker cable	.10
38827	Pulley—Drive cord pulley	.10
31731	Resistor—10 ohms, ½ watt	.10
35653	Resistor—100 ohms, ½ watt	.10
35436	Resistor—1,000 ohms, ½ watt	.10
35654	Resistor—2,200 ohms, ½ watt	.10
30482	Resistor—10,000 ohms, ½ watt	.10
14414	Resistor—22,000 ohms, ½ watt	.10
35655	Resistor—47,000 ohms, ½ watt	.10
30483	Resistor—100,000 ohms, ½ watt	.10
35656	Resistor—220,000 ohms, ½ watt	.10
30484	Resistor—330,000 ohms, ½ watt	.10
35657	Resistor—470,000 ohms, ½ watt	.10
30652	Resistor—1 megohm, ½ watt	.10
30653	Resistor—2 megohms, ½ watt	.10
13601	Resistor—10 megohm, ½ watt	.10
35658	Screw—No. 8-32 x ¾ fillister head	.10
37979	Shaft—Tuning knob shaft	.05
31365	Socket—Dial lamp socket	.20
35588	Socket—Tube socket	.35
31731	Socket—Tube socket—wafer—for standard base tube	.25
32881	Spring—Pointer cord spring	.05
30923	Spring—Tension spring for adjustable core and stud assembly	.10
38806	Switch—Battery change switch	1.65
35659	Switch—Voltage change switch	.35
38807	Transformer—Second I.F. transformer	1.85
38698	Transformer—Output transformer	1.35

SPEAKER ASSEMBLIES
(RI-81BZ)

35570	Cone—Cone complete with voice coil	1.90
35582	Cone—Cone complete with voice coil (92161-3)	1.35
39535	Cone—Cone complete with voice coil (92161-4)	1.90
38352	Cone—Cone complete with voice coil (92161-5)	1.35
38352	Cone—Cone complete with voice coil (92322-2)	1.35
39538	Cone—Cone complete with voice coil (92374-1)	1.90
38537	Cone—Cone complete with voice coil	1.35

MISCELLANEOUS ASSEMBLIES

39146	Clamp—Dial clamp	.15
39345	Dial—Dial scale	.10
39346	Grille—Perforated grille	.45
39347	Grille—Perforated grille	.45
39348	Handle—Lucite drop handle	.30

EXTERNAL LOOP

39374	Cap—Suction cup	.15
39375	Cord—Loop antenna to attach external antenna to case	.05
39376	Plug—3 prong male plug for loop cable	.05

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

NOTE: If the stamping on the speaker is torn away or the replacement does not agree with above speaker number, order replacement parts by re-ceiver model number and the speaker number stamped on speaker, and full description of part required.

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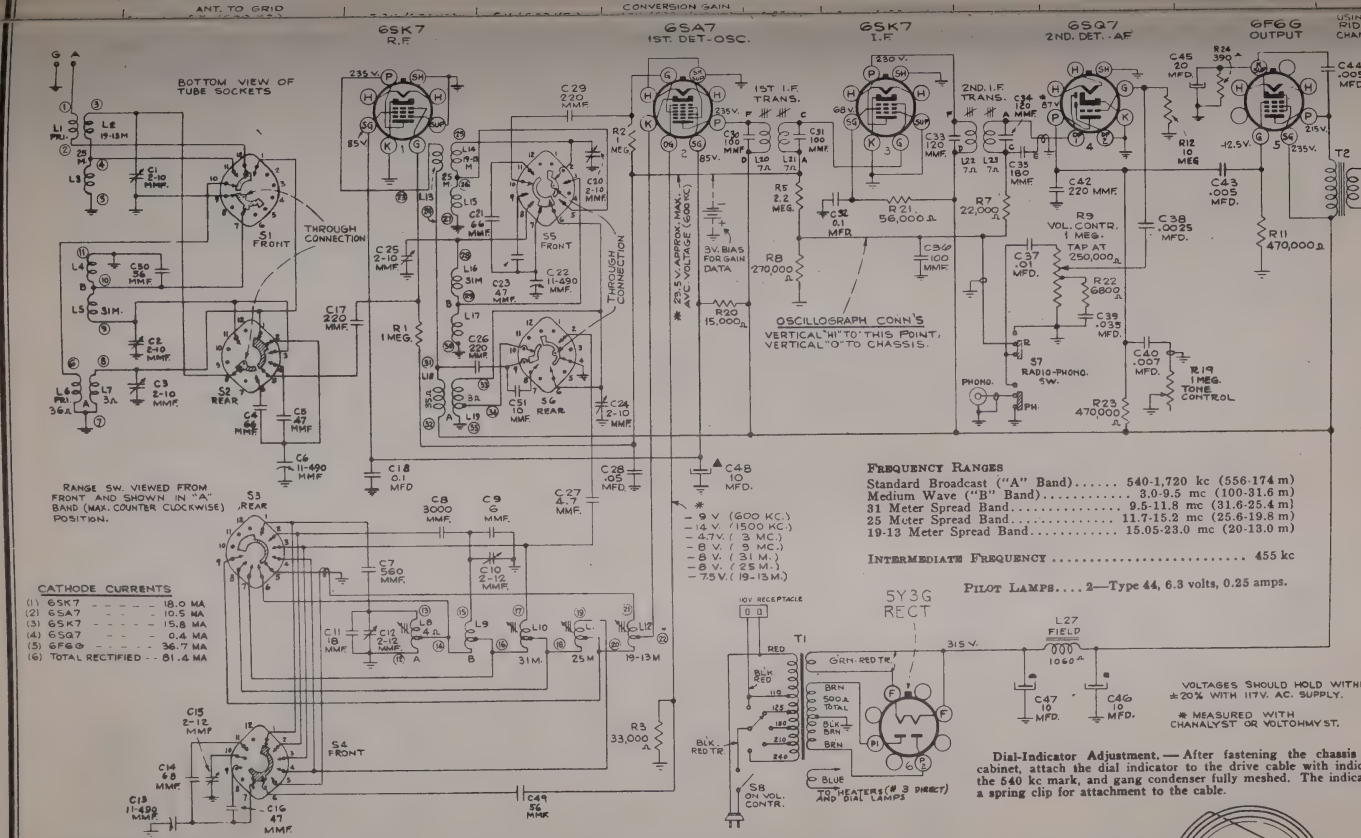

6SK7 R.F
6SA7 1ST. DET.-OSC.
6SK7 I.F.
6SQ7 2ND. DET.-AF
6F6G OUTPUT
USING RCA RIDER CHANALYST.
BOTTOM VIEW OF TUBE SOCKETS
THROUGH CONNECTION
1ST I.F. TRANS.
2ND. I.F. TRANS.
3V. BIAS FOR GAIN DATA
* 23.5 V. APPROX. MAX. A.V.C. VOLTAGE (600 KC.)
OSCILLOGRAPH CONN'S VERTICAL "HI" TO THIS POINT, VERTICAL "O" TO CHASSIS.
VOL. CONTR. 1 MEG.
TAP AT 250,000Ω
RADIO-PHONO. SW.
PHONO.
TONE CONTROL
SPEAKER
RANGE SW. VIEWED FROM FRONT AND SHOWN IN "A" BAND (MAX. COUNTER CLOCKWISE) POSITION.
CATHODE CURRENTS
(1) 6SK7 - - - - - 18.0 MA
(2) 6SA7 - - - - - 10.5 MA
(3) 6SK7 - - - - - 15.8 MA
(4) 6SQ7 - - - - 0.4 MA
(5) 6F6G - - - - - 36.7 MA
(6) TOTAL RECTIFIED - - 81.4 MA
* - 9 V. (600 KC.)
- 14 V. (1500 KC.)
- 4.7V. (3 MC.)
- 8 V. (9 MC.)
- 8 V. (31 M.)
- 8 V. (25 M.)
- 7.5V.(19-13M.)
5Y3G RECT
315 V.
RED
BLK. RED
GRN. RED TR.
BRN
500Ω TOTAL
BLK. BRN
BLK. RED TR.
BLUE
TO HEATERS (# 3 PIKET) AND DIAL LAMPS
S8 ON VOL. CONTR.
T1
L27 FIELD 1060Ω
C47 10 MFD.
C46 10 MFD.
19-13M
31M.
25M.

Frequency Ranges

Standard Broadcast ("A" Band)	540-1,720 kc (556-174 m)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.6 m)
31 Meter Spread Band	9.5-11.8 mc (31.6-25.4 m)
25 Meter Spread Band	11.7-15.2 mc (25.6-19.8 m)
19-13 Meter Spread Band	15.05-23.0 mc (20-13.0 m)

Intermediate Frequency ..... 455 kc

Pilot Lamps.... 2—Type 44, 6.3 volts, 0.25 amps.

VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117V. AC. SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

Dial-Indicator Adjustment. — After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Power Supply Ratings

105-125 volts, 50-60 cycles	75 watts
105-125 volts, 25-60 cycles	75 watts
100-130, 140-160, 200-250 volts, 50-60 cycles	75 watts

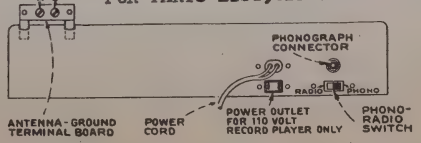
Power Output

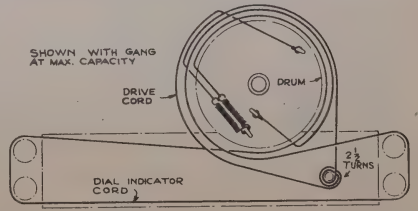
Undistorted	2.5 watts
Maximum	4.5 watts

Loudspeaker

Type	9 x 6¼ inch elliptical electrodynamic
V.C. Impedance	3.7 ohms at 400 cycles
Identification Number	92196-1

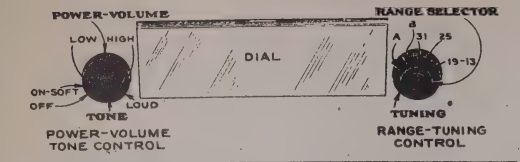
FOR PARTS LIST, SEE INDEX

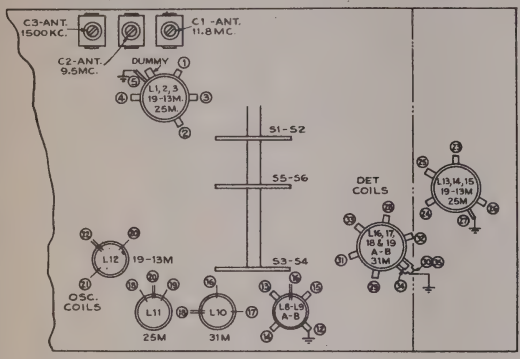


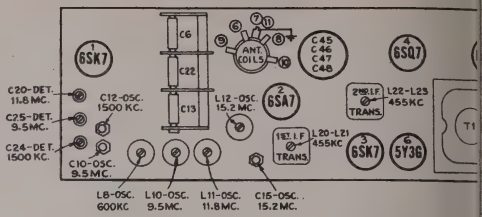


MODEL Q30
Ch. RC-538B

RCA MFG. CO., INC.







Precautionary Lead Dress:

1. Dress green leads from antenna and R-F gang sections away from all metal including chassis shield plates. The spaghetti covered braid in the antenna section should be at least ¼ inch away from gang.
2. Dress toothpick capacitors and switch leads away from and edge on to shield plates.
3. Closely twist ground lead about 2nd I-F transformer diode lead and dress close to chassis.
4. Dress volume control-arm lead and capacitor close to front apron and away from output tubes by-pass capacitors.
5. 6SQ7 10 megohm grid resistor should have no lead length on the grid side.
6. Dress capacitor high side of volume control toward base and as far as possible from a-c switch.
7. Leads to converter socket should not impede flexible mounting.
8. Converter control grid: clear of any other leads, especially filament leads which must be at least ¼ inch away. The meg-ohm grid leak must have its body as close to grid as possible.
9. Dress oscillator grid and control grid capacitors apart.
10. Dress all filament and B+ leads close to chassis. Dress speaker leads close to base.
11. Dress phono lead and diode return lead to switch away from power circuits and output tube sockets.
12. Dress power transformer leads between back apron, power transformer and 5Y3 socket.
13. Brown lead from electrolytic to rectifier tube should be well away from I.F. transformer parts.
14. AC leads to switch should be twisted and away from all parts.
15. Capacitor to phono switch and its lead should be away from all other leads.
16. Brown speaker leads should be dressed down and away from 6SQ7 socket.
17. C-38 should be close to chassis and away from all other leads.
18. Shielded lead from I.F. to phono switch should be away from all else.

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range Switch	Turn radio Dial to—	Adjust t following max. pea output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	"A" band	Quiet point near 600 kc (149.5°) end of dial	L23-L2 2nd I-F transform
2	6SA7 1st det. grid in series with .01 mfd.				L21-L2 1st I-F transform
3	Antenna terminal in series with 300 ohms	11.8 mc	25 meter band	11.8 mc (138.5°)	L11 (osc C1 (ant C20 (det Rock in
4		15.2 mc		15.2 mc (18.5°)	C15 (osc.)
5	Repeat steps 3 and 4 until aligned.				
6	Antenna terminal in series with 300 ohms	15.2 mc	19-13 meter band	15.2 mc (156°)	L12 (osc.
7		9.5 mc	31 meter band	9.5 mc (156°)	L10 (osc. C2 (ant C25 (det.) Rock in
8		9.5 mc	"B" band	9.5 mc (11.5°)	C10 (osc
9	Antenna terminal in series with 200 mmfd.	1,500 kc	"A" band	1,500 kc (27°)	C12 (osc C3 (ant C24 (det
10		600 kc		600 kc (149.5°)	L8 (osc. Rock in
11	Repeat steps 9 and 10.				

* Use minimum capacity peak if two can be obtained.

** Peak at minimum plunger position if two peaks can be obtai

*** Use maximum capacity peak if two peaks can be obtained.

† Check image to determine that C15 has been adjusted to rect peak by tuning receiver to approximately 14.29 mc whe weaker signal should be received.

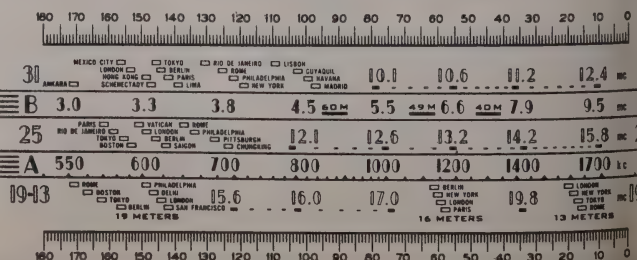
NOTE: Oscillator tracks above signals on all bands.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser fra and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Calibration Scale

Reduced Reproduction of Receiver Dial and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 150° on the calibration scale corresponds to approximately 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."



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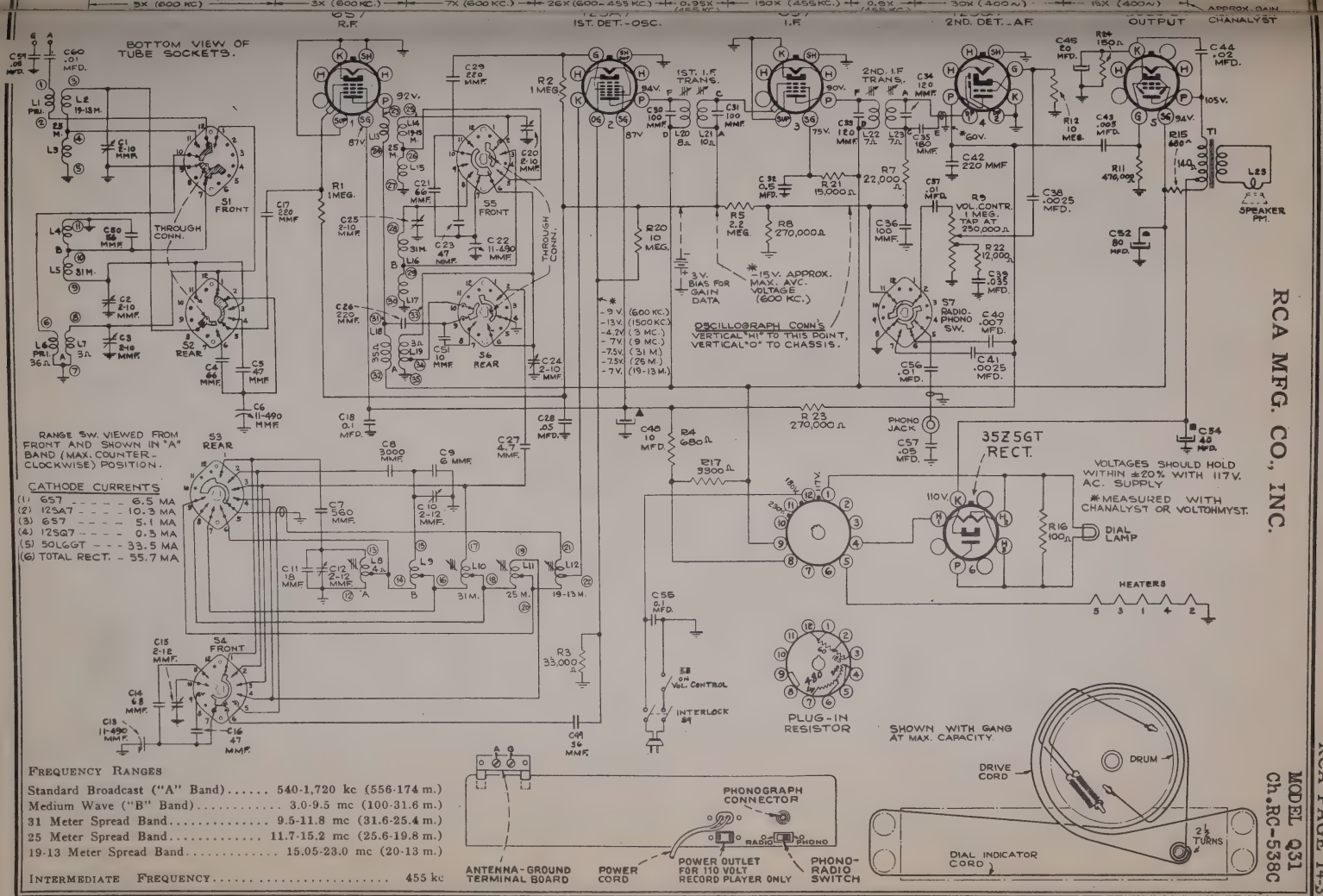

RCA MFG. CO., INC.
MODEL Q31
Ch. RC-538C
BOTTOM VIEW OF TUBE SOCKETS.
THROUGH CONN.
RANGE SW. VIEWED FROM FRONT AND SHOWN IN "A" BAND (MAX. COUNTER-CLOCKWISE) POSITION.
CATHODE CURRENTS
(1) 6S7 - - - - - 6.5 MA
(2) 12SA7 - - - - 10.3 MA
(3) 6S7 - - - - - 5.1 MA
(4) 12SQ7 - - - - 0.3 MA
(5) 50L6GT - - - 33.5 MA
(6) TOTAL RECT. - 55.7 MA
1ST. DET.-OSC.
1ST. I.F. TRANS.
2ND. I.F. TRANS.
2ND. DET.-A.F.
OUTPUT
APPROX. GAIN CHANALYST
OSCILLOGRAPH CONN'S VERTICAL "HI" TO THIS POINT, VERTICAL "O" TO CHASSIS.
3V. BIAS FOR GAIN DATA
*15V. APPROX. MAX. AVC. VOLTAGE (600 KC.)
-9 V. (600 KC.)
-13 V. (1500 KC.)
-4.2 V. (3 MC.)
-7 V. (9 MC.)
-7.5 V. (31 M.)
-7.5 V. (25 M.)
-7 V. (19-13 M.)
35Z5GT RECT.
VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V. AC. SUPPLY
*MEASURED WITH CHANALYST OR VOLTOHMYST.
HEATERS
5 3 1 4 2
PLUG-IN RESISTOR
SHOWN WITH GANG AT MAX. CAPACITY.
DRIVE CORD
DRUM
DIAL INDICATOR CORD
2½ TURNS
ANTENNA-GROUND TERMINAL BOARD
POWER CORD
POWER OUTLET FOR 110 VOLT RECORD PLAYER ONLY
PHONOGRAPH CONNECTOR
PHONO-RADIO SWITCH
RADIO
PHONO
SPEAKER PM.

FREQUENCY RANGES

Standard Broadcast ("A" Band)	540-1,720 kc (556-174 m.)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.6 m.)
31 Meter Spread Band	9.5-11.8 mc (31.6-25.4 m.)
25 Meter Spread Band	11.7-15.2 mc (25.6-19.8 m.)
19-13 Meter Spread Band	15.05-23.0 mc (20-13 m.)
INTERMEDIATE FREQUENCY	455 kc

MODEL Q31
Ch.RC-538C

RCA MFG. CO., INC.

POWER SUPPLY RATINGS

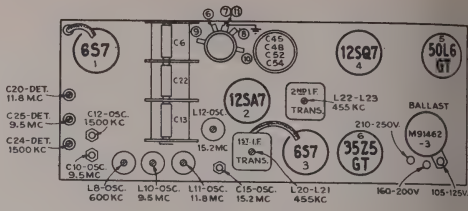
105-125 volts, 40 to 100 cycles AC, or DC.....31 watts
160-200 volts, 40 to 100 cycles AC, or DC.....50 watts
210-250 volts, 40 to 100 cycles AC, or DC.....68 watts

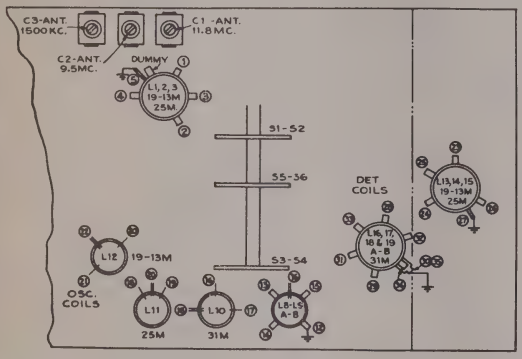
POWER OUTPUT

Undistorted..... 2.5 watts
Maximum..... 4.5 watts

LOUDSPEAKER

Type.....: 9 in. x 6¼ in. elliptical permanent magnet dynamic
V.C. Impedance..... 3.7 ohms at 400 cycles
Identification Number..... 92196-2





Precautionary Lead Dress

Dress the indicated circuit parts as follows:

1. Toothpick condensers in the ant., R. F. circuits and gang leads: away from metal especially shield plates; condensers at right angles to shield plates.
2. Speaker, pilot, and output filament leads: between terminal board and output tube socket and against the base.
3. Leads to converter socket so that they do not impede the flexible mounting.
4. Oscillator grid and control grid condensers (to 6SA7) well apart, but at least ½ in. from shield plates.
5. All filament and B+ leads close to chassis.
6. Black lead between the RF trimmer bank and switch: over the short wave RF coil and close to it.
7. Blue plate lead to 2nd I.F. transformer: under the brown and the red leads, and away from first I.F. transformer.
8. 2nd I.F. to diode lead (black): close to chassis and with yellow ground lead twisted about it closely.
9. Volume control high side condenser: close to base.
10. Phono lead and diode return lead to switch: away from power circuits and output tube socket.
11. .05 cond. from phono shield to ground up, under, and against joint of shielded cable.
12. R-12 (10 meg. grid res. on 12SQ7) down against chassis.
13. Yellow lead from switch lug 2 to B lug on 2nd I.F. down against chassis and away from plate and fil. leads.

Steps					
	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range Switch	Turn radio Dial to—	Adjust the following for max. peak output
1	6S7 I-F grid in series with .01 mfd.	455 kc	"A" band	Quiet point near 600 kc (149.5°) end of dial	L23-L22 2nd I-F transformer
2	12SA7 1st det. grid in series with .01 mfd.				L21-L20 1st I-F transformer
3	Antenna terminal in series with 300 ohms	11.8 mc	25 meter band	11.8 mc (138.5°)	L11 (osc.) .C1 (ant.) C20 (det.) Rock in
4		15.2 mc		15.2 mc (18.5°)	C15 (osc.)*
5	Repeat steps 3 and 4 until aligned.				
6	Antenna terminal in series with 300 ohms	15.2 mc	19-13 meter band	15.2 mc (156°)	L12 (osc.)**
7		9.5 mc	31 meter band	9.5 mc (156°)	L10 (osc.)** C2 (ant.) C25 (det.)** Rock in
8		9.5 mc	"B" band	9.5 mc (11.5°)	C10 (osc.)*
9	Antenna terminal in series with 200 mmfd.	1,500 kc	"A" band	1,500 kc (27°)	C12 (osc.) C3 (ant.) C24 (det.)
10		600 kc		600 kc (149.5°)	L8 (osc.) Rock in
11	Repeat steps 9 and 10.				

* Use minimum capacity peak if two can be obtained.

** Peak at minimum plunger position if two peaks can be obtained.

*** Use maximum capacity peak if two peaks can be obtained.

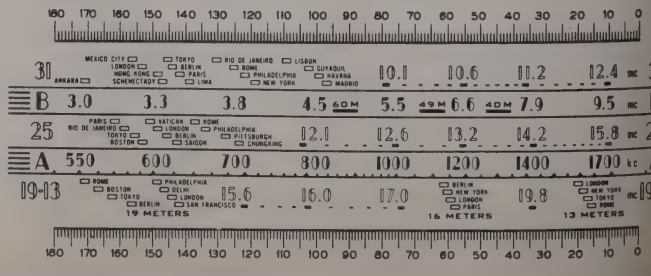
† Check image to determine that C15 has been adjusted to correct peak by tuning receiver to approximately 14.29 mc where a weaker signal should be received.

NOTE: Oscillator tracks above signals on all bands.

Calibration Scale

Reduced Reproduction of Receiver Dial and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 150° on the calibration scale corresponds to approximately 600 kc on "A" band, etc.



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RCA MFG. CO., INC.

MODELS QU51C, QU51M, QU55
Ch. RC-568, RC-568A

6SK7 R.F.
6SA7 1ST. DET. & OSC.
6SK7 I.F.
6SQ7 2ND. DET.-AF-AVC.
6AD7G OUTPUT & PHASE INV.
6FG6 OUTPUT
6U5/6G5 TUNING IND.
5U4G (RC-568) 5T4 (RC-568A) RECT.
E.M. SPEAKER
R.M. SPEAKER
H.C.
V.C.
T1
T3
T-93037 RC-568, 568A
VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V. AC SUPPLY.
* MEASURED WITH CHANALYST OR VOLTOHMYST
APPROX. GAIN DATA USING RCA RIDER CHANALYST
BOTTOM VIEW OF TUBE SOCKETS
RANGE SWITCH FROM FRONT AND SHOWN IN "A" BAND (MAX. COUNTER CLOCK-WISE) POSITION.
THROUGH CONN.
OSCILLOGRAPH CONN'S VERTICAL "HI" TO THIS POINT VERTICAL "G" TO CHASSIS
CATHODE CURRENTS
(1) 6SK7 - - - - 18.3 MA.
(2) 6SA7 - - - - 10.8 MA.
(3) 6SA7 - - - - 15.0 MA.
(4) 6SK7 - - - - 25.4 MA.
(5) 6AD7G - - - 23.5 MA.
(6) 6FG6 - - - - 23.5 MA.
(7) 6U5/6G5 - - 3.5 MA.
(8) TOTAL RECT. - 146.0 MA.
CHASSIS
TO HEATERS & DIAL LAMP
PHONO MOTOR SOCKET
LINK
FIELD
SOCKET (TERM. VIEW)
3V. FIXED BIAS GAIN DATA
-22V. AGC & MAX AVC.
-3V. FIXED BIAS
MEASURED WITH -3 V. FIXED BIAS
3.5X (600 KC)
6X (600 KC)
3X (600 KC)
40X (600-455 KC)
0.7X (455 KC)
200X (455 KC)
60X (400 ~)
0.7X (455 KC)
200X (400 ~)

Pilot Lamps ..... 2—Type 44, 6.3 volts, 0.25 amps.

Power Supply Ratings

105-125 volts, 50-60 cycles	115 watts*
105-125 volts, 25-60 cycles	115 watts*
100-130, 140-160, 200-250 volts, 50-60 cycles	115 watts*

* Including phono motor.

Power Output

	QU51	QU55
Undistorted	9.5 watts	12 watts
Maximum	11 watts	15 watts

Frequency Ranges

Standard Broadcast ("A" Band)	540-1,720 kc (556-174 m)
Medium Wave ("B" Band)	3.0-9.5 mc (100-31.6 m)
31 Meter Spread Band	9.5-11.7 mc (31.6-25.6 m)
25 Meter Spread Band	11.7-15.1 mc (25.6-19.9 m)
19-13 Meter Spread Band	15.1-22.5 mc (19.9-13.3 m)

Intermediate Frequency ..... 455 kc

Loudspeakers

	RL70N1	RL70N3	RL71A4
Type	12-in. EM	12-in. EM	12-in. PM
Used in	QU51	QU55	QU51 & QU55
V.C. Impedance at 400 cycles	15 ohms	15 ohms	15 ohms

Phonographs

Type RP145E ..... Used in QU51C
Type RP152R ..... Used in QU51M and QU65
Record Capacity ..... Eight 10-inch or seven 12-inch
Turntable Speed ..... 78 rpm
Pickup Type ..... Crystal in RP145E, magnetic in RP152R
Crystal Pickup Impedance ..... 100,000 ohms at 1,000 cycles
Magnetic Pickup Impedance ..... 96 ohms at 1,000 cycles
Motor ..... Self starting, constant speed, induction type

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MODELS QU51C, QU51M, QU55
Ch. RC-568, RC-568A

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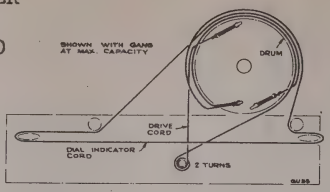
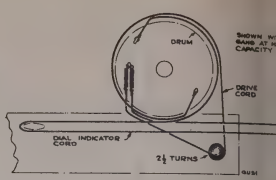
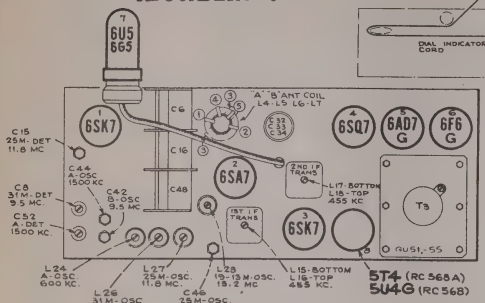
FOR RECORD CHANGER DATA, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".

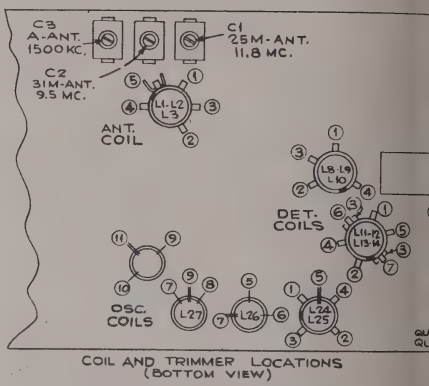


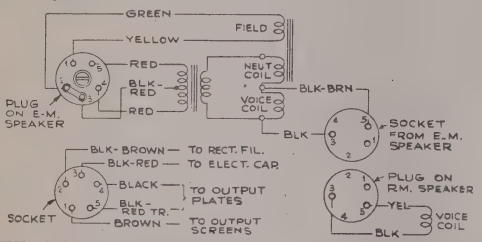
QU55



QU51







Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range Switch	Turn Radio Dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	"A" band	Quiet point 600 kc end of dial	L18-L17 2nd I-F transformer
2	6SA7 1st det. grid in series with .01 mfd.				L16-L15 1st I-F transformer
3	Antenna terminal in series with 300 ohms	11.8 mc	25 meter band	11.8 mc (138.5°)	L27 (osc.)** C1 (ant.) C15 (det.)***
4		15.2 mc		15.2 mc (18.5°)	C46 (osc.)*†
5	Repeat steps 3 and 4 until aligned.				
6	Antenna terminal in series with 300 ohms	15.2 mc	19-13 meter band	15.2 mc (156°)	L28 (osc.)**
7		9.5 mc	31 meter band	9.5 mc (156°)	L26 (osc.)** C2 (ant.) C8 (det.)***
8		9.5 mc	"B" band	9.5 mc (11.5°)	C42 (osc.)*
9	Antenna terminal in series with 200 mmfd.	1,500 kc	"A" band	1,500 kc (27°)	C44 (osc.) C3 (ant.) C52 (det.)
10		600 kc		600 kc (149.5°)	L24 (osc.) Rock in
11	Repeat steps 9 and 10.				

† Check image to determine that C15 has been adjusted to correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

* Use minimum capacity peak if two can be obtained.
** Peak at minimum plunger position if two peaks can be obtain
*** Use maximum capacity peak if two peaks can be obtained.

NOTE: Oscillator tracks above signals on all bands.

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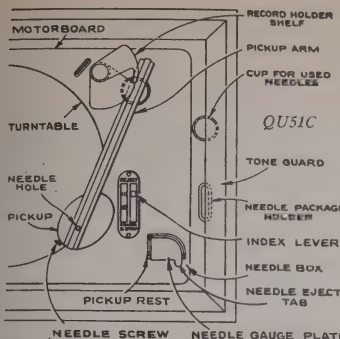
MODELS QU51C, QU51M, QU55
Ch. RC-568, RC-568A



QU51C

Crystal Pickup:

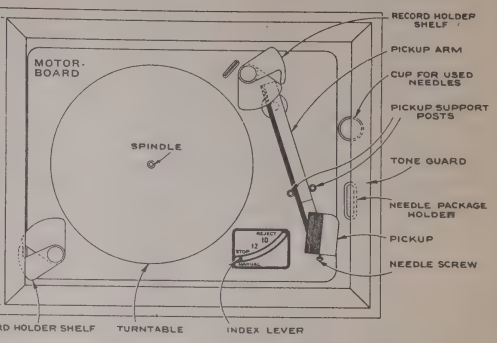
The crystal pickup is sealed in a metal case; if failure occurs, do not attempt to repair the unit, but install a new crystal unit.

Magnetic Pickup:

The magnetic pickup used is of an improved design. The horseshoe magnet is rigidly welded to the pole pieces and is irremovable. There is a centering spring attached to the armature to maintain proper adjustment and to provide a limiting effect on the movement of the armature. Service operations which may be necessary on the pickup are as follows:

Centering Armature. — Refer to the figure showing the pickup inner structure. The armature is shown in its proper relation to the magnet pole pieces, i. e., exactly centered. Whenever this centering adjustment has been disturbed it will be necessary to remove the pickup mechanism from the tone arm for re-adjustment. Unsolder the two leads from the lugs on the terminal board at the rear of the pickup. Insert a small rod or nail into the armature needle hole and tighten the needle holding screw to hold the rod securely. If the armature clamping screws A and B have not been disturbed, screws C should be loosened which will permit the armature to be moved from side to side, the rod acting as a lever to perform this operation. The proper adjustment is obtained when the armature is brought to the mid position between the pole pieces. Screws C should then be tightened. The armature position should then be central between the pole pieces and at right angles to them. Check to make sure that the armature is not touching the coil. The air gap between the pole pieces and the armature should be kept free from dust, filings, and other foreign material which would obstruct the movement of the pickup armature.

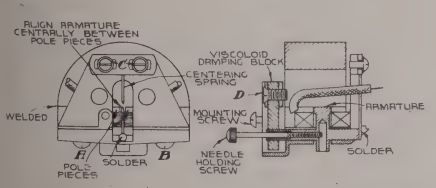
Replacing Coil.—Whenever there is defective operation due to an open or shorted pickup coil, this coil should be replaced. Remove the pickup mechanism and terminal board. Remove screws A and B and the magnet assembly. Remove the bakelite coil support (with coil attached) and insert the new coil support assembly in its place, after which replace the magnet assembly and center the armature as described above, then re-assemble the remainder of the unit. Only rosin core solder should be used for soldering the coil leads and pick-up leads to the pickup terminal board. This same type of solder should be used when necessary for soldering the centering spring to the armature.

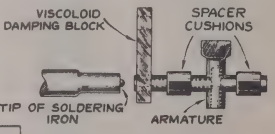


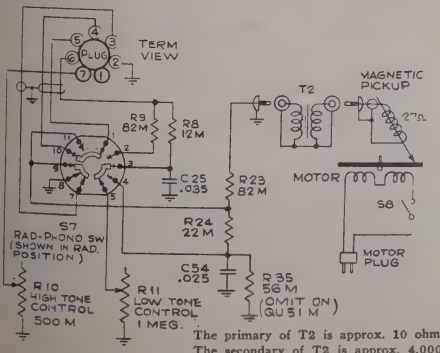
QU51M

Magnetizing.—Loss of magnetization will not usually occur when the pickup has received normal care because the magnet and pole pieces are one unit and the magnetic circuit remains practically closed at all times. When the pickup has been mishandled, subjected to a strong a-c field, jolted, or dropped, there may be an appreciable loss of magnetic strength, in which case it will be necessary to re-magnetize the entire structure. To do this, it will be necessary to first remove the pickup mechanism from the tone arm, and then remove the magnet assembly. Place the magnet assembly on the poles of a standard pickup magnetizer such as the RCA Stock No. 9549 Pickup Magnetizer and charge the magnet in accordance with the instructions accompanying the magnetizer. It is preferable to check the polarity of the pickup magnet and to remagnetize it so that the same polarity is maintained.

Damping Block.—The viscoloid damping block which is attached to the front end of the armature shank serves to reduce undesirable resonances and to cause the frequency response to be uniform. Should it be necessary to replace this damping block, the pickup mechanism should be removed from the tone arm. Remove screw D and the damping block from the pickup assembly. Make sure that the shaft of the armature which contacts the viscoloid is clean. Then insert the new damping block so that it occupies the same position as that of the original block, and is in correct vertical alignment with the armature. The hole in the block is somewhat smaller than the diameter of the armature in order to permit a snug fit. With the damping block properly aligned on the armature, screw D with its washer should then be replaced. Heat should be applied to the armature (viscoloid side) so that the damping block will fuse at the point of contact and become rigidly attached to the armature. A special-tip soldering iron, constructed as shown, will be found very useful in performing this operation. The iron should be applied only long enough to slightly melt the block, causing a small bulge on both sides.

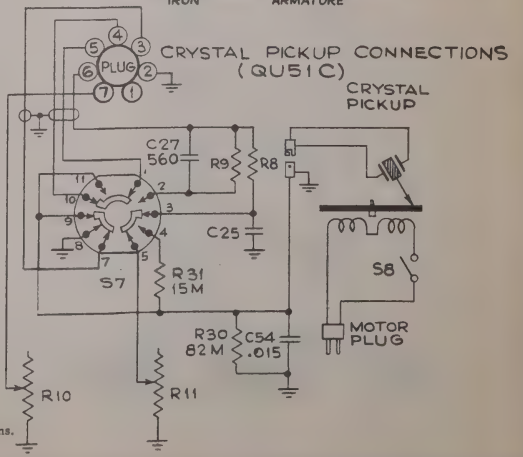






The primary of T2 is approx. 10 ohms.
The secondary of T2 is approx. 4,000 ohms.

MAGNETIC PICKUP CONNECTIONS (QU51M AND QU55)



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MODELS QU51C, QU51M, QU55
Ch. RC-568, RC-568A

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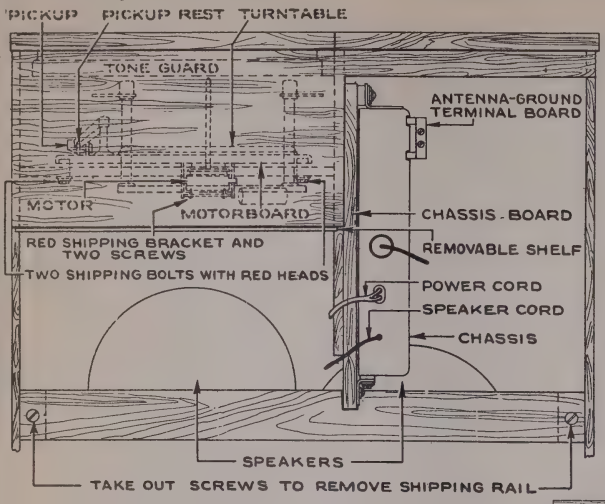
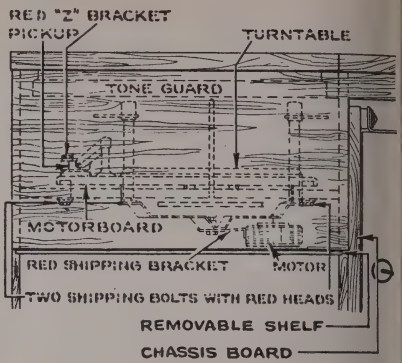
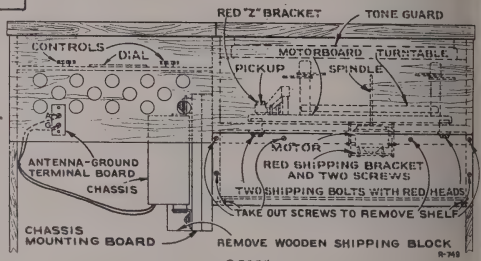


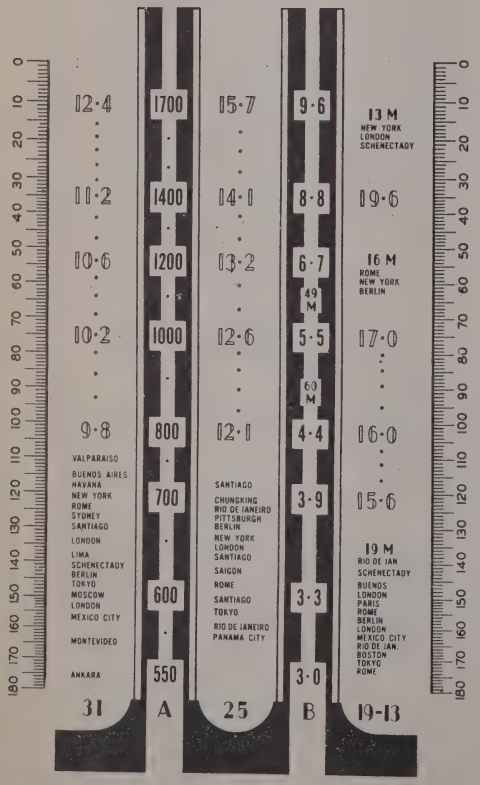
QU51M



QU51C



QU55



Precautionary Lead Dress:

(1) Dress all spread band oscillator coil leads to clear each other by ¼-inch.

(2) Dress toothpick condensers and switch leads away from and edge on to shield plates.

(3) Dress 2nd I.F. transformer lead to diode close to chassis and twist ground lead about it.

(4) Dress high side and tap condensers on vol. control close to chassis.

(5) Dress leads to converter socket so that they do not impair flexible mounting.

(6) Dress oscillator grid condenser and R.F. grid condenser well apart.

(7) Dress AVC resistor to R.F. converter grid close to lug on socket.

(8) Dress twisted AC wiring to power switch away from volume control wiring.

(9) Dress excess power trans. leads between trans. bell and back apron.

(10) Dress C23 away from front apron.

(11) Brown lead on 19-25M ant. coil must be dressed over top of coil.

(12) Dress C24 cap. with short lead to terminal board on rear apron. Power cord leads must be kept away from this section.

Phasing Loudspeakers

The two loudspeakers used in Models QU51 and QU55 have their voice coils connected in parallel and must be phased so that both cones will move in the same direction at the same time. If the phasing is incorrect a decided reduction in bass response will be produced. A very simple test for phasing can be made as follows:

1. Turn the instrument on and reduce the volume control setting until no signal is heard.
2. Momentarily connect the leads from a battery (4 to 6 volts) across the voice coils and note whether or not both cones move in the same direction. If they do the phasing is correct.
3. If the cones move in opposite directions the phasing is incorrect and the two voice coil leads going to the RL71A4 (P.M.) speaker should be reversed.

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STOCK No.	CHASSIS ASSEMBLIES (RC-539B) Q30	Unit List Price
34502	Arm—Operating arm between knob shaft and range switch	.25
37981	Board—"Antenna-Ground" board	.20
37896	Bracket—L.H. bracket complete with 2 drive cord pulleys	.45
37895	Bracket—R.H. bracket complete with 2 drive cord pulleys	.45
35795	Calibrator—Drive drum calibrator	.25
37059	Capacitor—Mica trimmer comprising 3 sections of 2.5-10 mmfd. each (C1, C2, C3), C20, C24, C25)	.60
33097	Capacitor—4.7 mmfd. (C27)	.35
35646	Capacitor—6 mmfd. (C9)	.35
33200	Capacitor—10 mmfd. (C31)	.35
31350	Capacitor—18 mmfd. (C11)	.30
35644	Capacitor—47 mmfd., ceramic (C16)	.35
37329	Capacitor—47 mmfd., silvered mica (C5, C23)	.35
12723	Capacitor—56 mmfd. (C49, C50)	.35
36072	Capacitor—56 mmfd. (C4, C21)	.30
35645	Capacitor—68 mmfd. (C14)	.35
12720	Capacitor—100 mmfd., moulded mica (C36)	.35
30904	Capacitor—100 mmfd., mica, I.F. (C30, C31)	.25
31813	Capacitor—120 mmfd. I.F. (C33, C34)	.30
36615	Capacitor—220 mmfd., mica (C35)	.30
12694	Capacitor—220 mmfd., moulded mica (C17, C26, C29, C42)	.35
31433	Capacitor—360 mmfd. (C37)	.35
35643	Capacitor—3,000 mmfd. (C8)	.55
34459	Capacitor—.0025 mfd. (C38)	.20
33584	Capacitor—.005 mfd. (C43)	.20
5148	Capacitor—.007 mfd. (C40)	.20
4937	Capacitor—.01 mfd. (C37)	.20
5198	Capacitor—.035 mfd. (C39)	.20
4896	Capacitor—.05 mfd. (C28)	.20
4839	Capacitor—0.1 mfd. (C18, C32)	.30
33014	Capacitor—Electrolytic comprising 3 sections of 10 mfd. 450 volts, and 1 section of 20 mfd. 25 volts (C46, C47, C48, C45)	1.90
37055	Coil—Antenna coil—"A" "B" and "31 meter" bands	1.80
37056	Coil—Antenna coil—"25 meter" and "19-13 meter" band	1.00
37093	Coil—Oscillator coil—A, B, C band	.85
35624	Coil—Oscillator coil—"19-13 meter" band	.45
35625	Coil—Oscillator coil—"25 meter" band	.50
35626	Coil—Oscillator coil—"31 meter" band	.45
37057	Coil—R.F. coil—"A" "B" and "31 meter" bands	1.60
37058	Coil—R.F. coil—"25 meter" and "19-13 meter" bands	.80
12714	Condenser—Air trimmer—2-12 mmfd. (C10, C12, C15)	.50
37151	Condenser—Variable tuning condenser (C6, C13, C22)	6.25
37052	Control—Tone control (R19)	1.00
37051	Control—Volume control and power switch (R9, S81)	2.00
34662	Cord—Indicator drive cord (approx. 72-in. overall lgth.)	.25
32834	Cord—Tuning condenser drive cord (approx. 29-in. overall lgth.)	.10
35788	Core—Adjustable core and stud for A, B, C band oscillator coil	.15
31259	Core—Adjustable core and stud for "25 meter," "19-13 meter" and "31 meter" band oscillator coils	.15
33773	Drum—Drive drum	.90
33185	Gear—Volume control gear and hub	.50
33767	Link—Operating link between knob shaft and range switch	.60
5119	Plug—3-contact female plug for speaker	.25
35630	Pulley—Drive cord pulley	.10
35711	Resistor—390 ohms, 1 watt (R24)	.22
14653	Resistor—6,800 ohms, ½ watt (R22)	.20
35595	Resistor—15,000 ohms, 3 watts (R30)	.35
13998	Resistor—22,000 ohms, ½ watt (R7)	.20
12454	Resistor—33,000 ohms, ½ watt (R3)	.20
30650	Resistor—56,000 ohms, ½ watt (R21)	.20
30651	Resistor—270,000 ohms, ½ watt (R8)	.20
30648	Resistor—470,000 ohms, ½ watt (R11, R23)	.20
13739	Resistor—1 meg., ½ watt (R1, R2)	.20
12679	Resistor—2.2 meg., ½ watt (R5)	.20
30992	Resistor—10 meg., ½ watt (R12)	.20
31611	Screw—No. 8-32 milled head set screw for gear, Stock No. 33185	.02
14350	Screw—No. 8-32 square head set screw for drive drum	.03
37893	Shaft—Range switch knob shaft	.35
34132	Shaft—Shaft and gear for tone control	.55
37894	Shaft—Tuning shaft and flywheel	1.50
31364	Socket—Dial lamp socket	.20
33745	Socket—Phono input socket	.20
36637	Socket—Power line receptacle	.40
31251	Socket—Tube socket	.25
31418	Spring—Drive cord and pointer cord spring	.05
33491	Switch—Radio-phono switch	.35
37050	Switch—Range switch	3.50
35636	Transformer—First I.F. transformer (L20, L21)	1.70
36615	Transformer—Second I.F. transformer (L22, L23)	1.60
31734	Transformer—Power transformer, 105-120 volts, 25 cycles	10.35
31735	Transformer—Power transformer, 105-130, 140-160, 200-250 volts, 50-60 cycles	10.80
2917	Washer—"C" washer for tuning drive	.03

SPEAKER ASSEMBLIES (92196-501)	
37963	Coil—Field coil—1,060 ohms
37947	Cone—Cone complete with voice coil
5118	Plug—3-prong male plug
37948	Transformer—Output transformer

STOCK No.	CHASSIS ASSEMBLIES (RC-539B) Q30	Unit List Price
34502	Arm—Operating arm between knob shaft and range switch	.25
37891	Ballast—Ballast tube resistor	3.00
37896	Bracket—L.H. bracket complete with 2 drive cord pulleys	.45
37895	Bracket—R.H. bracket complete with 2 drive cord pulleys	.45
35795	Calibrator—Drive drum calibrator	.25
37059	Capacitor—Mica trimmer comprising 3 sections of 2.5-10 mmfd. each (C1, C2, C3, C20, C24, C25)	.60
33097	Capacitor—4.7 mmfd. (C27)	.35
35646	Capacitor—6 mmfd. (C9)	.35
33200	Capacitor—10 mmfd. (C31)	.35
31350	Capacitor—18 mmfd. (C11)	.30
35644	Capacitor—47 mmfd., ceramic (C16)	.35
37329	Capacitor—47 mmfd., silvered mica (C5, C23)	.35
12723	Capacitor—56 mmfd. (C49, C50)	.35
36072	Capacitor—56 mmfd. (C4, C21)	.30
35645	Capacitor—68 mmfd. (C14)	.35
12720	Capacitor—100 mmfd., moulded mica (C36)	.35
30904	Capacitor—100 mmfd., mica, I.F. (C30, C31)	.25
31813	Capacitor—120 mmfd. I.F. (C33, C34)	.30
36615	Capacitor—220 mmfd., mica (C35)	.30
12694	Capacitor—220 mmfd., moulded mica (C17, C26, C29, C42)	.35
31433	Capacitor—360 mmfd. (C37)	.35
35643	Capacitor—3,000 mmfd. (C8)	.55
34459	Capacitor—.0025 mfd. (C38)	.20
33584	Capacitor—.005 mfd. (C43)	.20
5148	Capacitor—.007 mfd. (C40)	.20
4937	Capacitor—.01 mfd. (C37)	.20
5198	Capacitor—.035 mfd. (C39)	.20
4896	Capacitor—.05 mfd. (C28)	.20
32787	Capacitor—.05 mfd. (C28)	.20
4839	Capacitor—0.1 mfd. (C18)	.30
30367	Capacitor—0.5 mfd. (C32)	.30
37892	Capacitor—Electrolytic comprising 1 section of 80 mfd. 250 volts, 1 section of 40 mfd. 250 volts, 1 section of 10 mfd. 250 volts, and 1 section of 20 mfd. 25 volts (C52, C54, C48, C45)	3.65
37055	Coil—Antenna coil—"A" "B" and "31 meter" bands	1.80
37056	Coil—Antenna coil—"25 meter" and "19-13 meter" band	1.00
37093	Coil—Oscillator coil—A, B, C band	.85
35624	Coil—Oscillator coil "19-13 meter" band	.45
35625	Coil—Oscillator coil—"25 meter" band	.50
35626	Coil—Oscillator coil—"31 meter" band	.45
37057	Coil—R.F. coil—"A" "B" and "31 meter" bands	1.60
37058	Coil—R.F. coil—"25 meter" and "19-13 meter" bands	.80
12714	Condenser—Air trimmer—2-12 mmfd. (C10, C12, C15)	.50
37151	Condenser—Variable tuning condenser (C6, C13, C22)	6.25
37051	Control—Volume control and power switch (R9, S81)	2.00
34662	Cord—Indicator drive cord (approx. 72-in. overall lgth.)	.25
32834	Cord—Tuning condenser drive cord (approx. 29 in. overall lgth.)	.10
35788	Core—Adjustable core and stud for A-B-C band oscillator coil	.15
31259	Core—Adjustable core and stud for "25 meter," "19-13 meter" and "31 meter" band oscillator coils	.15
33773	Drum—Drive drum	.90
33185	Gear—Volume control gear and hub	.50
33767	Link—Operating link between knob shaft and range switch	.60
5119	Plug—3-contact female plug for speaker	.25
35630	Pulley—Drive cord pulley	.10
37891	Resistor—Ballast tube resistor	3.00
35711	Resistor—100 ohms, ¼ watts	.30
30780	Resistor—270 ohms, ½ watt	.22
31024	Resistor—680 ohms, ½ watt	.22
38325	Resistor—680 ohms, 2 watts	.25
30150	Resistor—3,300 ohms, ½ watt	.20
30128	Resistor—12,000 ohms, ½ watt	.20
36714	Resistor—18,000 ohms, ½ watt	.20
13998	Resistor—22,000 ohms, ½ watt	.20
12454	Resistor—33,000 ohms, ½ watt	.20
30651	Resistor—270,000 ohms, ½ watt	.20
30648	Resistor—470,000 ohms, ½ watt	.20
13739	Resistor—1 meg., ½ watt	.20
12679	Resistor—2.2 meg., ½ watt	.20
30992	Resistor—10 meg., ½ watt	.20
31611	Screw—No. 8-32 milled head set screw for gear, Stock No. 33185	.02
14350	Screw—No. 8-32 square head set screw for drive drum	.03
37893	Shaft—Range switch knob shaft	.35
34132	Shaft—Shaft and gear for tone control	.55
37894	Shaft—Tuning shaft and flywheel	1.50
35634	Socket—Ballast tube resistor socket—"Remove terminals not required"	.35
31365	Socket—Dial lamp socket	.30
33742	Socket—Phono input socket	.25
31251	Socket—Tube socket	.25
31418	Spring—Drive cord and pointer cord spring	.05
33491	Switch—Radio-phono switch	.35
37050	Switch—Range switch	3.50
34602	Switch—Tone switch	1.25
35636	Transformer—First I.F. transformer	1.70
36615	Transformer—Second I.F. transformer	1.60
37891	Tube—Ballast tube resistor	3.00
2917	Washer—"C" washer for tuning drive	.03

SPEAKER ASSEMBLIES (92196-502)	
37947	Cone—Cone complete with voice coil
5118	Plug—3-prong male plug
37903	Transformer—Output transformer

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STOCK No.	DESCRIPTION CHASSIS ASSEMBLIES QU51 RC568	List Price
37053	Board—"Antenna-Ground" board	.20
37994	Bracket—Pulley bracket assembly (long bracket)	.45
37995	Bracket—Pulley bracket assembly (short bracket)	.30
35842	Calibrator—Drive drum calibrator	.10
32187	Capacitor—Electrolytic, 8 mfd., 150 volts	.65
34185	Capacitor—Electrolytic, comprising one section of 20 mfd., 450 volts, one section of 15 mfd., 450 volts, and one section of 20 mfd., 25 volts	1.65
12714	Capacitor—Air trimmer—medium 2-12 mmfd.	.50
37996	Capacitor—Mica trimmer, comprising 2 sections of 2.5-10 mmfd. each	.40
37059	Capacitor—Mica trimmer, comprising 3 sections of 2.5-10 mmfd. each	.60
33097	Capacitor—4.7 mmfd., ceramic	.35
35646	Capacitor—6 mmfd., silvered mica	.35
13200	Capacitor—10 mmfd., mica	.35
12722	Capacitor—18 mmfd., ceramic	.35
35644	Capacitor—47 mmfd., ceramic	.35
13141	Capacitor—47 mmfd., moulded	.35
12723	Capacitor—56 mmfd.	.35
36072	Capacitor—56 mmfd.	.30
35645	Capacitor—68 mmfd., ceramic	.35
30904	Capacitor—100 mmfd.	.25
12724	Capacitor—120 mmfd., moulded	.35
31813	Capacitor—120 mmfd., unmoulded	.30
12694	Capacitor—220 mmfd., moulded	.35
36616	Capacitor—220 mmfd., unmoulded	.30
12537	Capacitor—560 mmfd.	.35
35643	Capacitor—3000 mmfd.	.55
33584	Capacitor—.005 mfd.	.25
5148	Capacitor—.007 mfd.	.20
4937	Capacitor—.01 mfd.	.25
32787	Capacitor—.05 mfd.	.20
4839	Capacitor—0.1 mfd.	.30
12484	Capacitor—.25 mfd.	.30
37055	Coil—Antenna coil—"A", "B" and 31 meter bands	1.80
37056	Coil—Antenna coil—25 meter and 19-13 meter bands	1.00
37093	Coil—Oscillator coil—"A," "B," "C" band	.85
35624	Coil—Oscillator coil—19-13 meter band	.45
35625	Coil—Oscillator coil—25 meter band	.50
35626	Coil—Oscillator coil—31 meter band	.45
37057	Coil—R.F. coil—"A" "B" and 31 meter bands	1.60
37058	Coil—R.F. coil—25 meter and 19-13 meter bands	1.60
37151	Condenser—3 gang variable tuning condenser	6.25
37992	Control—Volume control and power switch	1.50
32634	Cord—Condenser drive cord (approx. 60-in. overall length)	.10
32634	Cord—Pointer drive cord (approx. 60-in. overall length)	.10
31259	Core—Adjustable core and stud assembly for 25 meter, 31 meter, and 19-13 meter bands oscillator coils	.15
35788	Core—Adjustable core and stud for ABC band oscillator coil	.15
35768	Drum—Drive drum—less calibrator	.45
38842	Flywheel—Flywheel and tuning knob shaft	1.85
30868	Plug—2 contact female plug for motor cable	.35
31470	Plug—6 contact female plug for speaker cable	.30
35641	Pulley—Drive cord pulley	.10
34139	Resistor—Voltage divider comprising one section of 5000 ohms, 6 watts, one section of 5000 ohms, 2½ watt, and one section of 195 ohms, 2 watt	.80
30492	Resistor—22,000 ohms, ½ watt	.20
12454	Resistor—33,000 ohms, ½ watt	.20
30650	Resistor—56,000 ohms, ½ watt	.20
14560	Resistor—100,000 ohms, ½ watt	.20
14583	Resistor—220,000 ohms, ½ watt	.20
30651	Resistor—270,000 ohms, ½ watt	.20
14983	Resistor—330,000 ohms, ½ watt	.20
30648	Resistor—470,000 ohms, ½ watt	.20
30692	Resistor—1 meg., 1/10 watt	.20
13730	Resistor—1 meg., ½ watt	.20
30649	Resistor—2.2 meg., ½ watt	.20
30992	Resistor—10 meg., ½ watt	.20
14350	Screw—No. 8-32 square head set screw for drum	.03
36107	Socket—7 contact socket located on rear apron of chassis	.20
31364	Socket—Dial lamp socket	.20
31251	Socket—Tube socket	.25
34864	Socket—Tuning tube socket	.25
31418	Spring—Drive cord spring	.05
31261	Spring—Retaining spring for oscillator coils core and stud assemblies	.01
37993	Switch—Range switch	3.50
35636	Transformer—First I.F. transformer	1.70
36615	Transformer—Second I.F. transformer	1.60
34183	Transformer—Power transformer—110-125-150-210-240 volts, 50-60 cycle	10.00
2917	Washer—"C" washer for tuning shaft	.03

CHASSIS ASSEMBLIES QU55, RC568A (Same as QU51, RC568 except the following)	
DELETE	
37053	Board—"Antenna-Ground" board
37994	Bracket—Pulley bracket assembly (long bracket)
37993	Switch—Range switch
ADD	
31373	Pulley—Drive cord pulley (⅛-in. dia.)
38307	Pulley—Pulley (⅛-in. dia.) and bracket assembly
38508	Switch—Range switch

STOCK No.	DESCRIPTION SPEAKER ASSEMBLIES (RL70N1)	List Price
13867	Cap—Dust cap	.03
32079	Coil—Field coil, 1060 ohms	2.10
11469	Coil—Neutralizing coil	.30
36145	Cone—Cone complete with voice coil	1.35
31539	Plug—5 prong male plug	.25
36146	Suspension—Metal cone suspension	.35
37997	Transformer—Output transformer	3.25

SPEAKER ASSEMBLIES (RL70N3)	
13867	Cap—Dust cap
36331	Coil—Field coil, 1630 ohms
11469	Coil—Neutralizing coil
36145	Cone—Cone complete with voice coil
5118	Plug—3 prong male plug
31539	Plug—5 prong male plug for speaker cable
36146	Suspension—Metal cone suspension
37997	Transformer—Output transformer

SPEAKER ASSEMBLIES (RL71A4)	
13867	Cap—Dust cap
36145	Cone—Cone complete with voice coil
5118	Plug—3 prong male plug
36146	Suspension—Metal cone suspension

MISCELLANEOUS ASSEMBLIES QU51	
36461	Button—Plug button
12537	Capacitor—560 mmfd., for QU51C only
13315	Capacitor—.025 mfd., for QU51C only
4870	Capacitor—.025 mfd.
30716	Clip—Tuning tube clip
36109	Control—Bass tone control
35629	Control—Treble tone control
36328	Cover—Compartment leads cover
33680	Cup—Lead needle cup
36155	Decal—Bass tone control decal
35387	Decal—Power—volume decal
36074	Decal—Radio—Phono switch decal
37939	Decal—Range switch decal
36386	Decal—Trade mark decal (His Master's Voice)
35392	Decal—Trade mark decal (RCA Victrola)
36156	Decal—Treble tone control decal
35391	Decal—Tuning decal
38225	Dial—Glass dial scale
38303	Hinge—Cabinet door hinge
30698	Hinge—Cabinet lid hinge
36593	Indicator—Station selector indicator
13103	Jewel—Pilot lamp jewel
35814	Knob—Range switch or radio-phono switch knob
35775	Knob—Tuning, volume control, treble or bass control knob
11891	Lamp—Dial lamp
33774	Mounting—Complete set of mounting hardware to mount one speaker
31470	Mounting—Motorboard spring mounting
37998	Plate—Dial plate complete—less dial, pointer, and tube clip
36395	Plug—7-pron, male plug for radio-phono cable
31048	Plug—Phono input cable plug for QU51M
38302	Pull—Door pull and screw
36248	Receptacle—Packaged needle holder
30128	Resistor—12,000 ohms, ½ watt
30492	Resistor—22,000 ohms, ½ watt
14023	Resistor—82,000 ohms, ½ watt
37800	Shade—Lamp shade
33083	Spring—Cabinet lid support spring
30900	Spring—Retaining spring for knobs
35831	Support—Cabinet lid support
38301	Switch—radio-phono switch
14609	Transformer—Input transformer for QU51M

MISCELLANEOUS ASSEMBLIES QU55 (Same as QU51 except the following)	
DELETE	
38303	Hinge—Cabinet door hinge
30698	Hinge—Cabinet lid hinge
37998	Plate—Dial plate complete—less pointer and tube clip
38302	Pull—Pull and screw
33083	Spring—Cabinet lid support spring
35831	Support—Cabinet lid support
ADD	
38704	Back—Cabinet back
38310	Board—"Antenna-Ground"
38382	Hinge—Cabinet lid hinge L.H.
38381	Hinge—Cabinet lid hinge R.H.
38309	Plate—Dial plate complete—less pointer and tube clip
36413	Pull—Door pull
30650	Resistor—56,000 ohms, ½ watt
35575	Spring—Cabinet lid support spring
36414	Support—Cabinet lid support L.H.
36693	Support—Cabinet lid support R.H.

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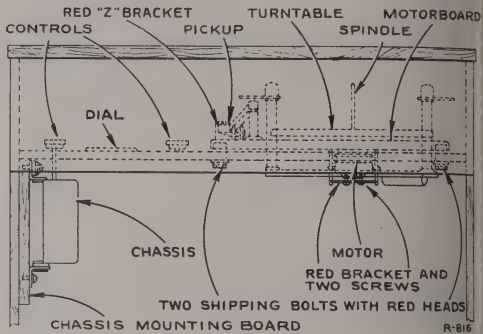
MODELS QU52C, QU52M

RCA MFG. CO., INC.

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC 507L) For Crystal Type Pickup (RC 507N) For Magnetic Type Pickup	
38923	Bracket—L. H. pulley support bracket complete with pulley	.30
38924	Bracket—R. H. pulley support bracket complete with pulley	.50
32556	Cable—Phono input cable (for magnetic type)	.75
36398	Cable—Shielded cable for radio-phono connector	.85
33014	Capacitor—Electrolytic, comprising 3 sections of 10 mfd., 450 volts, and 1 section of 20 mfd., 25 volts	1.90
12714	Capacitor—Air trimmer—medium—2-12 mmfd.	.50
34654	Capacitor—Mica trimmer, comprising 3 sections of 2.5-10 mmfd. each	.60
35646	Capacitor—6 mmfd., ceramic	.35
36012	Capacitor—15 mmfd., ceramic	.35
12896	Capacitor—15 mmfd., moulded mica	.35
35644	Capacitor—47 mmfd., ceramic	.35
13141	Capacitor—47 mmfd., moulded	.35
12723	Capacitor—56 mmfd., moulded	.35
30949	Capacitor—56 mmfd., unmoulded	.25
35645	Capacitor—68 mmfd., ceramic	.35
13057	Capacitor—68 mmfd., moulded	.35
12720	Capacitor—100 mmfd., moulded	.35
30904	Capacitor—100 mmfd., unmoulded	.25
12694	Capacitor—220 mmfd.	.35
12537	Capacitor—560 mmfd.	.35
35643	Capacitor—3,000 mmfd.	.55
4838	Capacitor—.005 mfd., 1,000 volts	.25
33584	Capacitor—.005 mfd., 1,200 volts	.25
4937	Capacitor—.01 mfd., 1,000 volts	.25
4870	Capacitor—.025 mfd.	.20
5196	Capacitor—.035 mfd. (for magnetic type)	.20
4886	Capacitor—.05 mfd.	.20
35632	Coil—Antenna coil—"A" band	1.10
35631	Coil—Antenna coil—spread band	.75
35623	Coil—Oscillator coil—"A" and "B" bands	.80
35624	Coil—Oscillator coil—19-13 meter band	.45
35625	Coil—Oscillator coil—25 meter band	.50
35626	Coil—Oscillator coil—31 meter band	.45
35619	Condenser—Variable tuning condenser	2.80
38409	Control—Tone control	1.00
38412	Control—Volume control and power switch	2.00
32634	Cord—Drive cord (approx. 27 in. overall lgth.)	.10
32634	Cord—Pointer cord (approx. 47 in. overall lgth.)	.10
35788	Core—Adjustable core and stud for "A" and "B" band oscillator coil	.15
31259	Core—Adjustable core and stud for "19-13 meter band," "25 meter band," and "31 meter band" oscillator coils	.15
35642	Dial—Drive drum calibrator dial	.10
35627	Drum—Drive drum—less calibrator dial	.55
35638	Flywheel—Tuning shaft flywheel	1.10
30868	Plug—2-contact female plug for motor cable	.35
5040	Plug—4-contact female plug for speaker cable	.30
35630	Pulley—Drive cord pulley—between tuning knob and range switch shafts	.10
30735	Resistor—560 ohms, 1 watt	.22
30436	Resistor—12,000 ohms, ½ watt	.20
36714	Resistor—15,000 ohms, ½ watt (for crystal type only)	.20
35595	Resistor—15,000 ohms, 3 watt	.35
3219	Resistor—18,000 ohms, ½ watt (for magnetic type)	.20
30492	Resistor—22,000 ohms, ½ watt	.20
12454	Resistor—33,000 ohms, ½ watt	.20
14138	Resistor—68,000 ohms, ½ watt (for magnetic type only)	.20
13734	Resistor—120,000 ohms, ½ watt	.20
30493	Resistor—150,000 ohms, ½ watt	.20
14020	Resistor—150,000 ohms, ½ watt (for magnetic type)	.20
30651	Resistor—270,000 ohms, ½ watt (for crystal type only)	.20
14983	Resistor—330,000 ohms, ½ watt	.20
30648	Resistor—470,000 ohms, ½ watt	.20
30648	Resistor—470,000 ohms, ½ watt	.20
13730	Resistor—1 meg., ½ watt	.20
30649	Resistor—2.2 meg., ½ watt	.20
30992	Resistor—10 meg., ½ watt	.20
14350	Screw—No. 8-32 sq. head set screw for drive drum	.03
38925	Shaft—Flywheel and tuning knob shaft	.25
31364	Socket—Dial lamp socket	.20
31251	Socket—Tube socket	.25
31418	Spring—Pointer cord or drive cord spring	.05
31261	Spring—Retaining spring for adjustable core and studs	.01
35622	Support—Tuning knob shaft and flywheel support	.20
38927	Switch—Phono switch	1.10
38926	Switch—Range switch	2.50
32827	Switch—Voltage switch	.35
35636	Transformer—First I.F. transformer	1.75
35628	Transformer—Second I.F. transformer	1.85
35588	Transformer—Power transformer—105-120 volts, 25 cycle	6.30
32911	Transformer—Power transformer—105-120 volts, 50-60 cycle	4.10
32852	Transformer—Power transformer—105-130, 140-160, 195-250 volts, 50-60 cycle	4.50

STOCK No.	DESCRIPTION	Unit List Price
	SPEAKER ASSEMBLIES (RL 70M-1)	
13867	Cap—Dust cap	.03
12079	Coil—Field coil	2.10
11469	Coil—Neutralizing coil	.30
36145	Cone—Cone complete with voice coil	1.35
5039	Plug—4-prong male plug for speaker	.30
37899	Transformer—Output transformer	2.25



FOR OTHER DATA ON PICKUPS, SEE MODELS QU51C, QU51M, AND QU55.

Lubrication.—Petrolatum or petroleum jelly should be applied t cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing record post bearings, and all other bearings of various levers an pulleys on underside of motorboard.

Do not allow oil or grease to come in contact with rubber part of the mechanism.

Service Hints.—

Before servicing the automatic record changer, inspect the assembl to see that all levers, parts, gears, springs, etc., are in good order an are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rota ing the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycl by pushing the index lever to "Reject" and revolving the turntable b hand. Six turntable revolutions are required for one change cycle.

When a record has been played the pickup moves out, anothe record is dropped down, and the needle is fed automatically into th starting groove of this record. If the needle fails to enter the startin groove, raise the right-hand side of the cabinet by inserting thi spacers under the feet on that side. If the needle slides over a fe grooves, raise the left-hand side of the cabinet in a similar manner.

The 10- and 12-inch records must be absolutely flat for smoot operation.

A pickup shorting switch, located under the motorboard, operate when the pickup is moved outward to the pickup rest.

Caution.—

1. This instrument is not recommended for playing 10-inch an 12-inch records in **mixed sequence.**

2. Never use force to start or stop the motor or any part of th record-changing mechanism or pickup arm.

3. Warped or damaged records may cause the mechanism to jam

4. Warped records may slide on one another when playing, result ing in unsatisfactory reproduction.

5. Do not leave records on the record-holder posts as they ma warp, particularly in warm climates. Warped records may be flat tened by placing them on a flat surface with a flat heavy articl placed on top of them for a few days.

6. Do not leave pickup needle resting on a record or on the turn table. Always place it on the pickup rest.

7. Do not insert a used needle in the pickup, and avoid turning needle after it has been used.

8. If for any reason the phonograph stalls, turn off the turntabl switch and remove the records from the record holder shelves. Star the turntable and allow the pickup arm to complete its cycle.

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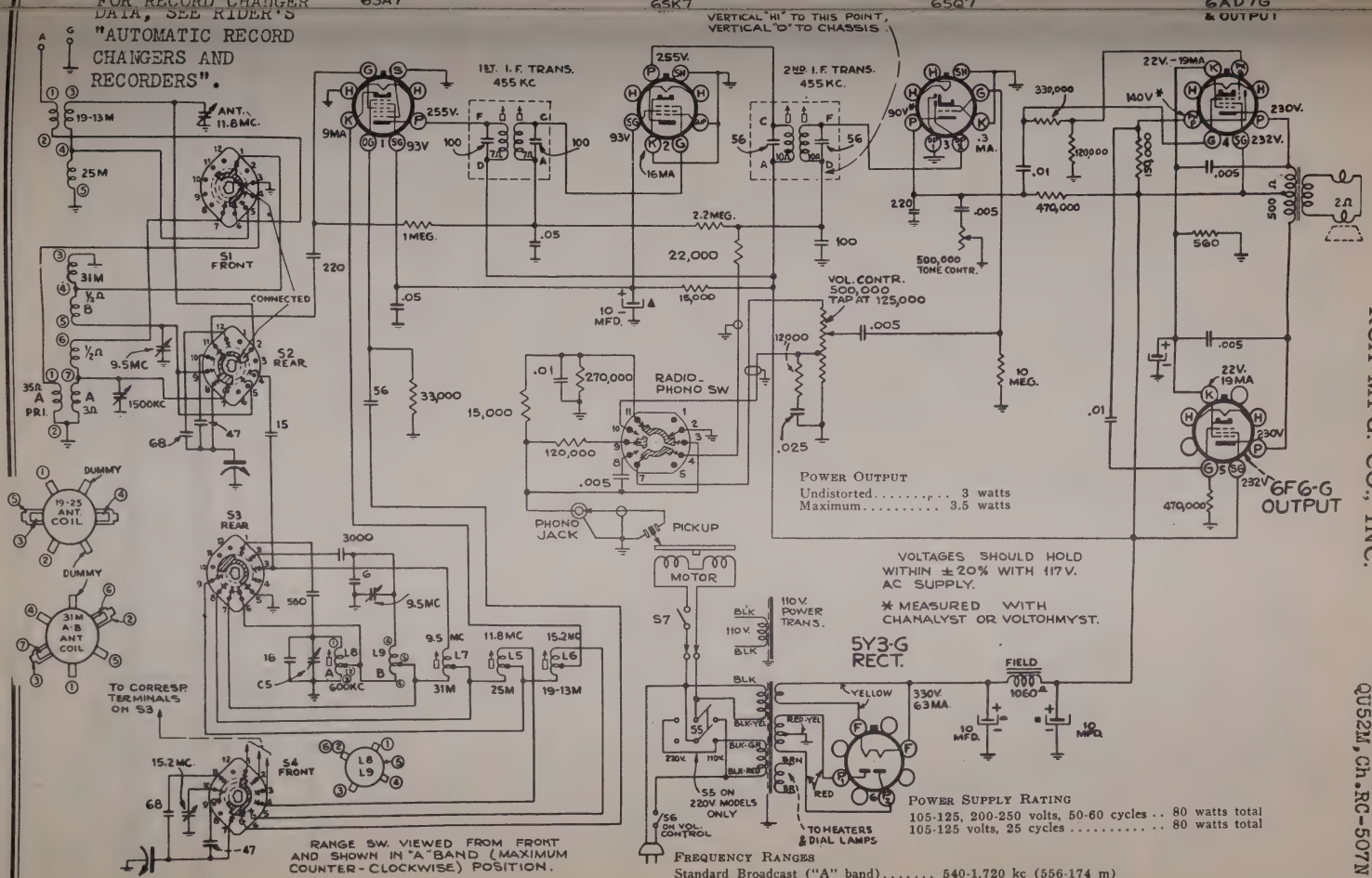


POWER SUPPLY RATING

105-125, 200-250 volts, 50-60 cycles	80 watts total
105-125 volts, 25 cycles	80 watts total

FREQUENCY RANGES

Standard Broadcast ("A" band)	540-1,720 kc (556-174 m)
Medium Wave ("B" band)	3.0-9.5 mc (100-31.6 m)
"31" Meter Spread Band	9.5-11.7 mc (31.6-25.6 m)
"25" Meter Spread Band	11.7-15.1 mc (25.6-19.9 m)
"19-13" Meter Spread Band	15.1-22.5 mc (19.9-13.3 m)

INTERMEDIATE FREQUENCY ..... 455 kc

The Magnetic Pickup Connections for QU52M are shown in a Separate Drawing.

John F. Rider

MODELS QU52C, Ch.RC-507L;
QU52M, Ch.RC-507N

RCA MFG. CO., INC.

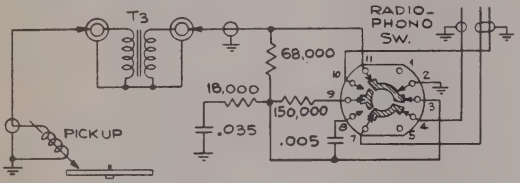
PHONOGRAPH (Automatic)

CRYSTAL PICKUP (QU52C)
Impedance..... 100,000 ohms at 1,000 c.p.s.
Average Output... 1.5 volts at 1,000 c.p.s. across 500,000 ohm load

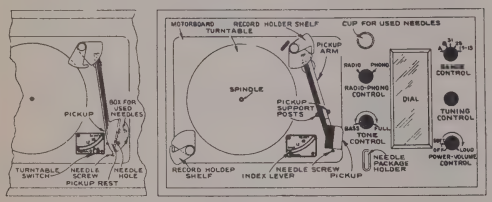
MAGNETIC PICKUP (QU52M)
Impedance..... 96 ohms at 1,000 c.p.s.
Average Output..... 0.14 volts at 400 c.p.s. across open circuit

LOUDSPEAKER (RL-70M1)
Type..... 12-inch Electrodynamic
V-C Impedance at 400 c.p.s..... 2.2 ohms

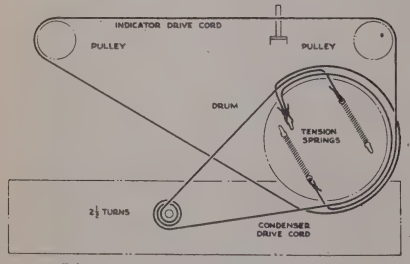
The QU52M is equipped with a magnetic pickup, the QU52C with a crystal pickup. The output of the crystal pickup is fed into the audio end of the receiver through a switch and compensating circuit. On instruments using a magnetic pickup, a transformer and compensating circuit are used between the pickup and the audio input (see schematic diagram). The transformer has two jacks, the larger one (primary) for input from the pickup and the smaller one (secondary) for output to the compensating circuit. The components of the compensating circuit are mounted externally to the chassis on a terminal board in the cabinet.



Schematic Showing Magnetic Pickup Connections (QU52M)



QU52C *QU52M*



Dial-Indicator and Drive Mechanism

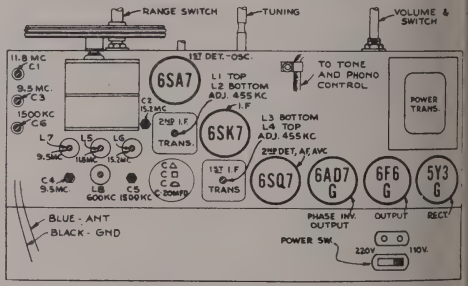
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	A	Quiet Point near 180°	L3 and L4 2nd I-F Trans.
2	6SA7 1st Det. grid in series with .01 mfd.				L1 and L2 1st I-F Trans.
3	Ant. lead in series with 300 ohms	11.8 mc	25M	138.5°	L5 (osc.) C1 (ant.)
4		15.2 mc		17°	C2 (osc.)*
5		Repeat steps 3 and 4			
6		15.2 mc	19-13M	156°	L6 (osc.)***
7		9.5 mc	31M	156°	L7 (osc.)*** C3 (ant.)
8		9.5 mc	B	11.5°	C4 (osc.)**
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C5 (osc.) C6 (ant.)
10		600 kc		150°	L8 (osc.) (Rock gang)
11		Repeat steps 9 and 10			

* Use minimum capacity peak if two can be obtained. Check image to determine that C2 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

**Peak at minimum position of plunger if two peaks can be obtained.

***Peak at minimum capacity if two peaks can be obtained.

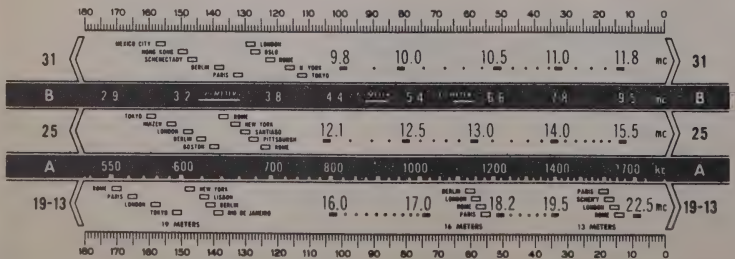
NOTE: Oscillator tracks above signal on all bands.



Precautionary Lead Dress.—

1. All leads between antenna coils and switch must be as short as possible and kept away from oscillator coil, leads and switches.
2. All oscillator coil leads must be kept apart from each other and other leads and parts.
3. Blue plate lead of 2nd I-F should be dressed under other leads and against chassis.

Loudspeaker.—To center the loudspeaker voice coil, first remove the front dust cover, then loosen the screws holding the spider assembly. Insert three narrow feelers into the air gap, and tighten the spider screws. Remove the feelers and fasten a dust cover in place with loudspeaker cement.



On actual Dial Scale the markings and calibration are rotated 90°

Calibration Scale

Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example, 150° on the calibration scale corresponds to approximately 600 kc on "A" band, etc.

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RCA MFG. CO., INC.

MODELS QU56C, QU56M
Ch. RC-566A

Pilot Lamp	Mazda 44

Power Supply Rating	
105-125 volts, 50-60 cycles	65 watts
105-125, 210-250 volts, 50-60 cycles	65 watts
105-125 volts, 25 cycles	65 watts

Frequency Ranges	
Standard Broadcast ("A" Band)	540-1720 kc (555-174 m)
Medium Wave ("B" Band)	2.3-7.0 mc (130-42.9 m)
Short Wave ("C" Band)	7.0-22.0 mc (42.9-13.6 m)
Intermediate Frequency	455 kc

Power Output	
Undistorted	1.4 watts
Maximum	2.3 watts

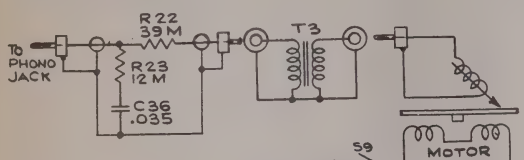
Loudspeaker	QU56M and C
Speaker No.	92156-104
Type	6-in. x 9-in. Elliptical PM
V.C. Impedance at 400 cycles	3.7 ohms

Phonograph	QU56M	QU56C
Type of Pickup	Magnetic	Crystal
Type of Mechanism	Manual	Manual
Turntable Speed	78 r.p.m.	

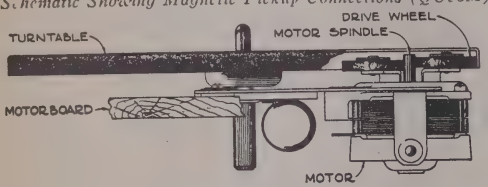
MODELS QU56C, QU56M
Ch. RC-566A

RCA MFG. CO., INC.

The QU56M is equipped with a magnetic pickup, the QU56C with a crystal pickup. The output of the crystal pickup is fed into the audio end of the receiver through a switch and compensating circuit. On instruments using a magnetic pickup, a transformer and compensating circuit are used between the pickup and the audio input (see schematic diagram). The transformer has two jacks, the larger one (primary) for input from the pickup and the smaller one (secondary) for output to the compensating circuit. The components of the compensating circuit are mounted externally to the chassis on a terminal board in the cabinet.



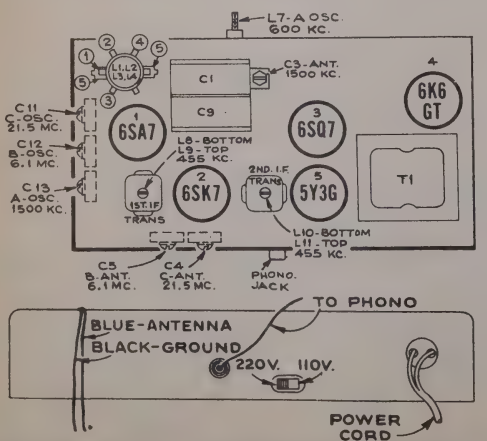
Schematic Showing Magnetic Pickup Connections (QU56M)

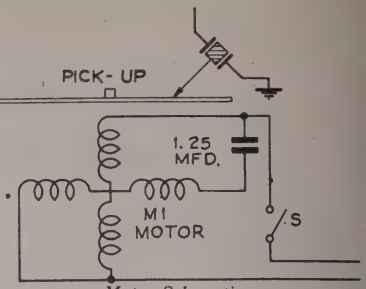


Motor Detail

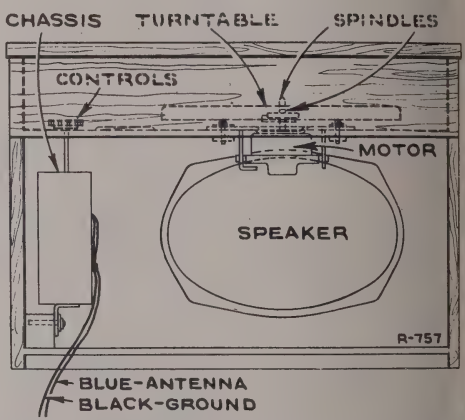
Precautionary Lead Dress.

1. "B" and "C" band antenna trimmer leads to be dressed away from "B" and "C" band oscillator trimmer leads.
2. Excess power transformer leads to be dressed between power transformer bell and rear apron of chassis.
3. R9 1st Audio grid lead, dressed down to chassis.
4. "B" Band Antenna coil lead to be wired so that it is dressed around "B" band section in a clockwise direction to coil lug in order to obtain proper "B" band tracking.
5. "C" band oscillator cathode lead to be dressed around coil in clockwise direction as shown in sample.
6. Dress tone control capacitor C23 up and away from A.C. switch leads.
7. Dress capacitor C25 from phono. socket to 6SQ7 socket up and away from all parts and leads.
8. Dress audio coupling C22 from volume control clear of A.C. wiring.
9. Red lead from A.C. switch to power switch to be dressed down against base.
10. Drive front gang mounting screw first.
11. Green lead to phono. socket dress up from chassis.
12. Dress A.C. switch leads to side apron.
13. Dress R20, R21 close to front apron.



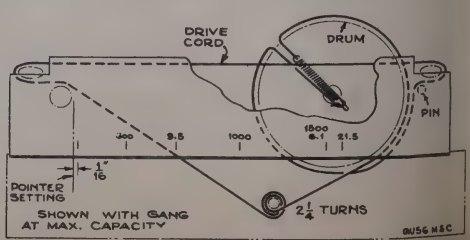


Motor Schematic



Steps	Range Switch	Connect high side test osc. to—	Tune test osc. to—	Turn radio dial to	Adjust following for max. peak output
1	"A"	I-F grid in series with .01 mfd.	455 kc	"A" band quiet point at high freq. end.	L10, L11 (2nd I-F trans.)
2		1st det. grid, in series with .01 mfd.			L9, L8† (1st I-F trans.)
3		Antenna lead in series with 200 mmf.	1,500 kc (200 m)	1,500 kc mark (5th mark)	C13, C3
4			600 kc (500 m)	600 kc mark (2nd mark)	L7** Rock gang
5			Repeat steps 3 and 4.		
6	"B"	Antenna lead in series with 300 ohms	6.1 mc	6.1 mc mark (5th mark)	C12* (osc.) C5 (ant.)
7	"C"		21.5 mc	21.5 mc mark (6th mark)	C11,* C4

* Use minimum capacity peak if two peaks can be obtained.
** Rock gang slightly for peak output.
† Do not readjust L11 or L10 when test oscillator is applied to the 6SA7 Grid.
NOTE: Oscillator tracks above signal on all bands.



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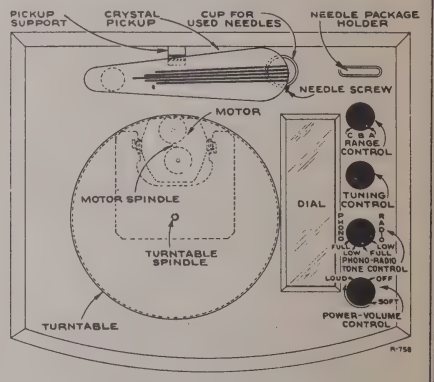
MODELS QU56C, QU56M
Ch. RC-566A

RCA MFG. CO., INC.

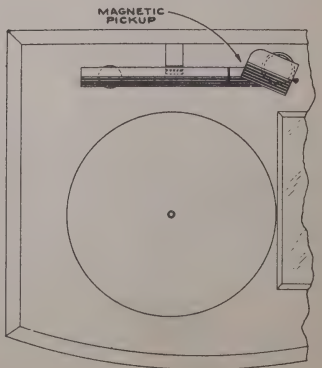
STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC 566-A)	
35761	Capacitor—Electrolytic—comprising 1 section of 20 mfd., 350 volts, and 1 section of 10 mfd., 350 volts	.90
32830	Capacitor—Mica trimmer—comprising 2 sections of 2-20 mmfd. each	.40
32829	Capacitor—Mica trimmer—comprising 3 sections of 5-60 mmfd. each	.55
12723	Capacitor—56 mmfd., moulded	.35
30949	Capacitor—56 mmfd., unmoulded	.25
30904	Capacitor—100 mmfd.	.25
12724	Capacitor—120 mmfd.	.35
12694	Capacitor—220 mmfd.	.35
12952	Capacitor—330 mmfd.	.35
12537	Capacitor—580 mmfd.	.35
31403	Capacitor—3,300 mmfd.	.60
31405	Capacitor—6,000 mmfd.	.75
4838	Capacitor—.005 mfd., 1,000 volts	.25
33584	Capacitor—.005 mfd., 1,200 volts	.25
4870	Capacitor—.025 mfd.	.20
4839	Capacitor—0.1 mfd.	.30
32821	Coil—Antenna coil—"A," "B," and "C" bands	1.35
38292	Coil—Oscillator coil—"A," "B," and "C" bands	1.00
38287	Condenser—Variable tuning condenser	2.50
38408	Control—Volume control and power switch	2.00
32634	Cord—Drive cord (approx. 42 in. overall lgth.)	.10
32713	Core—Adjustable core and stud for oscillator coil	.35
36237	Drum—Tuning condenser drive drum	.25
38331	Indicator—Station selector indicator	.25
38432	Plate—Dial back plate complete with pulleys—less dial	1.25
30868	Plug—2-contact female plug for motor cable	.35
5119	Plug—3-contact female plug for speaker cable	.25
31373	Pulley—Drive cord pulley (¼-in. dia.)	.08
32289	Pulley—Drive cord pulley (½-in. dia.)	.10
13988	Resistor—10 ohms, ½ watt	.20
32686	Resistor—680 ohms, 1 watt	.22
30152	Resistor—1,000 ohms, 1 watt	.22
43765	Resistor—12,000 ohms, 2 watt	.35
36714	Resistor—15,000 ohms, ½ watt	.20
12454	Resistor—33,000 ohms, ½ watt	.20
12412	Resistor—47,000 ohms, ½ watt	.20
13734	Resistor—120,000 ohms, ½ watt	.20
30648	Resistor—470,000 ohms, ½ watt	.20
13730	Resistor—1 meg., ½ watt	.20
32809	Resistor—3.9 meg., ½ watt	.20
30992	Resistor—10 meg., ½ watt	.20
38433	Shaft—Tuning knob shaft	.20
35772	Shield—Bottom end shield for power transformer	.30
35709	Shield—Top end shield for power transformer	.30
36932	Socket—Dial lamp socket	.20
35787	Socket—Phono input socket	.15
31251	Socket—Tube socket	.25
31418	Spring—Drive cord spring	.05
38431	Switch—Range switch	1.20
38434	Switch—Tone control switch	.95
32827	Switch—Voltage change switch	.35
35636	Transformer—First I.F. transformer	1.70
35628	Transformer—Second I.F. transformer	1.85
35758	Transformer—Power transformer — 105/125 volts, 25 cycle—less end shields	5.25
35757	Transformer—Power transformer — 105/125 volts, 50/60 cycle—less end shields	2.95
35759	Transformer—Power transformer — 105/125–210/225 volts, 50/60 cycle	4.00
33726	Washer—"C" washer for tuning shaft and pulley, No. 31373	.02
	PICKUP AND ARM ASSEMBLY (CRYSTAL TYPE)	
33591	Arm—Pickup arm shell only	.50
38435	Arm—Pivot arm and shaft complete	.70
34758	Bushing—Rubber bushing and metal bushing for pivot arm	.18
33122	Crystal—Pickup crystal complete	3.75
33529	Screw—Needle screw	.10
	PICKUP AND ARM ASSEMBLY (MAGNETIC TYPE)	
38420	Arm—Pickup arm shell only—less mechanism, support arm, pins and shielded cable	2.00
38436	Arm—Pickup support arm complete—less rubber bushings	1.00
14291	Armature—Pickup armature assembly	1.45
34550	Bushing—Rubber bushing for support arm	.05
32635	Cable—Pickup lift cable	.24
38215	Cable—Shielded pickup cable	.50
38216	Catch—Pickup head catch	.20
14672	Coil—Pickup coil	1.10
38197	Cover—Insulating cover	.10
38421	Head—Pickup head shell only	2.20
37291	Mechanism—Pickup mechanism complete	5.65
38198	Pin—Pin to attach head to arm (¼-in. dia.) Pkg. 2	.06
38199	Pin—Pin to attach support arm to shell (3/32-in. dia.)	.06
38196	Screw—Needle screw	.10
38217	Screw—Pickup mechanism support screw—Pkg. 2	.06
38213	Spring—Needle point weight adjustment spring	.10
38214	Stud—Shouldered stud to hold tension spring and head catch	.06

STOCK No.	DESCRIPTION	Unit List Price
	MOTOR ASSEMBLIES	
36986	Arm—Drive wheel or idler wheel support arm	.70
36988	Armature—Armature complete for 105-125 volts, 50 cycle motor	6.50
36987	Armature—Armature complete for 105-125 volts, 60 cycle motor	2.75
36989	Bushing—Motor mounting rubber bushings	.10
36991	Capacitor—Motor capacitor for 105-125 volts, 50 cycle motor	1.75
36990	Capacitor—Motor capacitor for 105-125 volts, 60 cycle motor	1.50
36993	Cover—Bakelite top end shell for 105-125 volts, 50 cycle motor	.50
36992	Cover—Bakelite top end shell for 105-125 volts, 60 cycle	.50
36985	Motor—105-125 volts, 50 cycle motor—less pulleys, capacitor and cradle	10.00
36984	Motor—105-125 volts, 60 cycle motor—less pulleys, capacitor and cradle	6.00
36995	Plate—Motor support plate complete with turntable bearing	1.50
36997	Spring—Idler arm tension spring	.06
36996	Spindle—Turntable spindle	.50
36994	Wheel—Rubber tired idler or drive wheel	.65
	AUTOMATIC SWITCH ASSEMBLIES	
34419	Base—Pickup arm mounting base	.35
36772	Cam—Automatic switch cam	.65
36771	Mounting—Pickup arm mounting	.20
36773	Plug—3-prong male plug	.15
36521	Spring—Cam tension spring	.05
38995	Switch—Automatic switch—less cam, base, and shaft	1.75
	SPEAKER ASSEMBLIES (92196-504)	
37947	Cone—Cone complete with voice coil	1.75
5118	Plug—3-prong male speaker plug	.25
37948	Transformer—Output transformer	1.65

QU56C



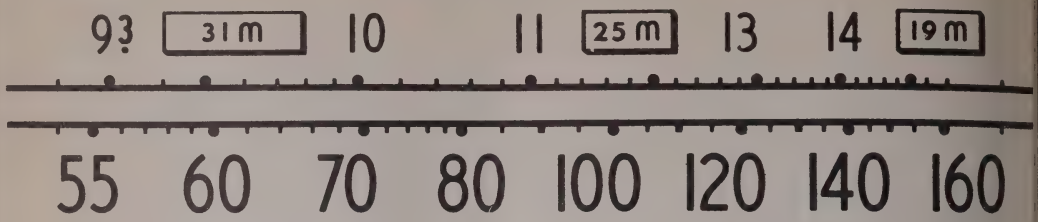
QU56M



ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

MODEL VHR212
Ch.RC-574

RCA MFG. CO., INC.



The dial scale drawing shown is a full size reproduction. It can be used as a direct substitute for regular dial scale in alignment procedure.

Push Button Adjustments

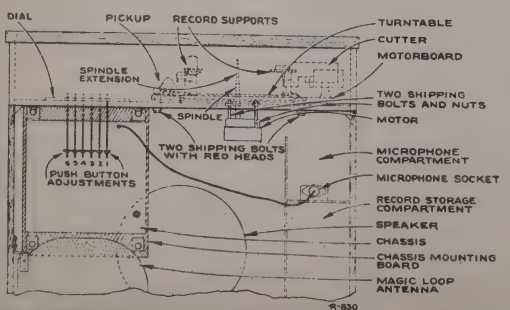
The push buttons connect to separate magnetite-core oscillator coils and separate ant. circuit trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow about five minutes warm-up period before making adjustments.

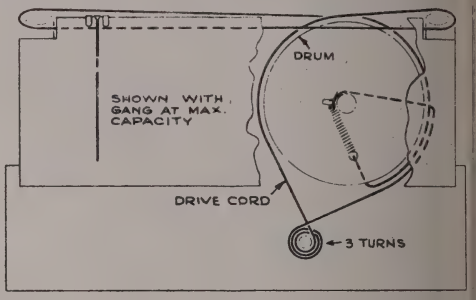
The procedure is as follows:

1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range switch to the broadcast position and manually tune in the first station on the list.
3. Turn range switch to push-button position and press in the left-hand button.
4. Adjust No. 1 oscillator core to receive the first station. To secure the best adjustment, rotate the Loop Antenna for least pickup, and adjust core for peak output.
5. Adjust No. 1 antenna trimmer capacitor for peak output on the first station.
6. Proceed in the same manner to adjust for the remaining stations.

On the 880 to 1,600 kc push-button, the higher frequency stations may be received with osc. core either in or out (oscillator frequency either 455 kc below or 455 kc above the station frequency). The adjustment with this core in its out position (oscillator frequency 455 kc above the station frequency) is the correct one.

NOTE: Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.





Public Address

The microphone, amplifier, and loudspeaker in the Home Recorder forms a public address (PA) system, and may be mixed with the phonograph or radio.

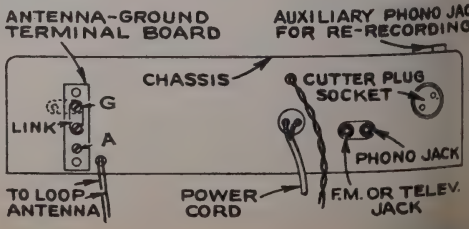
The various combinations are shown in the illustration of the service selector control.

Television

In areas where Television Broadcasts are available, a Television Attachment will reproduce the picture while the receiver reproduces the sound. The pin plug on the Attachment cord plugs into the jack on the apron of the receiver chassis. For Television operation, turn the Service Selector to "F-M Tel." A proper Television Antenna is essential.

Frequency Modulation

In areas where Frequency Modulation (F-M) Broadcasts are available, a Frequency Modulation Attachment will permit reception on this newly developed short wave system. The pin plug on the Attachment cord plugs into the jack on the apron of the receiver chassis. For F-M operation, turn the Service Selector to "F-M Tel." A proper antenna is essential.



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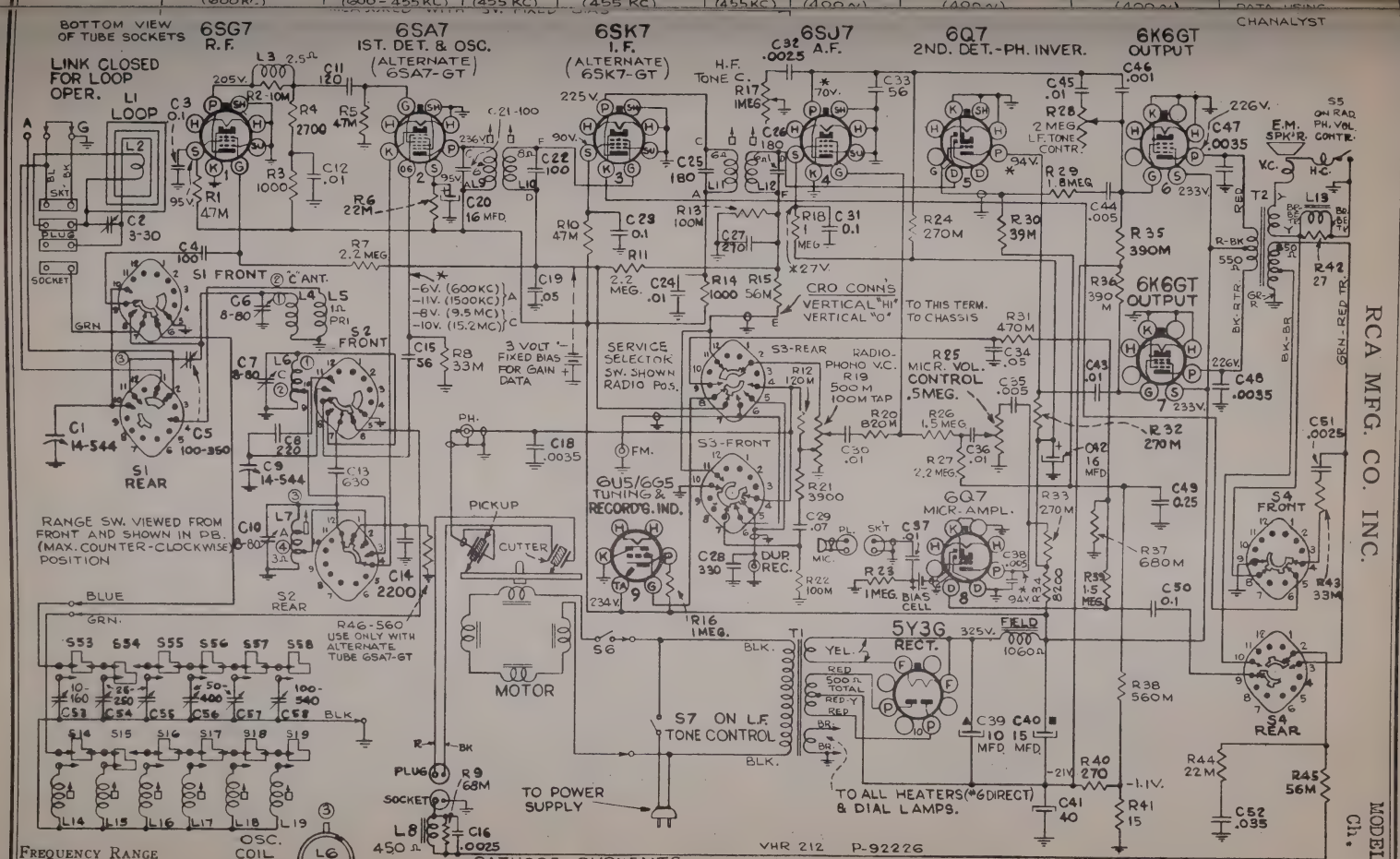

CATHODE CURRENTS

(1) 6SG7	10.9 MA.	(6) 6K6GT	19.5 MA.
(2) 6SA7	10.9 MA.	(7) 6K6GT	19.5 MA.
(3) 6SK7	13.4 MA.	(8) 6Q7	0.4 MA.
(4) 6SJ7	0.7 MA.	(9) 6U5/6G5	0.8 MA.
(5) 6Q7	0.5 MA.	(10) TOTAL RECT.	77.0 MA.

VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V. AC. SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

FREQUENCY RANGE

Broadcast "A" ..... 540-1600 kc
Short Wave "C" 9,400-15,400 kc

Intermediate Frequency ..... 455 kc

RCA MFG. CO. INC.

MODEL VHR212
Ch. RC-574

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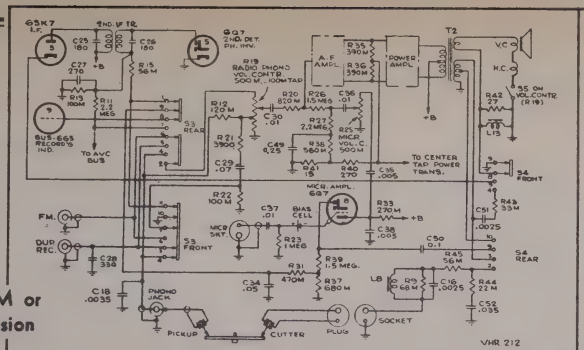
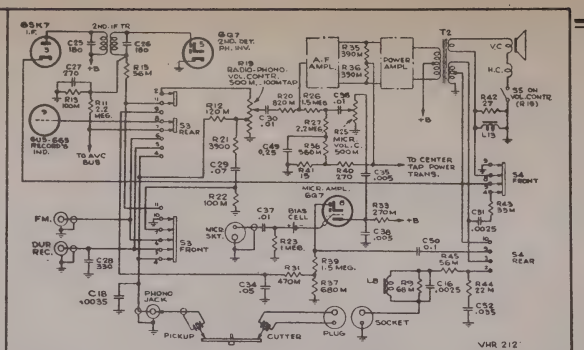
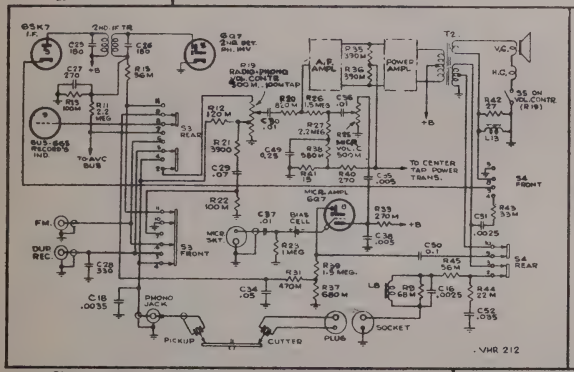


5. FM or Television

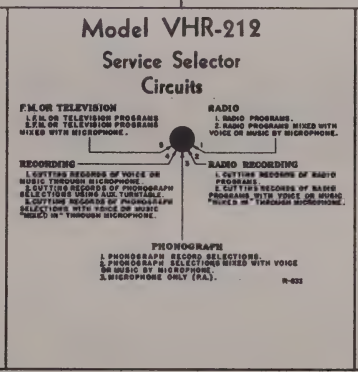


1. Radio



Model VHR-212

Service Selector Circuits


F.M. OR TELEVISION
1. F.M. OR TELEVISION PROGRAMS
2. F.M. OR TELEVISION PROGRAMS MIXED WITH MICROPHONE.
RADIO
1. RADIO PROGRAMS.
2. RADIO PROGRAMS MIXED WITH VOICE OR MUSIC BY MICROPHONE.
RECORDING
1. CUTTING RECORDS OF VOICE OR MUSIC THROUGH MICROPHONE.
2. CUTTING RECORDS OF PHONOGRAPH SELECTIONS BEING AUD. TURNTABLE.
3. CUTTING RECORDS OF PHONOGRAPH SELECTIONS WITH VOICE OR MUSIC "MIXED IN" THROUGH MICROPHONE.
RADIO RECORDING
1. CUTTING RECORDS OF RADIO PROGRAMS.
2. CUTTING RECORDS OF RADIO PROGRAMS WITH VOICE OR MUSIC "MIXED IN" THROUGH MICROPHONE.
PHONOGRAPH
1. PHONOGRAPH RECORD SELECTIONS.
2. PHONOGRAPH SELECTIONS MIXED WITH VOICE OR MUSIC BY MICROPHONE.
3. MICROPHONE ONLY (P.A.).
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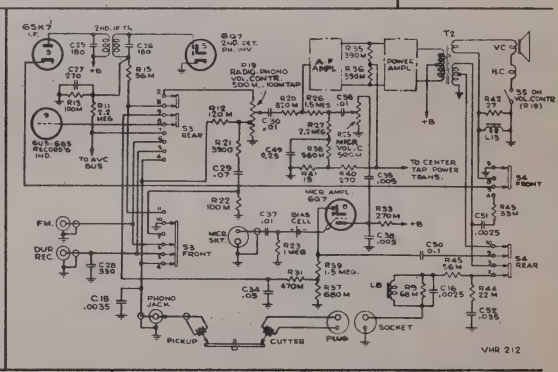


4. Recording

RECORD CHANGER (RP-161)

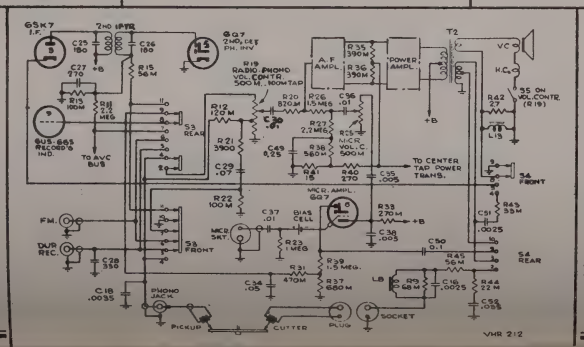
Record Capacity	Twelve 10-in., Ten 12-in.
Turntable Speed	78 r.p.m.
Type Pickup	Crystal

RECORDER (RMP-110)

Recording Head (Cutter)	Crystal
Turntable Speed	78 r.p.m.
Recording Disc Diameter	Up to 10 inches

LOUDSPEAKER (RL-70M-6)

Type	12-inch electrodynamic
Voice Coil Impedance	2.2 ohms at 400 cycles



2. Radio Recording

PILOT LAMPS

Dial	(2) Mazda No. 51, 6-8 V., 0.2 amps.
Indicator	Mazda No. 44, 6-8 V., 0.25 amps.
Compartment	Mazda No. 55, 6-8 V., 0.4 amps.

POWER OUTPUT

Undistorted	5 watts
Maximum	5.5 watts

POWER SUPPLY RATING

105-125 volts, 60 cycles	140 watts

3. Phonograph

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Electronic Voltmeter. — The electronic voltmeter in the Chanalyst or VoltOhmyst provides an unexcelled output indicator. It should be connected to the AVC bus, and the test-oscillator output adjusted to produce several volts of AVC.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. In the event that only the chassis is returned for service, and the cabinet with its tuning dial is left in the customer's home, the scale printed in this service note can be used as an accurate and convenient substitute for the regular dial.

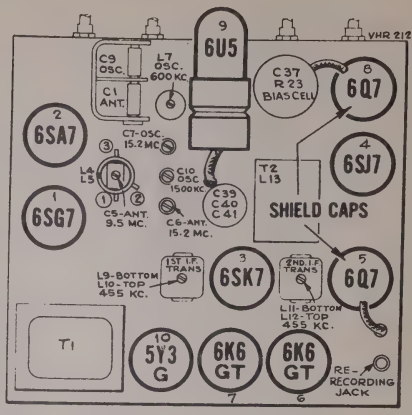
Using Tuning Dial.—

1. Remove glass dial from the cabinet.
2. With gang in full mesh, move the dial pointer to a point 1/16 inch to left of reference mark at left hand end of the dial backing plate.
3. Place the glass dial under the pointer so that the extreme left scale graduation coincides with the pointer. Use scotch tape to hold the glass dial in place.

"C" Band Reception.—For best reception on "C" band with an outside antenna, adjust the trimmer screw on the RF coil on the chassis. Turn screw carefully with a special screwdriver (RCA Stock No. 31031) while the receiver is tuned to a station in the 31-meter band, and make setting for best reception. If returning to internal antenna, close the link on the center terminal and adjust "C" band antenna trimmer for best reception on 31-meter band.

Steps	Connect test-osc. output to—	Tune test osc. to—	Turn radio dial to—	Adjust the following for maximum peak output—
1	I-F grid in series with .01 mfd.	455 kc	"A" band 540 kc	L11 and L12 (2nd I-F trans.)
2	1st Det. grid in series with .01 mfd.			L9 and L10 (1st I-F trans.)
3	A-Terminal in series with 47 mmfd. (link closed)	15.2 mc	"C" band 15.2 mc	C7 (osc.)* C8 (ant.)
4		9.5 mc	"C" band 9.5 mc	C5 (ant.) (Rock gang)
5		Repeat steps 3 and 4		
6	Green loop lead in series with 200 mmfd. (link closed)	1,500 kc	"A" band 1,500 kc	C10 (osc.)
7		600 kc	"A" band 600 kc	L7 (osc.)
8		Repeat steps 6 and 7		
9	Install and connect chassis in cabinet with antenna link closed. Tune in a radiated oscillator signal at 1,500 kc. and peak the "A" band trimmer C2 (on loop). Rock in L7 for peak output at 600 kc.			

*Use minimum capacity peak if two peaks can be obtained. Oscillator tracks 455 kc. above signal on all bands.



Alternate Glass Tubes

When using a 6SK7-GT glass tube in place of the metal tube 6SK7, a shield (Stock No. 39074) and a clip (Stock No. 39073) are required for shielding purposes. When using a 6SA7-GT glass tube in place of the metal tube 6SA7, a 560 ohm, ¼ watt resistor (Stock No. 12414) must be added in parallel with C-14 capacitor 2200 mmf. to prevent oscillation with push buttons in out position.

Critical Lead Dress:

1. Bus from "C" band oscillator trimmer C7 to coil should be dressed away from coil and other leads.
2. Yellow lead from oscillator coil to range switch should be dressed over coil terminals and away from other leads.
3. Red, green, and black oscillator coil leads should be dressed clear of each other and all other leads and parts.
4. "A" band tracking capacitor C13 should be dressed up and away from the coil and tuning shaft.
5. The green and blue push-button leads should be dressed clear of all other leads.
6. The grid leads to gang should be dressed away from all other leads and parts.
7. A.C. cord and motor lead should be dressed up and away from phono. and F.M. jack.
8. All excess power transformer leads should be dressed down towards chassis and back towards transformer.
9. Phono. cable should be dressed up away from tube sockets and service switch.
10. Dress cable from re-recording jack up and against end chassis apron.
11. Yellow lead at terminal No. 5 of 6Q7 amplifier should be dressed up and back towards pin No. 8.
12. Red lead to pin No. 6 of 6Q7 amplifier should be dressed against chassis.
13. Coupling capacitor C11 (120 mmfd.) should be dressed toward end apron.
14. R.F. coupling capacitor C4 (100 mmfd.) should be dressed away from terminal board on end apron.
15. R.F. plate choke should be dressed back and close to end shield away from C11 (120 mmfd.) capacitor.
16. All excess speaker leads should be dressed against chassis under phono. shield plate.
17. All leads and parts to cutter choke should be dressed away from phono. cable.
18. The .01 mfd. C43 capacitor from the plate of the 6Q7 to grid of 6K6GT should be dressed down against chassis.
19. The .0035 mfd. C47, C48 plate by-pass capacitors at 6K6GT sockets should be dressed against chassis.

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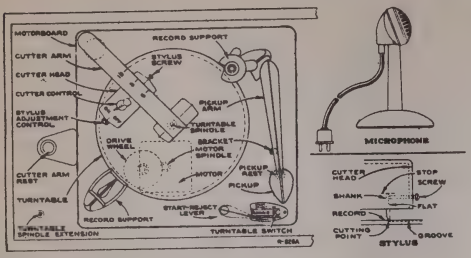
RCA MFG. CO., INC.
Recorder Operating Instructions



Preliminary.—

1. See that the phonograph pickup is on its rest, the turntable cleared of records, and the "start-reject" lever at "recording."

2. See that a perfect stylus is installed in the cutter head, the stylus holding screw tightened, and the stylus correctly adjusted as outlined under "Recorder Cutting Adjustments."

3. Pull off the spindle extension and place in hole at front left corner of compartment.

4. Place recording disc on the turntable with the spring stud engaged in one of the holes in the disc.

5. Lift the cutter arm well up and place the free end on the turntable spindle, making sure it is properly seated. Move the cutter head along the arm to the 6, 8, or 10 point so that the stylus is about ¼-inch from the edge of the recording disc.

6. Turn on power-bass control, just past the click of the power switch. Turn treble tone control fully clockwise. Set radio-phono volume control to soft, and microphone volume control fully counter-clockwise.

Radio Recording.—

1. Tune in the desired radio program.

2. Turn service selector to "Radio Recording," position 2.

3. Turn radio-phono volume control so the "Magic Eye" just closes on average passages. Do not turn too high. The "Magic Eye" should flicker throughout the recording. It electrically monitors the recording.

4. Push turntable switch "on."

5. Turn the cutter control "on" (clockwise) to record.

6. During the recording, listen to the loudspeaker, watch the "Magic Eye," and increase or decrease the radio-phono volume control if the broadcast level becomes too low or too high.

7. Use a fine hair brush occasionally to keep the area immediately ahead of the stylus free from chips and threads.

8. Before the cutter reaches its inner limit, turn the cutter control "off" (counter-clockwise) and remove the cuttings from the disc.

9. The recording may be "played-back" immediately without moving the cutter arm: Turn the service selector to "Phonograph," position 3; turn the power-bass control fully clockwise; place the pickup sapphire in the outer groove of the disc; and adjust the radio-phono volume control.

10. After the playback, lift the cutter arm and place on its rest.

11. If the recording is not satisfactory on playback, check "Recorder Cutting Adjustments."

Microphone Recording.—

1. Turn service selector to "Recording," position 4.

2. Turn radio-phono volume control to its "off" position to prevent feed-back and "howl."

3. To obtain an approximate setting of the microphone volume control before making a recording, talk into the microphone (which should be left plugged into its receptacle at all times) and adjust the microphone volume control so the "Magic Eye" closes with medium voice. By talking in a fairly level tone, and by maintaining the same distance between the microphone and lips, the microphone volume control will not require continual readjustment. Never turn the microphone volume control too high or damage to the cutter will result.

4. Start the turntable, place the cutter in position and turn the cutter control "on" (clockwise).

5. Talk into the microphone to make the desired recording and re-adjust the microphone volume control if required, as indicated by the "Magic Eye."

6. Before the cutter reaches its inner limit, turn the cutter control "off" (counter-clockwise), turn the microphone volume control counter-clockwise and play back the recording as desribed in "9" above

Re-Recording.—

A record may be re-recorded, or duplicated (that is, a "copy" may be made from an "original") by connecting the RCA Victrola Attachment (record player) to the "auxiliary phono jack" near the rear of the radio chassis. The "original" record is played on the RCA Victrola Attachment, and the "copy" is cut or recorded on the Home Recorder.

The procedure is as follows:

1. Turn the service selector to "Recording," position 4.

2. Connect the RCA Victrola Attachment pickup cable to the jack near the rear of the radio chassis.

3. Place the "original" record on the RCA Victrola Attachment, turn its volume control fully clockwise, and place its pickup on the "original" record.

4. Adjust the radio-phono volume control so the "Magic Eye" just closes on average passages, then lift pickup off the RCA Victrola Attachment.

5. Start the recorder by pushing turntable switch "on," placing the cutter in position and turning the cutter control "on."

6. Put the RCA Victrola Attachment pickup arm on the "original" record. The recorder will cut a duplicate of the record, which may be played-back as described previously.

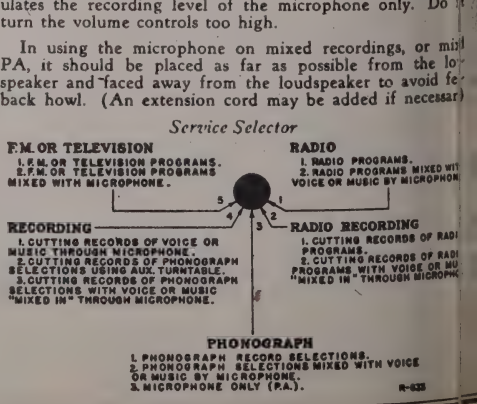
Mixed Recording.—

The RCA Home Recorders have complete flexibility for mixed recordings of radio, microphone, and phonograph. The various possible combinations are clearly shown in the illustration of the service selector control.

In mixed recordings, the radio-phono volume control regulates the recording level for radio, and for the RCA Victrola Attachment. The microphone volume control regulates the recording level of the microphone only. Do not turn the volume controls too high.

In using the microphone on mixed recordings, or mixed PA, it should be placed as far as possible from the loudspeaker and faced away from the loudspeaker to avoid feed-back howl. (An extension cord may be added if necessary)

Service Selector


F.M. OR TELEVISION
1. F.M. OR TELEVISION PROGRAMS.
2. F.M. OR TELEVISION PROGRAMS MIXED WITH MICROPHONE.
RADIO
1. RADIO PROGRAMS.
2. RADIO PROGRAMS MIXED WITH VOICE OR MUSIC BY MICROPHONE
5
1
4
2
3
RECORDING
1. CUTTING RECORDS OF VOICE OR MUSIC THROUGH MICROPHONE.
2. CUTTING RECORDS OF PHONOGRAPH SELECTIONS USING AUX. TURNTABLE.
3. CUTTING RECORDS OF PHONOGRAPH SELECTIONS WITH VOICE OR MUSIC "MIXED IN" THROUGH MICROPHONE.
RADIO RECORDING
1. CUTTING RECORDS OF RADIO PROGRAMS.
2. CUTTING RECORDS OF RADIO PROGRAMS WITH VOICE OR MUSIC "MIXED IN" THROUGH MICROPHONE.
6
PHONOGRAPH
1. PHONOGRAPH RECORD SELECTIONS.
2. PHONOGRAPH SELECTIONS MIXED WITH VOICE OR MUSIC BY MICROPHONE.
3. MICROPHONE ONLY (P.A.).
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MODEL VHR212
Ch.RC-574

Recorder Cutting Adjustments
IMPORTANT

The cutting point of the stylus must be in perfect condition in order to make good recordings.

The condition of the stylus point can not be determined by ordinary visual inspection. If the recordings are noisy or poor in quality, first try a new stylus.

The stylus cutting point can be ruined by dropping the cutter on the record, by cutting into the base metal of the recording blank, or by cutting into the paper label on the blank.

Always turn off the cutter control (counter-clockwise), before the stylus reaches the inner limit as it will repeat in the last groove and may wear into the base material, thereby ruining the stylus point.

Be sure the cutter arm is properly seated on the turntable spindle.

Never turn the radio-phono volume control or microphone volume control too high or injury to the cutter will result.

Keep the cutter control at "off" except when actually cutting a record.

To insert or change a stylus, lift the cutter arm, loosen the stylus screw, and insert the stylus as far as it will go in the hole at bottom of cutter head, with the **flat** on the shank of the stylus toward the screw. Tighten the screw against the flat on the shank. **Retighten the screw before making each recording.** Do not use pliers or wrench.

To adjust the stylus pressure for the correct depth and width of cut, the best procedure is to cut some "blank" grooves in a recording disc of the type that will be used. The stylus pressure can be regulated, by means of the stylus adjustment control knob on the end of the cutter head, to produce the correct thickness of the hair-like cuttings. The procedure is as follows:

1. See that the phonograph pickup is on its rest, the turntable cleared of records, the "start-reject" lever at "record," a perfect stylus correctly inserted in the cutter head, and the stylus screw firmly tightened.

2. Pull off the spindle extension and place in hole at front left corner of compartment.

3. Place the blank recording disc on the turntable, with the spring stud that protrudes from the turntable engaged with one of the three holes at inside of the disc. This prevents the disc from slipping during recording.

4. Turn on power-bass control just past the click of the switch. Turn radio-phono volume control to "soft" and microphone volume control fully counter-clockwise.

5. Turn "on" the turntable switch.

6. Lift the cutter arm well up, move it over, and seat it on the turntable spindle; set the cutter head so that the stylus is about ¼ inch from the edge of the recording disc. The graduation marks 6, 8 and 10 on the cutter arm show the position for the center line on the cutter head for commencing to cut records of 6 inches, 8 inches or 10 inches. See that the arm engages properly and is seated down on the turntable spindle.

7. Turn the cutter control on top of the cutter head in a clockwise direction. The stylus will begin to cut, and the cuttings should collect toward the center of the recording disc. If they collect toward the outside, the stylus is not correctly inserted, and must be adjusted by removal and reinsertion. If the threads continue to collect toward the outside, use a new stylus. Turn the cutter control counter-clockwise to stop cutting.

8. Examine the cuttings and the grooves in the disc.

The cuttings should be even, thin, hair-like threads about three-thousandths of an inch across or approximately the diameter of a human hair.

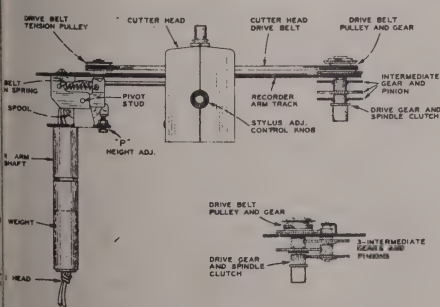
The groove width should almost equal, but not exceed, the distance between grooves. A magnifying glass is helpful in examining the grooves. **If the grooves are too shallow, the phonograph pickup sapphire will slide over them on play-back. If the grooves are cut too deep, rumble will be excessive.**

After examining the cuttings and the groove width, adjust the cutter pressure as required by means of the stylus adjustment control knob. Turn this **counter-clockwise to increase pressure** and increase size of cuttings. Turn **clockwise to decrease pressure** and decrease size of cuttings.

Check the new adjustment by running more blank grooves.

Check the cuttings and groove width each time a new stylus is inserted, and whenever a different type of recording disc is used.

Recorder Mechanism Data (RMP-110)



Cutter Arm

Drive: The cutter head is belt driven from the turntable spindle through the train of gears at the spindle end of the cutter arm. Tension on the drive belt is maintained by a spring on pulley at the pivot end of the cutter arm. Two fixed pulleys and one tension pulley guide the cutter head on the recorder arm track.

The cutter arm pivot shaft bearing should be so positioned with reference to the spindle that the spindle clutch fits easily on the spindle and does not bind as the turntable revolves.

Leads from the cutter crystal pass over a wooden pulley and down through the cutter arm pivot shaft, slack being taken up by a cable weight within the pivot shaft. The knot in the leads below the weight should be enclosed by the cavity in the weight so it will not rub or bind against the sides of the pivot shaft. This knot should be so positioned as to allow full movement of the cutter head without allowing the weight to come entirely out of the pivot shaft. Within the cutter head, the leads in the vicinity of the cutter crystal should be free and floating to prevent reaction on the crystal suspension.

Cutter Control: When the cutter control knob is in the "off" position, the cutter control cam, through a lever fastened to the cutter crystal, holds the cutter stylus clear of the recording blank. In the "on" position of the cutter control, the cam allows the cutter crystal and stylus to lower into position for recording and locks the drive belt between the belt locking stud and a lip on the cutter head frame so the cutter head travels with the belt. Correct clamping occurs when the flat cam spring almost touches the bottom of the cam detent. Adjustment of clamping may be accomplished by carefully bending the clamping lip on the cutter frame.

Replace the belt if it shows roughness, wear, or stretching. Keep the belt free of oil, grease, dirt, or other foreign matter.

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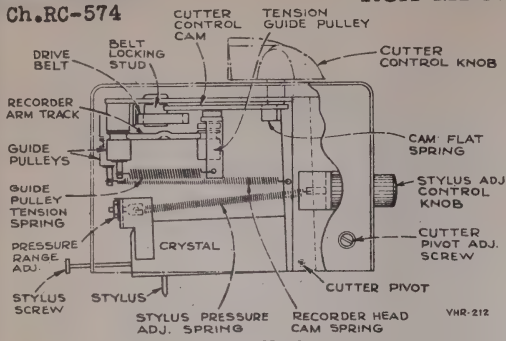


Cutter Head

Stylus Adjustment Control: The stylus adjustment control knob increases or decreases the tension of the stylus pressure adjustment spring, thereby opposing to a greater or lesser degree the tension of the recorder head cam spring and the pressure due to the weight of the crystal.

The range of the stylus adjustment control may be adjusted, if necessary, by turning the pressure range adjustment nut. Counter-clockwise increases, clockwise decreases stylus pressure for a given setting of the stylus adjustment control knob.

Correct adjustment of the stylus adjustment control knob for recording is outlined under "Recorder Cutting Adjustments."

Cutter Pivot Adjustment: The cutter crystal is supported on cone pivots. Pressure against these pivots is adjusted by the cutter pivot adjustment spreader screw. Correct adjustment is for no play or bind. Adjustment is best accomplished by starting with some play and relaxing the adjusting screw until the play just disappears.

Recorder Arm Height Adjustment: Adjust the recorder arm height adjustment screw "P" so that the cutter stylus cannot touch the turntable or the motorboard when the cutter control is on "off" and the recorder arm is suspended freely between the spindle and the cutter arm rest. The screw should not, however, prevent the cutter arm from seating firmly on the spindle. Tighten the locknut after adjustment is made.

Lubrication: Lubriplate No. 110 should be used on all gear and pulley studs, pivots, sliding and bearing surfaces of the recorder arm and cutter head. However, **do not** lubricate: the gear teeth, the wooden pulley bearing, the clamping surface of the belt locking stud, or the recorder arm track.

"Rumble".—

Any instrument with the sensitivity and tone response of this home recorder is capable of picking up the mechanical vibrations of the motor. However, due to many preventives incorporated in the design of this instrument, rumble will not be recorded if the following precautions are observed:

Leveling—See that the instrument is perfectly level.

Freeness—Be certain that the motorboard and mechanism is "floating" free from the cabinet. All four mounting springs should be at approximately equal tension.

Stylus—Make sure that a **perfect** stylus is **tightly** inserted in the cutter-head. Because both stylus and retaining screw are of hard steel there is a tendency towards loosening during cutting. Tightness should be checked before each cut.

Input Level — Set for sufficient input level so that the "Magic Eye" just closes on average passages.

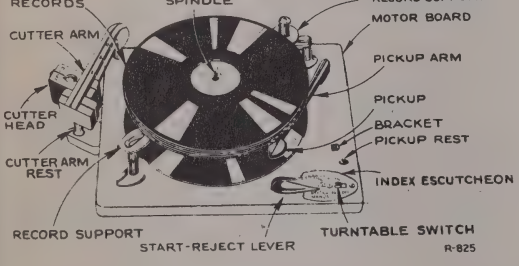
Tone Control Settings—During recording, the power-base control should be set for maximum lows, just beyond the click of the power switch. The treble tone control setting will depend on the degree of potential rumble present. For extreme cases, it should be set for minimum highs **during recording only,** in order that the low frequencies in the **selection** or **voice** may have a full chance to mask any possible rumble.

Depth of Cut—During recording, the shavings should be directed towards the spindle and prevented from obstructing the cutter path. The thickness of these shavings should be about that of human hair, or approximately .003 inches. An additional check on depth of cut is to inspect the recording under a magnifying glass. The groove width should approach but not exceed the distance between grooves. Depth of cut may be varied by means of the stylus adjustment control knob on the end of the cutter head.

Turntable Drive—If rumble persists, inspect the idler wheel (between **motor** spindle and turntable) for possible runout, flat spots, and scraping against bottom of turntable.

Recording Discs—Due to variations in material composition and hardness of different types of discs, the same cutting pressure adjustment will not give an equal depth of cut on all types. Thus, it may be necessary to change the adjustment previously set for one type of disc, when recording on a different type.

Automatic Record Changer Data (RP-161)



Manual Operation

1. See that the mechanism is out of cycle, with the pickup on its rest. If not, a "cycle" must be completed.
2. Set the "start-reject" lever at "manual."
3. Place record on turntable and push turntable switch "on."
4. Lift the pickup and set it down on the record.
5. When the record is finished, the pickup will swing in the eccentric groove, or run in the last groove, until the power is shut off.
6. Lift the pickup and place it on its rest.

Automatic Operation

Before starting automatic operation, see that the mechanism is out of cycle and that the pickup is on its rest. If it is not, start the motor and allow to run until the pickup comes down on its rest. Be sure the turntable spindle extension is in place and properly seated on the spindle.

1. Turn the "record support" in front left-hand corner to its position for 10-inch or 12-inch records as required. Turning the front record support automatically positions the rear support.
2. Load the records on the supports, with required selections upward, the last record to be played on top. **Be sure that the rear record support is pushed down.**
3. Push turntable switch "on."
4. Push the "start-reject" lever towards the back to the "start-reject" position, and let go. The first record drops on turntable, and the pickup moves onto the record.
5. When the last record is finished, the pickup moves out and comes down on its rest.
6. To reject a record being played, push the "start-reject" lever to "start-reject," and let go.
7. For automatic operation, each record must have the standard eccentric groove.

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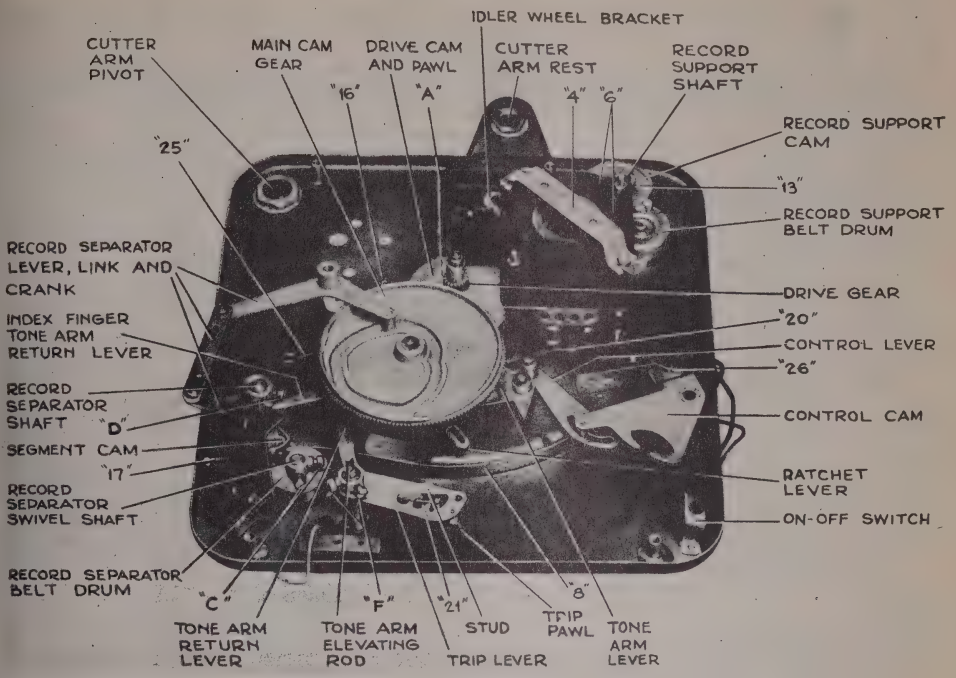
MODEL VHR212
Ch. RC-574



NOTE: *Bottom Support Bracket and Bearing Plate Removed*

Function of Principal Levers

Trip Lever
When the tone arm swings in the eccentric groove, the trip lever pawl acts on the ratchet lever to start the automatic cycle.

Ratchet Lever
Transfers motion from trip lever or control lever to start automatic cycle by allowing drive cam pawl to engage with sprocket of safety clutch.

Drive Cam Pawl and Sprocket
(This is the "safety clutch")
Engages turntable spindle to drive gear during cycle (see sketch "A").

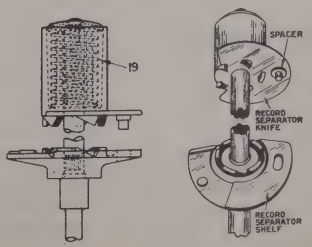
Drive Gear
Transfers rotation of turntable spindle to main cam and gear when the clutch is engaged.

Main Cam and Gear
Has four "tracks" which control horizontal and vertical motion of tone arm, and rotation of record separator knife and shelf. The bushing on this gear governs position of the ratchet lever (see sketch "A").

Record Separator Lever Train (Lever-Link-Crank)
Directs motion of separator knife and shelf.

Separator Knife
Separates record from stack and supports stack during cycle.

Separator Shelf
Supports stack during playing time.



Details of Record Separator

Control Cam and Lever
In **"recording-manual"** position, it disengages the ratchet lever and safety clutch so the mechanism cannot go into cycle.

In **"automatic"** position, it permits operation of the ratchet lever and safety clutch.

In **"start-reject"** position, it moves the ratchet lever away from the drive cam pawl, permitting the clutch to engage and thus start the change cycle.

Tone Arm Lever
Directs horizontal motion of tone arm.

Tone Arm Return Lever
Keeps tone arm moving in with receding tone arm lever and provides proper landing.

Tone Arm Elevating Lever
Directs vertical motion of tone arm (see sketch "G").

Tone Arm Elevating Rod
Transfers motion of elevating lever to tone arm.

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Cycle of Operation

The changer can be conveniently rotated through the change cycle by pushing the reject button and revolving the turntable by hand. Eight turntable revolutions are required for one change cycle. Hold idler wheel bracket back so idler wheel is away from turntable to permit easier manual rotation of the turntable.

Function	Explanation
Turn Record Support to 10" or 12" Position as Desired	1. Separator post positions itself by means of belt drive.
Place Records on Posts	1. Separator shaft is pushed down against its spring and carries segment-cam out of path of index finger (see sketch "D").
Turn "Start-Reject" Lever to "Start-Reject"	1. Control lever moves in and pushes ratchet lever out of eccentric step on main gear shaft, thus releasing drive cam pawl (see sketch "A"). 2. Drive cam pawl engages cam sprocket and it revolves carrying drive gear with it.
Tone Arm Rises	1. Main cam and gear revolves with drive gear. 2. Stud on tone arm lever rides in top track on main cam and directs movement of the lever. 3. Tone arm elevating lever rides up on ridge on main cam and pushes tone arm up by means of lift rod (see sketch "G").
Tone Arm Moves Out	1. Tone arm lever pushes on trip lever stud. 2. Trip lever moves out, carrying the tone arm out. 3. Tone arm return lever is carried along by trip lever stud, and by stud on main cam top track.
Record Knife Separates Bottom Record from Stack after Gauging Thickness of Record	1. Stud on separator lever follows main cam bottom track and directs the motion of the lever. 2. Through the separator link and crank, the separator lever turns the separator shaft. 3. Knife turns with shaft and strikes edge of bottom record. 4. Separator shaft continues to revolve and teeth on inner circumference of knife ride up on shelf teeth until knife is carried high enough against the action of spring 19 to move in over top of bottom record.
Record Drops to Turntable	1. Separator shaft continues to turn until knife supports stack of records and shelf moves out from under bottom record, which drops to turntable.
Tone Arm Moves In	1. Separator shaft reverses rotation. 2. Tone arm return lever pushes on trip lever stud. 3. Trip lever moves in, carrying the tone arm in.
Tone Arm Lowers Sapphire on to Record	1. Index finger on tone arm return lever moves against separator shaft to insure proper landing position. 2. Tone arm elevating lever rides down on main cam ridge thus lowering the elevating rod and the tone arm. 3. Separator shaft returns knife to original position and allows stack of records to rest on shelf.
Sapphire Moves In to Record Groove Record Begins to Play	1. Ratchet lever rides down into eccentric step on main gear shaft and blocks drive cam pawl, disengaging the pawl from drive cam sprocket. 2. Drive gear and main gear stop. 3. Tone arm lever moves into cam to maintain disengagement.

Cautions

Before servicing the automatic changer, inspect the assembly to see that all gears, cams, springs, levers, etc., are correctly assembled and in good working order.

1. Never use force to start or stop the motor or any part of the record changing mechanism.

2. Warped or damaged records may cause the mechanism to jam. **When jamming occurs, the safety clutch slips, causing a clicking sound.**

3. A cracked or chipped record may damage the sapphire.

4. Warped records may slide on one another while playing and result in unsatisfactory reproduction.

5. Do not leave the records on the record posts or on the turntable as they may warp, particularly in warm climates. Warped records may be flattened by placing them on a flat surface with a heavy flat article placed on top of them for a few days.

6. If, for any reason, the mechanism stalls, turn off the turntable switch and remove the records from the posts. Start the turntable by turning the switch on and allow the pickup arm to complete its cycle.

7. Do not tighten copper-plated, cone-pointed screws until final adjustment has been made.

8. When not recording, see that the cutter arm is in its rest position at the left of the turntable, and that the cutter head is pushed towards the front of the arm to give space for 12-inch records to drop onto the turntable.

9. This instrument will not play 10-inch and 12-inch records in mixed sequence.

Lubrication

The drive motor bearing is lubricated from felt washers at the bottom and top. A light machine oil should be used at these points.

On all bearing surfaces except the motor bearings Houghton Stayput No. 320 should be used. On all other surfaces Lubriplate No. 110 is recommended.

Do not oil the record separator shaft.

It is important that the drive motor spindle and the rubber tire on the idler wheel be kept clean and free from oil, grease, dirt, or any foreign material at all times. Any quick drying naphtha is satisfactory for cleaning these parts.

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Quick-Reference Chart for Automatic Record Changer Adjustments

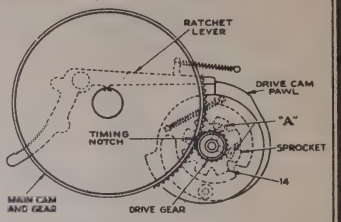
Mechanism jams. General irregularity of operation.

(Mechanism Timing)

"A"

With the ratchet lever and the pawl on the drive shaft cam in playing position as shown, remove the bottom support bracket. Remove the "C" washer on the main cam shaft and slip the cam down far enough that it can be rotated with respect to the drive gear. Then rotate it until the timing notch is positioned as shown. Put the main gear back in mesh with the drive gear, replace the "C" washer, place the elevating lever on the cam ridge. Make certain the separator lever train is in its correct position and replace the bottom support bracket.

Any jam will cause the safety clutch to slip and produce a clicking sound.

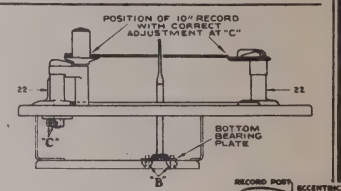


Turntable does not turn freely.

(Turntable Bottom Bearing Position)

"B"

Loosen the bottom bearing screws "B" and position the bottom bearing plate until the turntable revolves freely. Tighten the screws and check by applying a.c. to the turntable motor, allowing it to reach full speed, then pull idler away from turntable and note that the turntable continues to make at least twelve revolutions.



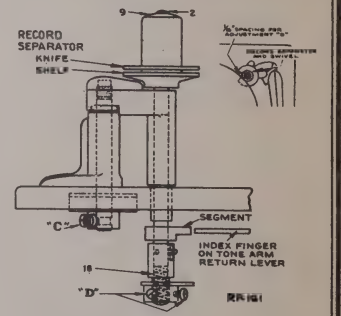
Records strike separator post or fail to stay on record shelf.

(Spacing Between Record Posts)

"C"

Turn the record support post to the ten-inch position. Loosen set screws "C," hold the separator post against the end of its slot in the motorboard and turn the belt drum to take up any slack in the belt. Tighten the zinc-plated, blunt-nosed screw and check to see that a ten-inch record fits the posts as shown. Then tighten the copper-plated, cone-pointed screw.

The twelve-inch position is adjusted after that of the ten-inch, by changing the support post to take the twelve-inch record, and turning the eccentric stop until the edge of the record is halfway up on the record support bevel while the other edge is against the record separator post.



Records do not drop at proper time.

(Record Shelf Timing)

"D"

Place a ten-inch record on the posts. Loosen the set screws "D" and turn the record separator shaft until the edge of the record-separating knife is one-sixteenth inch away from the edge of the record. The teeth on the inner circumference of the knife should be resting in the bottom of their slots at the time the adjustment is made. Tighten the zinc-plated screw first, run through cycle several times as a check, then tighten the copper-plated screw. Do not tighten set screws "D" enough to distort the housing of the separator shaft spring.

Sapphire does not land at correct point.

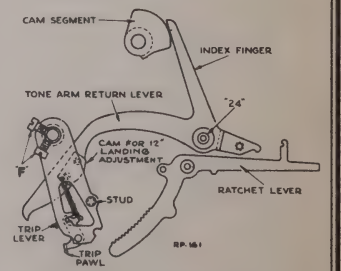
(Tone Arm Position With Respect To Trip Lever)

Correct dimension from nearest edge of sapphire to sapphire: For 10-inch records 4 3/4 inches; for 12-inch records 5 5/8 inches.

"F"

Place a ten-inch record on the turntable and rotate the changer through cycle until the sapphire is just ready to land. Make sure that the index finger of the pickup arm return lever is against the record separator shaft and that the tone arm trip lever stud is held firmly against the return lever. Loosen the set screws "F" and move the pickup arm to the correct landing position. See that there is a 1/32 inch clearance between the pickup arm bearing and the set screw collar. Tighten the zinc-plated screw, run the changer through cycle several times as a check, then tighten the copper-plated screw. Do not tighten screws "F" too tightly or the hollow pivot shaft will be distorted.

Twelve-inch landing adjustment: Make the ten-inch landing adjustment first. Then check landing on a twelve-inch record and adjust the cam on he tone arm return lever if necessary.

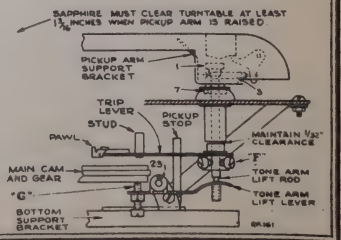


Top of pickup arm strikes stack of records or sapphire fails to clear the records on the turntable.

(Pickup Arm Height While In Cycle)

"G"

Rotate the changer through cycle until the pickup arm has risen to its maximum height above the turntable but has not begun to move out. At this point adjust the screw "G" until the distance between the turntable and the sapphire is one and three-sixteenth inch. Tighten the locknut.



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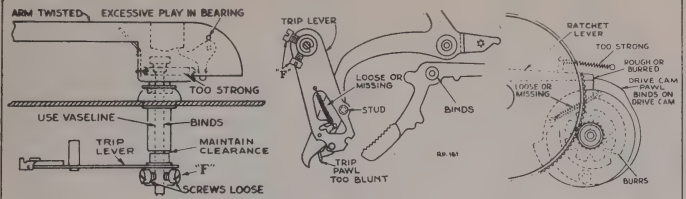
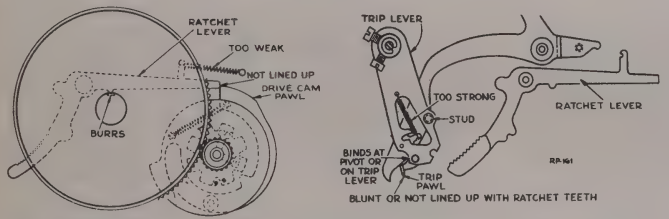
Fails to Trip

First check adjustment "F." Do not tighten screws "F" too tightly or the hollow pivot shaft will be distorted.

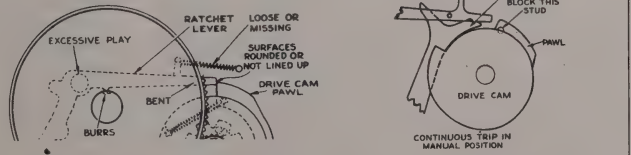


Trips Early



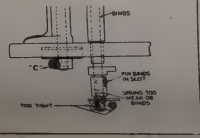
Trips Continuously

Bend the control cam flat spring for greater pressure.

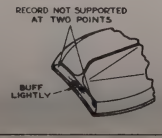


Repeats Playing of Last Record

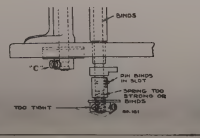
First check adjustment "C."



Record Stack Unsteady

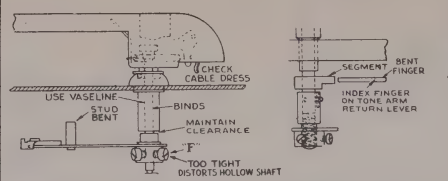


Tone Arm Returns to Rest Continuously



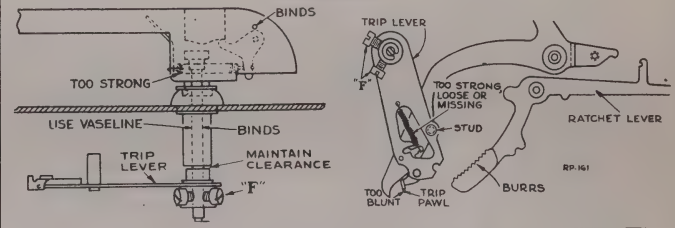
Lands Incorrectly

First check adjustments "F" and "C."



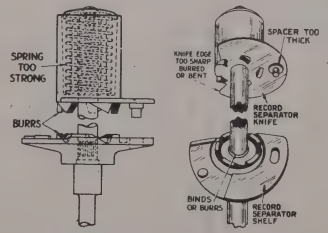
Repeats Grooves

First check adjustment "G."



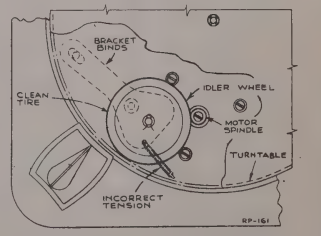
Jams Records

Record too thick, too thin, warped, or has rough edge.

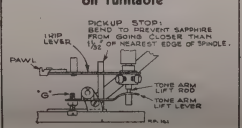


Slow Speed

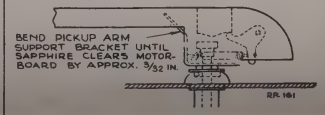
Turntable spindle binds on bottom bearing (adjustment "B").



Sapphire Strikes Spring Stud on Turntable


PICKUP STOP: BEND TO PREVENT SAPPHIRE FROM GOING CLOSER THAN 1½" OF NEAREST EDGE OF SPINDLE.
TRIP LEVER
PAWL
"G"
TONE ARM ROD
TONE ARM LIFT LEVER
RP-161

Sapphire Strikes Motorboard



Fails to Track or Distorts:

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binet Leveling.—

If the sapphire fails to enter the starting groove, raise the ht-hand side of the cabinet by inserting thin spacers under e legs. If the pickup slides over a few grooves, raise the t-hand side of the cabinet.

This changer is designed to operate **when the changer and binet are level.** Always make landing adjustments under ese conditions.

pphire Pressure.—

In these mechanisms, the correct pressure is approximately ounces, measured at the sapphire. Adjust the spring (3) the tone-arm base if necessary (see sketch "G").

Remove Pickup Arm.—

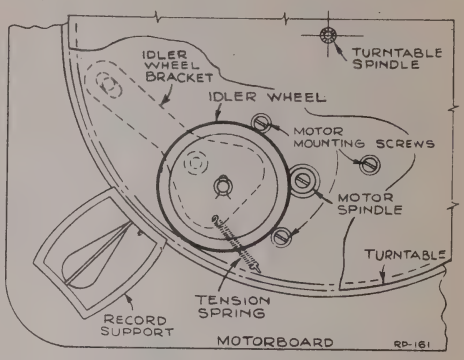
One of the tone arm bearings has a slotted head and can turned out to facilitate removal of the tone arm. Raise tone arm and loosen the bearing set screw. Turn the ring partly out through the hole in the side of the tone n and lift the arm off.

Repeat One Record.—

When checking for landing and tripping action, it is pos-le to play one record repeatedly by simply placing a weight the rear record post. A small pipe nipple that fits over top of the post is satisfactory.

To Remove the Turntable.—

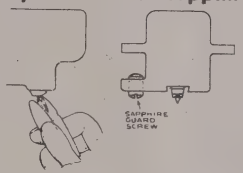
Insert 10-32 screws in the holes on either side of the spindle. Tap lightly on top of the spindle while pulling upward on the screws and turntable.



Turntable Drive

Replacement of Sapphire

An additional precaution against rough handlin the top of the sapphire is dipped in a rubbe cement (such as Goodrich "Plasticon") befor being inserted in the pickup. To remove the sapphire, grasp it firmly with a pair of tweezers, give it a few turns to loosen the cement and then pull it out. Much easier handling of the sapphire will result if the tweezers are



notched with a file as shown. Naphtha may be used as a thinner should difficulty with the rubber cement be experienced.

Before inserting the new sapphire it should be dipped in the rubber cement previously thinned with naphtha. After insertion clean the point with naphtha if there is any doubt as to the presence of cement.

Replacement Parts—Model VHR-212

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-574)	
39172	Arm—Adjusting arm for service selector switch	.40
36342	Board—"Antenna-Ground" board	.20
30786	Cap—Rubber cap for tuning tube	.15
37877	Capacitor—Electrolytic—16 mfd., 450 volts	.70
37888	Capacitor—Electrolytic comprising 1 section of 15 mfd., 400 volts, 1 section of 10 mfd., 400 volts, and 1 section of 40 mfd., 25 volts	1.65
38368	Capacitor—Adjustable—50-350 mmfd.	.25
38801	Capacitor—Mica trimmer comprising 3 sections of 8-80 mmfd. each	.55
12723	Capacitor—56 mmfd.	.35
12720	Capacitor—100 mmfd., moulded	.35
34699	Capacitor—100 mmfd., unmoulded	.30
12724	Capacitor—120 mmfd.	.35
14712	Capacitor—180 mmfd.	.30
38858	Capacitor—220 mmfd.	.35
12488	Capacitor—270 mmfd.	.35
12952	Capacitor—330 mmfd.	.35
38831	Capacitor—630 mmfd.	.45
14338	Capacitor—2,200 mmfd.	.50
37102	Capacitor—.001 mfd.	.25
34459	Capacitor—.0025 mfd.	.20
30303	Capacitor—.0035 mfd.	.40
33584	Capacitor—.005 mfd.	.25
4937	Capacitor—.01 mfd.	.25
5196	Capacitor—.035 mfd.	.20
32787	Capacitor—.05 mfd.	.20
14626	Capacitor—.07 mfd.	.25
4839	Capacitor—0.1 mfd.	.30
12484	Capacitor—0.25 mfd.	.30
31581	Cell—Bias cell	.25
39073	Clip—Tube shield clip	.05
34285	Clip—Tuning tube clip	.25
38788	Coil—Antenna coil—"C" band	.60
37064	Coil—Choke coil	1.10
38829	Coil—Coil and resistor—10,000 ohms	.40
38787	Coil—Oscillator coil	1.00
38800	Condenser—Variable tuning condenser	3.00
38409	Control—Microphone volume control	1.00
39171	Control—Radio volume control and switch	2.00
34662	Cord—Drive cord (approx. 43-in. overall lgth.)	.25
12006	Core—Adjustable core and stud for I.F. transformers	.15
35788	Core—Adjustable core and stud for oscillator coil	.15

STOCK No.	DESCRIPTION	Unit List Price
38359	Cup—Oscillator coil mounting cup	.20
38790	Drum—Drive drum	.45
31580	Holder—Bias cell holder	.15
35870	Indicator—Station selector indicator	.20
37017	Plate—Dial back plate complete—less pulleys, tuning tube clip, and "Indicator" screen	1.50
11824	Plug—2 contact female plug for microphone cable—less shell	.34
30868	Plug—2 contact female plug for motor cable	.35
36009	Plug—2 prong male plug for loop cable	.25
31572	Plug—3 contact female plug for power switch cable	.15
32641	Plug—3 prong male plug for selector switch cable	.10
5040	Plug—4 contact female plug for speaker cable	.30
39153	Plug—4 prong male plug for tone control cable	.15
32289	Pulley—Drive cord pulley	.10
33514	Receptacle—Phonograph and television socket	.25
11565	Resistor—15 ohms, ½ watt	.20
39380	Resistor—27 ohms, 1 watt	.22
36692	Resistor—270 ohms, 3 watt	.25
12414	Resistor—560 ohms, ½ watt	.20
14720	Resistor—1,000 ohms, ½ watt	.20
14024	Resistor—2,700 ohms, ½ watt	.20
30694	Resistor—3,900 ohms, ½ watt	.20
14250	Resistor—8,200 ohms, ½ watt	.20
30736	Resistor—22,000 ohms, 1 watt	.22
19081	Resistor—22,000 ohms, 2 watt	.25
12454	Resistor—33,000 ohms, ½ watt	.20
12266	Resistor—39,000 ohms, ½ watt	.20
12412	Resistor—47,000 ohms, ½ watt	.20
30787	Resistor—47,000 ohms, ½ watt	.20
30650	Resistor—56,000 ohms, ½ watt	.20
14138	Resistor—68,000 ohms, ½ watt	.20
14560	Resistor—100,000 ohms, ½ watt	.20
13734	Resistor—120,000 ohms, ½ watt	.20
30651	Resistor—270,000 ohms, ½ watt	.20
13479	Resistor—390,000 ohms, ½ watt	.20
30648	Resistor—470,000 ohms, ½ watt	.20
12486	Resistor—560,000 ohms, ½ watt	.20
30562	Resistor—680,000 ohms, ½ watt	.20
30963	Resistor—820,000 ohms, ½ watt	.20
30652	Resistor—1 meg., ½ watt	.20
12201	Resistor—1.5 meg., ½ watt	.20
11769	Resistor—1.8 meg., ½ watt	.20
30649	Resistor—2.2 meg., ½ watt	.20
37018	Screen—"Indicator" screen	.30
39175	Screen—Service indicator screen	.40

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Replacement Parts (Continued)

STOCK No.	DESCRIPTION	Unit List Price
14350	Screw—Square head set screw for arm No. 39172	.03
38803	Shaft—Tuning knob shaft	.25
39074	Shield—Tube shield	.10
38324	Sleeve—Rubber sleeve for arm No. 39172	.10
39173	Slider—Indicator slider complete—less screen	.45
31364	Socket—Dial lamp or compartment lamp socket	.20
35787	Socket—Phono input socket	.15
35165	Socket—Recorder head socket	.25
31251	Socket—Tube socket	.25
34864	Socket—Tuning tube socket	.25
31418	Spring—Drive cord spring	.05
38805	Switch—Range switch	1.80
39174	Switch—Service selector switch	2.25
39636	Transformer—Inst. I.F. transformer	1.70
37085	Transformer—Second I.F. transformer	1.55
39538	Transformer—Output transformer	5.50
35898	Transformer—Power transformer—105-120 volts, 50/60 cycle—less end shields	3.75
35969	Washer—"C" washer for tuning shaft	.02
	MOTOR ASSEMBLY	
39510	Bearing—Bottom bearing and bracket (4)	.45
39509	Field—Motor field coils and laminations—105-125 volts, 50/60 cycle (6)	7.75
39088	Motor—105-125 volts, 50/60 cycle	13.75
39508	Pulley—Motor rotor shaft pulley for 50 cycle operation	.30
39507	Pulley—Motor rotor shaft pulley for 60 cycle operation	.30
39506	Rotor—Motor rotor and shaft—less pulley	4.10
	PICKUP AND ARM ASSEMBLIES	
38608	Arm—Pickup arm shell only	1.00
38603	Arm—Pivot arm and shaft—less spring	.95
38610	Crystal—Pickup crystal cartridge, sapphire and shielded cable	5.00
38607	Cushion—Pusher rod cushion (rubber) (1)	.30
38458	Nut—Speed nut to hold cable in arm	.05
39387	Plate—Bottom plate for pickup arm—less screws	.10
38606	Rod—Pusher rod—less cushion	.50
39564	Sapphire—Sapphire only	2.00
38609	Screw—No. 6-40 x 1-in. headless set screw for pickup arm	.05
38605	Screw—No. 6-40 x 1-in. screw to mount crystal—Pkg. of 6	.02
38611	Screw—No. 6-40 x 3/16-in. headless set screw for pickup crystal (oval point)—Pkg. of 5	.10
39388	Screw—No. 6-40 x 3/16-in. screw for pickup arm bottom plate—Pkg. of 5	.02
38608	Screw—No. 6-32 x 9/32-in. headless set screw for pickup arm—Pkg. of 5	.03
30585	Spring—Pivot arm spring (3)	.06
38604	Stud—Pivot arm spring stud and nut	.10
	MOTORBOARD ASSEMBLY	
10129	Ball—3/16-in. dia. steel ball for bottom spindle	.02
3688	Ball—3/32-in. steel ball for tone arm bearing (7)	.02
39101	Base—Recorder arm base	.35
39092	Bearing—Turntable spindle bearing	.25
36616	Belt—Record support to separator belt (8)	.25
39091	Board—Motorboard with all riveted and welded posts, studs, and bearings—less all operating parts	9.00
39098	Brace—Angle brace, or bottom support bracket and bearing plate	.65
36832	Bracket—Idler wheel bracket and stud	.25
39105	Bushing—Collar to hold idler wheel bracket—less screws	.20
38620	Bushing—Separator shaft and bushing	.30
39097	Cam—Drive shaft cam and pawl—less spring	.65
38641	Cam—Main cam	1.50
38646	Cam—Record support cam	.40
39676	Cap—Record separator cap (9)	.50
39340	Clip—Retaining clip for idler wheel	.02
39104	Clip—Retaining clip for record arm pivot shaft	.04
38640	Drum—Record separator belt drum	.40
38617	Drum—Record support belt drum	.40
38680	Escutcheon—Index lever escutcheon	.30
38467	Knife—Record separator knife	1.10
38663	Lever—Index lever and bushing and screw	.45
39108	Lever—Index control lever and shaft	.95
38622	Lever—Link and lever assembly—fastens on separator shaft	.65
38661	Lever—Manual lever	.35
38658	Lever—Ratchet lever	.20
38633	Lever—Tone arm lever	.45
38631	Lever—Tone arm lift lever	.15
39751	Lever—Tone arm return lever and spring	.45
38619	Lever—Tone arm segment—fastens on separator shaft—less screw	.50
38632	Lever—Trip lever—less pawl spring	.65
39103	Mounting—Motor mounting hardware (3 req'd)	.10
38474	Pin—Drive pin for record support cam (13)	.06
38740	Pin—Drive pin for separator shaft and bushings	.05
39094	Pin—Recording pin for turntable	.10
38870	Plug—2 prong male for motor cable	.35
39811	Plug—2 prong male for recorder cable	.15
39096	Ratchet—Ratchet wheel for turntable spindle (14)	.35
39102	Rest—Recorder head rest	.35
38634	Rest—Tone arm rest	.05
39093	Spindle—Turntable spindle—top section only	2.20
39078	Spring—Idler arm tension spring	.05
38649	Spring—Index lever spring (riveted to motorboard) (26)	.20
38628	Spring—Main cam pawl spring	.10
38635	Spring—Ratchet lever spring (18)	.10
38468	Spring—Record separator spring (19)	.20
39095	Spring—Recording pin spring for turntable	.15
38642	Spring—Separator belt drum spring (17)	.10
38621	Spring—Separator shaft bushing (18)	.10
38634	Spring—Tone arm lever spring (20)	.10
39038	Spring—Tone arm return lever spring (25)	.10
39961	Spring—Trip lever pawl spring (21)	.10
38648	Support—Record separator support (2 used) (22)	.50
38645	Support—Record support and shaft	2.70
32875	Switch—Motor "On-Off" switch	.30
38615	Switch—Record separator swivel and bearing	.75
38093	Turntable—Record turntable complete with recording pin	5.25
20165	Washer—"C" washer for ratchet lever, tone arm lift lever, or tone arm push rod (23)	.05
2917	Washer—"C" washer tone arm lever, tone arm return lever, record support belt drum, link lever, or cam (24)	.03
38560	Washer—Felt washer for tone arm bearing	.04
38629	Washer—Felt washer for turntable bottom bearing	.04
36831	Wheel—Idler wheel	.75
	RECORDER ASSEMBLY	
10129	Ball—3/16-in. dia. steel ball for spindle clutch	.02
39131	Belt—Recorder head drive belt	.25
39116	Bracket—Bracket and stud for recorder head guide pulley	.30
39114	Bracket—Drive belt pulley bracket (tension pulley)	.30
39117	Bracket—Recorder arm frame bracket	.10
39119	Cam—Recorder head cam and knob shaft	.30
39106	Cover—Recorder arm cover	2.75
39109	Cover—Recorder head cover	1.00
39110	Cutter—Recorder head cutter with stylus screw	7.00
39113	Frame—Recorder arm frame	.75
39112	Frame—Recorder head frame	.95
39135	Gear—Drive gear and spindle clutch—less ball	.60
39133	Gear—Intermediate gear and pinion (3 used)	.65
39122	Knob—Recorder head "On-Off" knob—less screw	.25
39132	Knob—Stylus adjusting knob	.20
39138	Nut—Nut, washer, and lockwasher to hold recorder head cover	.05
39125	Pivot—Recorder arm pivot shaft and bracket	.75
39123	Plate—Recorder arm bottom plate and drive gear bearing	.10
39128	Pulley—Drive belt pulley—located at pivot end of arm	.20
39134	Pulley—Drive belt pulley and gear	.55
39129	Pulley—Recorder head guide pulley (small—3 used)	.30
39136	Screw—Recorder arm height adjustment screw and nut	.05
14427	Screw—Set screw for "On-Off" knob	.02
39111	Screw—Stylus screw	.10
39126	Screw—4-32 special screw for stylus adjustment	.40
39115	Screw—No. 6-32 x 1¼-in. round head screw to adjust cutter pivot friction or play	.10
39130	Spool—Recorder cable spool—(wood)	.30
39120	Spring—Recorder head cam spring	.05
39675	Spring—Stylus pressure adjusting spring	.07
39677	Spring—Tension spring for drive belt pulley	.07
39676	Spring—Tension spring for guide pulley	.05
39121	Stud—Belt locking stud for recorder head—actuated by cam	.10
39118	Stud—Recorder arm pivot stud and cable pulley shaft	.05
39137	Washer—"C" washer to hold drive belt drive pulley	.04
38475	Washer—"C" washer to hold intermediate drive gears, and drive belt pulley	.03
31605	Washer—"C" washer to hold large guide pulley bracket, small guide pulleys, and large guide pulley	.01
2917	Washer—"C" washer to hold recorder head cam shaft	.03
39139	Washer—1 set flat washers for drive gear mounting	.06
39127	Weight—Recorder head cable weight	.20
	MICROPHONE ASSEMBLIES	
39330	Base—Microphone base only	1.00
39332	Cover—Front cover and screw	.10

Replacement Parts, (Continued)

STOCK No.	DESCRIPTION	Unit List Price
39332	Crystal—Microphone crystal and holder encased in sponge rubber ring	4.65
39334	Handle—Microphone handle (wood)—less base and hooking	.65
39333	Housing—Crystal housing	.90
14793	Plug—2 prong male plug for microphone cable	.25
5042	Screw—No. 8-32 x ¼-in. cup point set screw	.03
	SPEAKER ASSEMBLIES (RL-70M-6)	
13867	Cap—Dust cap	.02
12079	Coil—Field coil—1,060 ohms	2.10
11469	Coil—Neutralizing coil	.30
36145	Cone—Cone complete with voice coil	1.35
6039	Plug—4 prong male plug for speaker	.30
36146	Suspension—Metal cone suspension	.35
	MISCELLANEOUS ASSEMBLIES	
X1214	Baffle—Baffle board and grille cloth	2.00
36661	Button—Plug button	.10
38376	Button—Push button	.20
38854	Capacitor—Mica trimmer—3-30 mmfd.	.35
36494	Capacitor—Mica trimmer comprising 1 section of 10-180 mmfd., 2 sections of 25-380 mmfd., 2 sections of 50-400 mmfd., and 1 section of 100-540 mmfd.	1.10
36462	Clamp—Dial clamp	.10
36663	Coil—Loop primary coil	.40
3837	Coil—P.B. oscillator coil—high frequencies	.30
3763	Coil—P.B. oscillator coil—low frequencies	.30
38464	Control—H.F. tone control and power switch	1.00
38462	Control—L.F. tone control and power switch	1.50
38671	Core—Adjustable core and stud for P.B. oscillator coils	.55
36838	Cover—Compartment lamp lead cover	.20
38472	Decalcomania—Control panel decal	.15
37148	Decalcomania—"Power-Base" decal	.05
36366	Decalcomania—Trade mark decal (His Master's Voice)	.25
35467	Decalcomania—Trade mark decal (RCA Victrola)	.05
37147	Decalcomania—"Treble" decal	.05
39471	Dial—Glass dial scale	1.10
36397	Escutcheon—Dial scale escutcheon—less dial	.55
38376	Escutcheon—Push button escutcheon—less buttons	.75
39352	Hinge—Cabinet door hinge	.35
30698	Hinge—Cabinet lid hinge	.95
13103	Jewel—Pilot lamp cap	.15
35814	Knob—Control knob	.25
5117	Lamp—Compartment lamp	.25
11785	Lamp—Dial lamp	.15
11891	Lamp—Indicator lamp	.17
38806	Loop—Antenna loop complete	3.75
34317	Marker—Station call letter markers	.35
39563	Mounting—Spring mounting hardware for motorboard (2 required)	.16
38580	Pivot—Pivot and support located on top of loop frame	.30
31567	Plug—3 prong male plug for power switch cable	.15
37800	Shade—Compartment lamp shade	.40
36999	Socket—2 contact female socket for loop leads	.25
36422	Socket—3 contact female socket for selector switch cable	.25
38853	Socket—4 contact female socket for tone control cable	.20
34053	Spring—Retaining spring for buttons	.02
30900	Spring—Retaining spring for knobs	.05
33083	Spring—Spring for lid support No. 35831	.50
35575	Spring—Spring for lid support No. 34414	.60
37114	Spring—Spring for lid support No. 37113	.35
34414	Support—Cabinet lid support for production using 1 section lid	1.35
35831	Support—L.H. lid support for production using 2 section lid	1.50
37113	Support—R.H. lid support for production using 2 section lid	1.35
35831	Support—Support and bracket—located on bottom of loop frame	.25
38575	Switch—P.B. selector switch	3.85

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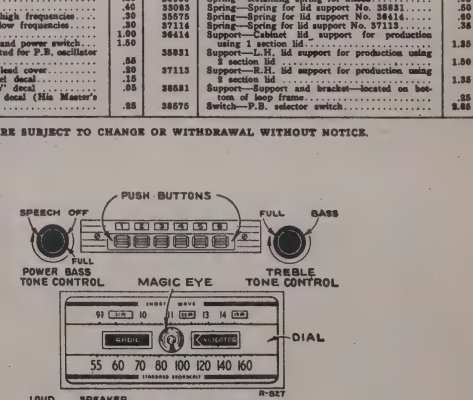

CHASSIS (RC-574)

Height (inches)	2⅞
Width (inches)	11¼
Depth (inches)	10½
Tuning Drive Ratio	18-1

CABINET DIMENSIONS

Height (inches)	34
Width (inches)	33⅞

RCA MFG. CO., INC.

MODELS 520(1st Prod)
510(3rd Prod)
Ch.RC-1003D

FREQUENCY RANGE..... 540-1,720 kc
Intermediate Frequency..... 455 kc

POWER SUPPLY RATINGS
105-125 volts, direct current, or 50-60 cycles..... 30 watts

POWER OUTPUT (125 volts, 60 cycle supply)
Undistorted..... 0.8 watts Maximum..... 1.2 watts

LOUDSPEAKER (RL-86-B1 or RL-86-B4)..5 inch electro-dynamic

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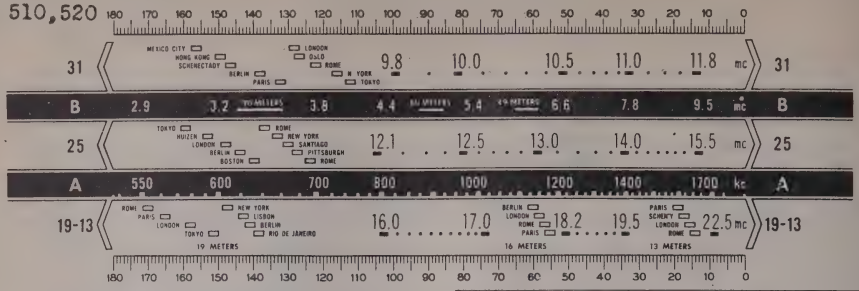
MODEL QB1
MODELS 510,520

RCA MFG. CO., INC.



MODEL QB1 ALIGNMENT

* Use minimum capacity peak if two can be obtained. Check image to determine that C14 has been adjusted to the correct peak by tuning receiver to approximately 14.29 mc (29°) where a weaker signal should be received.

NOTE: Oscillator tracks above signal on all bands.

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
	On oscillator-circuit cores and trimmers, if two peaks can be obtained, use the one of minimum inductance or minimum capacity.				
1	1st I-F grid cap, in series with .01 mfd.	455 kc	A	Quiet point near 180°	L15 and L16 2nd I-F transformer
2	1st Det. grid, in series with .01 mfd.				L13 and L14 1st I-F transformer
3	Ant. lead in series with 300 ohms	11.8 mc	25M	138.5°	L11 (osc.) C1 (ant.)
4		15.2 mc		17°	C14 (osc.)*
5		Repeat steps 3 and 4.			
6		15.2 mc	19-13M	156°	L12 (osc.)
7		9.5 mc	31M	156°	L10 (osc.) C2 (ant.)
8		9.5 mc	B	11.5°	C7 (osc.)
9	Ant. lead in series with 200 mmf.	1,500 kc	A	26°	C4 (osc.) C3 (ant.)
10		600 kc		150°	L8 (osc.) (Rock gang)
11		Repeat steps 9 and 10.			

MODEL 510, 520 ALIGNMENT PARTS LIST

Pre-Setting Dial. — With gang condenser in full mesh, the pointer should be adjusted so that it is vertical.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	I-F grid, in series with .01 mfd.	455 kc	Quiet point 1,600 kc end of dial	C8, C9 2nd I-F Transformer
2	1st Det. grid in series with .01 mfd.			C6, C7 1st I-F Transformer
3	Ant. terminal in series with 100 mmfd.	1,720 kc	Gang at minimum	C3 (osc.)
4	Radiated signal 1,300 kc		Signal Frequency	C1 (ant.)
5	Repeat steps 3 and 4.			

STOCK No.	DESCRIPTION	Unit List Price
	CHASSIS ASSEMBLIES (RC-1003-D)	
35097	Can—Shield can for 1st I.F. transformer	.30
35332	Can—Shield can for 2nd I.F. transformer	.30
35348	Capacitor—Electrolytic comprising 1 section of 20 mfd., 150 volts, and 1 section of 30 mfd., 150 volts	.95
37359	Capacitor—Comprising 1 section of .005 mfd., and 1 section of .0003 mfd.	.25
4937	Capacitor—.01 mfd.	.25
36248	Capacitor—.02 mfd.	.20
32787	Capacitor—.05 mfd.	.20
36234	Coil—Oscillator coil	.60
37911	Condenser—Variable tuning condenser	2.25
35344	Control—Volume control and power switch	1.50
32634	Cord—Drive cord (approx. 16½-in. overall length)	.10
37991	Dial—Dial scale	.70
36786	Indicator—Station selector indicator	.25
11765	Lamp—Dial lamp	.15
37915	Loop—Antenna loop	1.43
35993	Plate—Dial plate—less dial	.25
30189	Resistor—120 ohms, ½ watt	.20
30492	Resistor—22,000 ohms, ½ watt	.20
14583	Resistor—220,000 ohms, ½ watt	.20
30648	Resistor—470,000 ohms, ½ watt	.20
12928	Resistor—3.3 meg., ½ watt	.20
30271	Resistor—4.7 meg., ½ watt	.20
38846	Shaft—Tuning knob shaft	.10
34449	Socket—Dial lamp socket	.30
31251	Socket—Tube socket	.25
31418	Spring—Drive cord spring	.05
35098	Spring—To hold I.F. transformers in shield cans	.08
36232	Transformer—First I.F. transformer—less shield can	1.50
37364	Transformer—Second I.F. transformer—less shield can	1.35
35056	Transformer—Output transformer	1.30
33726	Washer—"C" washer for tuning shaft	.02

STOCK No.	DESCRIPTION	Unit List Price
	SPEAKER ASSEMBLIES (RL-86B-1)	
32907	Cap—Dust cap	.02
39448	Coil—Field coil—350 ohms	1.30
39447	Cone—Cone complete with voice coil	1.20
	(RL-86B-4)	
32907	Cap—Dust cap	.02
39448	Coil—Field coil—350 ohms	1.30
39447	Cone—Cone complete with voice coil	1.20
	(92379-1)	
39995	Coil—Field coil—350 ohms	1.50
39994	Cone—Cone complete with voice coil	1.20
	NOTE: If the stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker, and full description of part required.	
	MISCELLANEOUS ASSEMBLIES	
39778	Back—Cabinet back (Radiola 520)	.30
37916	Back—Cabinet back (Radiola 510, 3rd Prod.)	.25
35079	Crystal—Dial scale crystal	.65
33317	Fastener—Push fastener to hold back (Radiola 510, 3rd Prod.)	.02
35069	Fastener—Push fastener to hold crystal (Radiola 510, 3rd Prod.)	.05
33006	Feet—Rubber feet—Pkg. of 4	.03
34428	Knob—Control knob	.20

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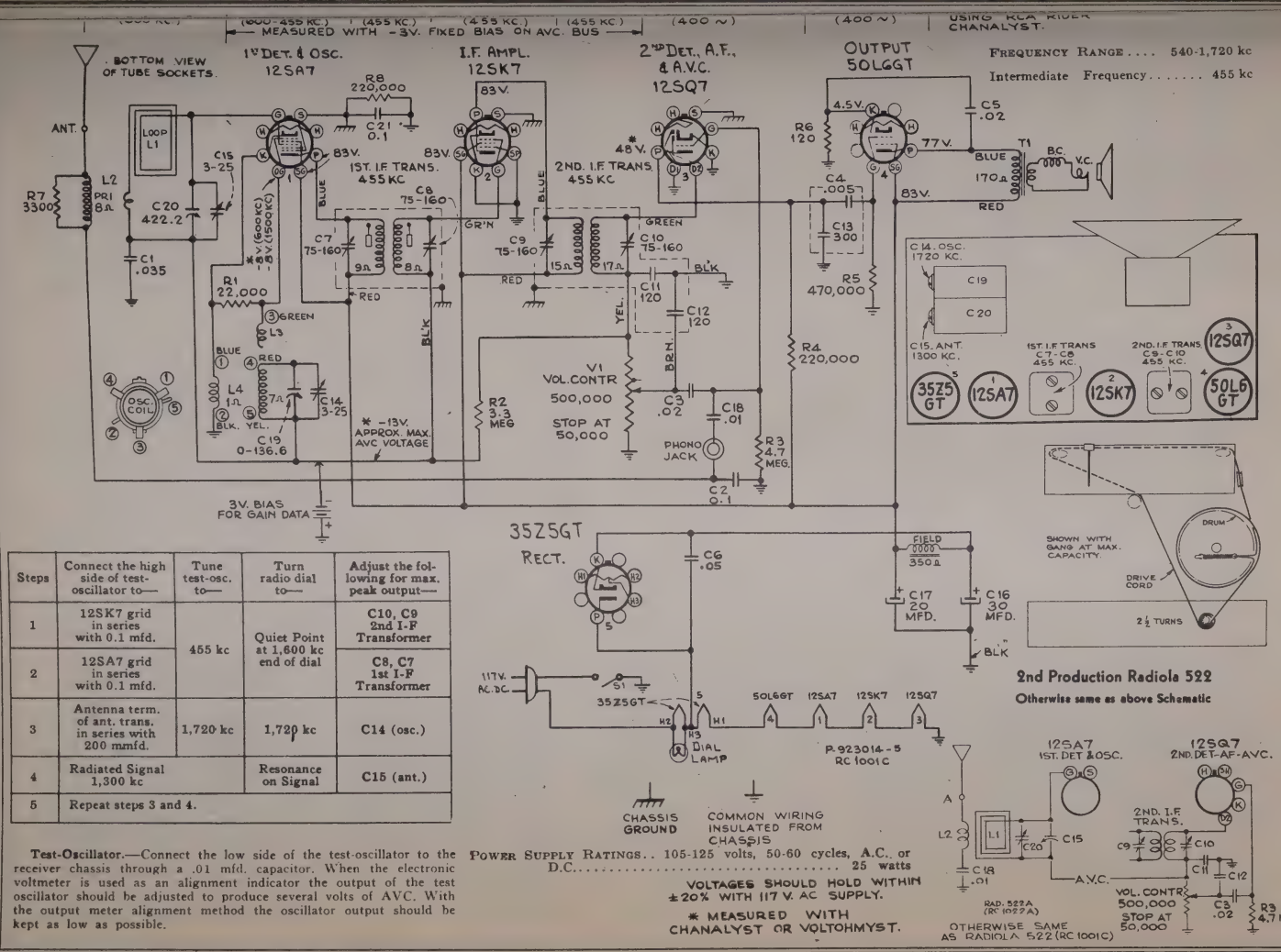


Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	12SK7 grid in series with 0.1 mfd.	455 kc	Quiet Point at 1,600 kc end of dial	C10, C9 2nd I-F Transformer
2	12SA7 grid in series with 0.1 mfd.			C8, C7 1st I-F Transformer
3	Antenna term. of ant. trans. in series with 200 mmfd.	1,720 kc	1,720 kc	C14 (osc.)
4	Radiated Signal 1,300 kc		Resonance on Signal	C15 (ant.)
5	Repeat steps 3 and 4.			

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis through a .01 mfd. capacitor. When the electronic voltmeter is used as an alignment indicator the output of the test oscillator should be adjusted to produce several volts of AVC. With the output meter alignment method the oscillator output should be kept as low as possible.

POWER SUPPLY RATINGS.. 105-125 volts, 50-60 cycles, A.C. or D.C..... 25 watts

VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V. AC SUPPLY.

* MEASURED WITH CHANALYST OR VOLTOHMYST.

25X, 34X, 35X

Speakers RL-86-B1, RL-86-B4, 92379-1:

Three different speakers have been used on these models. The replacement parts are listed below:

Stock No.	Description	Unit List Price
	(RL-86-B1, RL-86-B4)	
32907	Cap—Dust cap	
39448	Coil—Field coil—450 ohms.	
39447	Cone—Cone complete with voice coil	
	(92379-1)	
39995	Coil—Field coil—350 ohms.	
39994	Cone—Cone complete with voice coil	

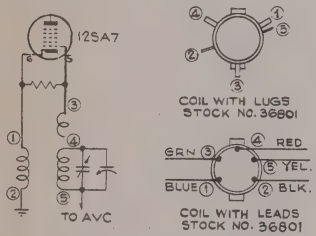
NOTE: If number stamped on your speaker frame does not appear on above list, order part required by description giving number stamped on your speaker and receiver model.

11X1, 35X

Oscillator Coil Connections:

The oscillator coil (Stock No. 36801) drawing, as shown in the service notes of Models 11X1 and 35X, is incorrect.

Two types of Stock No. 36801 coils are in use: One type has terminal lugs, the other has leads. Both types are shown in the accompanying sketch.



Oscillator Coil—Stock No. 36801

36X

Speakers RL-86-B1, RL-86-B4:

Two different speakers have been used on these models. The replacement parts are listed below:

Stock No.	Description
	(RL-86-B1, RL-86-B4)
32907	Cap—Dust cap .....
39448	Coil—Field coil—450 ohms.
39447	Cone—Cone complete with voice coil.....

NOTE: If number stamped on your speaker frame does not appear on above list, order part required by description giving number stamped on your speaker and receiver model.

BT-42

Replacement Dial, Pulley, and Shaft:

A complete Dial Assembly (Stock No. 38781) consisting of dial plate, dial scale, pulleys, drive drum, drive cord and spring, shaft, lamp bracket, and terminal strip is available for replacement on the Model BT-42 receiver.

However, the original assembly may be brought up to date by replacing the studs and shaft as follows:

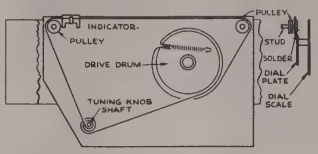
File off the two old studs on the dial plate. Tin, with solder, the surface (between dial and plate) around the stud holes, and insert the new pulley studs with the heads against the plate.

Solder the studs so their heads are flat against the plate and the shanks are at right angles to the plate.

The pulleys can now be slipped over the studs with the bearing surface toward the plate. Apply a drop of oil on each stud.

Thread the drive cord as shown in the drawing.

Stock No.	Description	Unit List Price
38781	Dial assembly complete (New type, including Stock No. 38783 and 34124)	2.50
38783	Pulley (2 pulleys, 2 studs).	.25
34124	Shaft (Shaft and spring washer)	.35



Dial Drive. Model BT-42

45X1, 45X2

Cabinet Replacement:

In order to use wooden cabinet Stock Number X912 as an alternate for plastic cabinets Y806 (Model 45X1) or Y807 (Model 45X2), the following is necessary:

(a) Remove the baffle and grille by removing three screws.
(b) Separate the grille from the baffle.
(c) Fasten the grille to the cabinet.
(d) Remove the two "L" shaped clamps from the wood blocks.
(e) Insert chassis and fasten by means of two wood screws screwed to blocks.

45X-1, 45X-2

Changes in 2nd Production:

The AVC filter resistor R4 is changed from 2.2 to 3.3 megs., Stock No. 12928.

The output tube bias resistor, R8, is changed from 150 to 120 ohms, Stock No. 30189.

46X SERIES

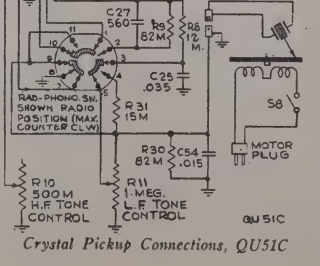
Dial Lamp Burnout:

In Models 46X-1, -2, -3, -11, -12, -13, -21, -23, -24, the dial lamp is Mazda No. 47 (.15 amp.). In case of frequent burnout, Mazda No. 51 (.2 amp.) can be used for replacement.

QU51C

Crystal Pickup Connections:

The schematic "Crystal Pickup Connections (QU51C)" in the QU51C service note is in error in the connections to switch terminals 7, 9, and 11. The correct schematic is shown in the accompanying sketch.



Crystal Pickup Connections, QU51C

QU52C, QU52M

Power Transformer:

Power transformer, Stock No. 32852, is incorrectly described in the Replacement Parts List of the QU52C, QU52M service note. The correct listing is as follows:

Stock No.	Description	Unit List Price
32852	Transformer — Power transformer, 105-125/200-240 volts, 50-60 cycle.....	4.50

55X

"PM" Speaker 92388-1:

The cone and voice coil for this speaker is Stock No. 39572.

U-123 (TWO BAND TYPE)

Knob Stock Numbers:

In the Service Note for U-123, No. 31355 knob should read "Range-switch or radio-record switch knob." No. 14359 knob should read "tuning knob."

V-100

Phono Compensation Change:

Capacitor C17 across the pickup is changed from .015 to .01 mfd., Stock No. 4937.

V-105

Phono Compensation Change:

C17 and R16, shunted across the pickup are changed from .015 to .01 mfd. (Stock No. 4937), and from 47,000 to 68,000 ohms (Stock No. 13715).

Speaker No. 92322-2:

In some production of V-105, the speaker is stamped 92322-2. The cone and voice coil for this speaker is Stock No. 39536.

V-175

Motorboard Mounting:

In the Replacement Parts, under "Miscellaneous Assemblies," change the Stock No. of mounting spring hardware from 31470 to 39563.

V-175

Low Output and/or Distortion:

Check the following.—

(a) Rectifier tube 25Z6GT (slow in coming up to full plate voltage).
(b) Output tube 25L6GT (usually accompanied by high hum).
(c) Bias cell reversed. The negative side should connect to the grid of the 6SQ7. See accompanying sketch of bias-cell polarity.

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Q27

Capacitor C33:

C33 is changed from 18 to 15 mmfd., Stock No. 12896.

28T

C13 Connections Changed:

In some production, C13, from the plate of the RF tube, is connected to the switch, side of C8 instead of to the grid side of C8.

C51 Deleted:

In 2nd production, C51 (22 mmfd.), Stock No. 14021, connected from antenna terminal to chassis, is omitted.

28X

Change in 2nd Production:

In 1st production, a capacitor C47 is connected from chassis to the junction of R1 and R27 in the RF plate circuit. In 2nd production, C47 is omitted, and terminal 11 on the oscillator coil is connected to the junction of R1 and R27 instead of to the "plus B" bus.

28X, 28X-5

C4 Changed to 47 mmfd:

The oscillator grid capacitor is changed from 33 to 47 mmfd., Stock No. 13141.

28X, 28X-5

Hum Modulation:

This form of hum becomes evident when a station's carrier is tuned in, and disappears when the set is tuned between stations. The hum may be present on only a few locals, or on many stations, depending, among other things, on the type and installation of the a-c supply line.

If hum modulation exists, check to see that there is an .05 mfd., 400-volt capacitor connected from the plate of the 25Z6GT rectifier to -B. Add this capacitor if necessary. The capacitor acts to by-pass RF signals around the rectifier tube.

29K2 (RC-570-D)

With 5-inch "EM" Speaker:

In 2nd production, the 5-inch speaker is changed from "PM" to "EM," as listed below:

SPEAKER ASSEMBLIES
(RL-86B-5)

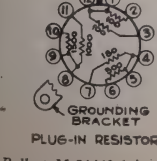
Stock No.	Description
39543	Coil—Field coil—450 ohms
39567	Cone—Cone complete with voice coil
30870	Plug—2-prong male plug for speaker
5118	Plug—3-prong male plug for speaker

Q31, 5Q66

Ballast Resistor Correction:

In the Service Data for Q31, the resistance between terminals 6 and 7 of the ballast resistor M-91462-3 should be 480 ohms instead of 580 ohms.

In the Service Data for 5Q66, the connections inside the ballast resistor M-91462-1 should be as shown in the accompanying drawing.



Ballast M-91462-1 in 5Q66.

25X, 34X, 35X

Electrolytic Capacitor:

Under "Chassis Assemblies," in the Replacement Parts Lists of the above models, delete Stock No. 36301 Capacitor and add:

Stock No.	Description	Unit List Price
35348	Capacitor—Electrolytic comprising 1 section of 30 mfd., 150 volts (C19-25X; C16-34X, 35X) and 1 section of 20 mfd., 150 volts (C20-25X; C17-34X, 35X)	.95

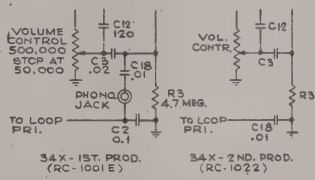
34X—2ND PROD. (RC-1022)

Service Data:

Model 34X—2nd Production (RC-1022) is similar to the 34X—1st Production (RC-1001-E) except as follows:

The phonograph jack has been omitted in 2nd production as shown in the accompanying sketches.

A different loop is used.



Circuit Changes, 2nd Production 34X

For replacement parts list, refer to the Service Notes for 34X (RC-1001-E) with the exception of the following parts used in the 34X—2nd Production (RC-1022):

Stock No.	Description	Unit List Price
35348	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts (C17), and 1 section of 30 mfd., 150 volts (C16)	.95
12723	Capacitor—56 mmf.	.35
39628	Capacitor—100 mmf.	.35
36248	Capacitor—.02 mfd.	.20
34298	Capacitor—0.1 mfd.	.30
34662	Cord—Drive cord (approx. 33-in. overall length)	.25
35078	Knob—Range switch knob	.15
39822	Loop—Antenna loop	1.70
31251	Socket—Tube socket—wafer	.25
37605	Socket—Tube socket—moulded	.25
37364	Transformer—Second I. F. transformer	1.35

SPEAKER ASSEMBLIES
(RL-86B-1)

32907	Cap—Dust cap	.02
39448	Coil—Field coil—350 ohms.	1.30
39447	Cone—Cone complete with voice coil	1.20
	(RL-86B-4)	
32907	Cap—Dust cap	.02
39448	Coil—Field coil—350 ohms.	1.30
39447	Cone—Cone complete with voice coil	1.20
	(92379-1)	
39995	Coil—Field coil—350 ohms.	1.50
39994	Cone—Cone complete with voice coil	1.20

NOTE: If the stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker, and full description of part required.

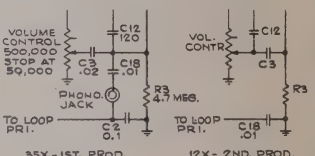
35X—2ND PROD. (RC-1022-A)
12X—2ND PROD. (RC-1022-A)

Service Data:

Models 12X—2nd Production and 35X—2nd Production are identical except for cabinet design. The RC-1022-A chassis used in both these receivers is similar to the RC-1001-C chassis used in Model 35X—1st Production, except that the phonograph jack of the 1st Production 35X has been omitted in the RC-1022-A chassis, as shown in the accompanying sketches.

For replacement parts list for both receivers, refer to the Service Notes for 35X (RC-1001-C) with the exception of the following parts used in the 12X—2nd Production and 35X—2nd Production:

Stock No.	Description	Unit List Price
35348	Capacitor — Electrolytic, comprising 1 section of 20 mfd., 150 volts (C17), and 1 section of 30 mfd., 150 volts (C16)	.95
36248	Capacitor—.02 mfd.	.20
34298	Capacitor—0.1 mfd.	.30
34662	Cord — Drive cord (approx. 33-in. overall length)	.25
39823	Loop—Antenna loop	1.43
31251	Socket—Tube socket—wafer	.25
37605	Socket — Tube socket — moulded	.25
37364	Transformer — Second I. F. transformer	1.35



Circuit Changes, 2nd Production 12X and 35X

SPEAKER ASSEMBLIES
(RL-86B-1)

32907	Cap—Dust cap	.02
39448	Coil—Field coil—350 ohms.	1.30
39447	Cone — Cone complete with voice coil	1.20
	(RL-86B-4)	
32907	Cap—Dust cap	.02
39448	Coil—Field coil—350 ohms.	1.30
39447	Cone — Cone complete with voice coil	1.20
	(92379-1)	
39995	Coil—Field coil—350 ohms.	1.50
39994	Cone—Cone complete with voice coil	1.20

NOTE: If the stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker, and full description of part required.

MISCELLANEOUS ASSEMBLIES

37906	Back—Cabinet back (12X—2nd Prod.)	.25
39775	Back—Cabinet back (35X—2nd Prod.)	.30
37362	Clamp—Dial clamp (12X—2nd Prod.)	.20
37363	Dial—Glass dial scale (12X—2nd Prod.)	.75
39780	Dial—Glass dial scale (35X—2nd Prod.)	1.50
37831	Fastener—Push fastener (12X—2nd Prod.)	.10
37907	Handle—Carrying handle (12X—2nd Prod.)	.35
35078	Knob—Volume or tuning knob (12X—2nd Prod.)	.15
36722	Knob—Volume or tuning knob (35X—2nd Prod.)	.20
37909	Mounting—Carrying handle mounting hardware (12X—2nd Prod.)	.10

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CHANGES, COLOR CODING
OUTPUT TRANSFORMERS

RCA MFG. CO., INC.

162, 162A CHANALYST

Parts List Changes:

The parts list of the Chanalyst 162, 162A (Serial numbers 3500-up) should be corrected as follows:

R25 listed as 7.5 megohms should be 8.0 megohms (matched pair). The Stock Number remains 35260.

R26 listed as 2 megohms should be 1.6 megohms (matched pair). The correct Stock Number is 39989.

R27 listed as 400,000 ohms should be 300,000 ohms (matched pair). The Stock Number remains 35258.

165 JUNIOR VOLTOHMYST

Meter Needle Off Scale:

If the meter needle drives violently off scale when no test is being made, remove the cover from the "Ohms Adj." potentiometer R23, insulate the inside of this cover with cambric cloth, fibre paper, or lacquer, and replace. If the trouble persists, do the same to the covers of the "DC Voltage Calibration Adj." potentiometer R22 (be careful not to disturb its adjustment or recalibration with a voltage standard will be necessary), and the "Zero Adj." potentiometer R21.

165 JUNIOR VOLTOHMYST

Replacement Parts List:

In some Stock No. 165 Junior VoltOhmysts, R32 is 1,800 ohms instead of the original value of 1,100 ohms, while R34 is 7,500 ohms instead of 7,000 ohms. Should it be necessary to replace these resistors, use the new values in all instruments.

R30, 20,000 ohms, ½ watt, is incorrectly listed as 1% matched pair instead of 10% tolerance (correctly shown in the parts list below.

R2, 2 meg., ½ watt, 1% matched pair, is incorrectly listed as Stock No. 35259. The correct Stock Number is 39988.

No orders for meters can be accepted without return of the defective meter for exchange or repair.

The following are additions and corrections to the replacement parts list:

Stock No.	Description
14086	Cord—Power cord and plug
4323	Knob—Round knob
34950	Knob—Bar knob
4340	Lamp—Pilot lamp (Mazda type 40)
44288	Meter Case—Case front only for meter number 7090
45934	Meter Case—Case front only for meter number Z-15-1102A
46533	Probe—Probe only for "AC-Ohms" cable
30930	Resistor—1,800 ohms, ½ watt, 10% (R32. Originally 1,100 ohms. Replace with 1,800 ohms)
43937	Resistor—7,500 ohms, ½ watt, 10% (R34. Originally 7,000 ohms. Replace with 7,500 ohms)
6240	Resistor—20,000 ohms, ½ watt, 10% (R30)
39988	Resistor—2 meg., ½ watt, 1% matched pair (R2)
31251	Socket—Tube socket
14551	Switch—Toggle switch SPST (S3)

9890 PHONOGRAPH KIT

Part Number of Replacement Sapphire:

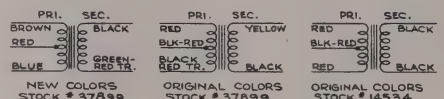
The instructions for the RCA Phonograph Modernization Kit, Stock No. 9890, incorrectly lists the Magic Tone Cell replacement sapphire as Stock No. 38449.

The correct listing should be: Replacement Sapphire for Magic Tone Cell, Stock No. 39863.

STOCK No. 9901C

Tube Tester Modernization Kit:

References to "Ser. Nos. below 1200" and "Ser. Nos. above 1200" on the wiring connection diagram for the 156, 156A Tube Tester Modernization Kit Installation Instructions should read: "Ser. Nos. below 1700" and "Ser. Nos. above 1700." The serial number 1700 is the dividing number of the two productions, not 1200 as shown.



Original and Alternate Colors on Transformer Stock No. 37899, and Colors on No. 14534, which is Superseded by No. 37899.

COLOR CODING OF OUTPUT TRANSFORMERS

In some production, the color code of leads on the following transformers is changed. When installing, check the drawing number stamped on the transformer and refer below for color code.

ORIGINAL COLORS

Stock No.	35774	37350	35056	33444	37899	14534	36098
Dwg. No.	94106-1	89681-3	89681-2	83517-3	94193-1	83517-1	94117-1
Pri. Start	Red	Red	Red	Red	Red	Red	Red
Pri. Tap	Black	———	———	Red-Black	Red-Black	Red-Black	———
Pri. Finish	Blue	Blue	Blue	Red	Black-Red Tr.	Red	Red
Sec. Start	Bus	Green-Red Tr.	Black	Black	Yellow	Black	Bus
Sec. Finish	Bus	Brown	Black	Black	Black	Black	Bus

ALTERNATE COLORS

Stock No.	35774	38994*	35056	33444	37899**	36098
Dwg. No.	94106-2	97610-2	97610-1	97604-2	97604-1	97611-1
Pri. Start	Blue	Blue	Blue	Brown	Brown	Blue
Pri. Tap	Red	———	———	Red	Red	———
Pri. Finish	Red-Black	Red	Red	Blue	Blue	Red
Sec. Start	Bus	Black	Black	Bus	Black	Black
Sec. Finish	Bus	Green-Red Tr.	Green-Red Tr.	Bus	Green-Red Tr.	Black

* Stock No. 38994 supersedes No. 37350.
** Stock No. 37899 supersedes No. 14534.

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RP-152, -A, -B, -C, -D, -J

Intermittent Start, Slow Speed, or Stalling:

These conditions may be caused by binding of idler wheel on its mounting stud. Smooth and clean the idler wheel bearing so that it can rotate freely.

RP-152, -152A

Tendency to Stall:

Some RP-152 and -152A automatic record changer mechanisms in Model VA-15, V-170, V-200, and V-201 use a motor identified by stamping number 91706-1. Slow speed and

Motor Stamped No. 91706-1 Used in Some RP-152, -152A Automatic Record Changers.

tendency to stall in this motor may be due to the motor bearings becoming misaligned with respect to the motor spindle.

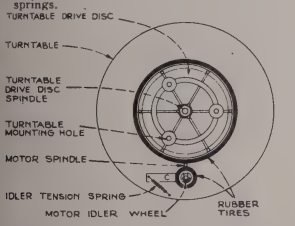
In most cases, the motor spindle may be freed by tapping the stator laminations while the motor is in operation.

For a permanent remedy it is advisable to install an idler wheel assembly to reduce side thrust on the motor bearings. The following parts are required:

Stock No.	Description	Unit List Price
1—36274	Idler wheel	.55
1—36275	Idler wheel arm	.25
2—33726	"C" washer for idler wheel	.02
1—30585	Spring for idler	.06

Installation Instructions:

1. Remove one of the two motor support springs.



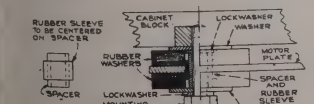
Arrangement of Idler Wheel Assembly to Improve RP-152, -152A Using Motor 91706-1.

2. Remove the turntable by removing the screw in the turntable spindle drive gear below the motorboard.
3. Mount the idler wheel by means of a "C" washer on the single end stud of the idler arm.
4. Install the idler assembly in place on the motor board as shown in accompanying sketch and fasten by means of the second "C" washer.
5. Connect the tension spring between the end of the idler arm and the motorboard pin (below motorboard).

RP-153 (V-301, V-302)

Motor Hum:

Excessive hum may be caused by incorrect assembly of the rubber grommets on the two bolts that fasten the motor-mounting plate to the cabinet. The correct assembly is shown in the sketch. The rubber sleeve must be centered on the metal spacer so that the motor plate can not come in metallic contact with the spacer.



RP-153 MOTOR MOUNTING ARRANGEMENT

Excessive Motor Hum will Result in RP-153 if the Rubber Sleeves are not Centered on the Metal Spacers.

RP-151

Pickup Arm Springs:

In the Replacement Parts List, Pickup and Arm Assemblies, in the RP-151 Automatic Record Changer service note, the following change and addition should be made:

Stock No.	Description	Unit List Price
38455	Spring—Coil spring (10) for upper pickup pressure adjustment (2 required)	.10
39695	Spring—Flat spring for pickup arm pivot tension	.10

RP-151, -152, -153, -154, -158, -160, -161, -162

Idler Wheel Fiber Washers:

In order to reduce idler wheel noise, the two metal washers have been replaced by two fiber washers in the Idler Wheel Assembly, Stock No. 36274, for the above record changers. The new fiber washers are Stock No. 39996.

RP-158, -160, -161, -162

Bakelite Alternate Replacement Parts:

The following shows a comparison of replacement part stock numbers for the above record changers when bakelite parts are used as alternates for regular die-castings:

Description	Stock No. Die-Cast	Stock No. Bakelite
Record Separator Assembly:		
Separator cap	38470	38470
Separator knife	38467	39768
Separator spring (upper)	38468	39769
Separator spring (bottom) (RP-158, -160, -161)	38621	39968
Separator shelf and shaft (RP-158, -160, -161)	38652	39767
Separator shelf and shaft (RP-162)	39035	39770
Main Cam	38641	39760
Record Support and Shaft (Left hand front post): (RP-158, -160, -161)	38645	39762
Record Support Cam: (RP-158, -160, -161)	38646*	39763†
Tone Arm Segment Cam: (RP-158, -160, -161)	38619*	39764†

*The die-cast cams 38646 and 38619 require a 10-32 set screw, stock number 32869, to fasten cam to shaft.

†The bakelite cams 39763 and 39764 require a drive pin, stock number 39765, to fasten cam to shaft. (A drive pin is included with 39763 and 39764).

RP-151, -158, -160, -162

Crystals and Sapphires:

RP	Stock No. of Sapphire and Holder, less nut—	Stock No. of Crystal and Sapphire Assembly—
151	38449	Top, 38453 (Alum. case) Bottom, 38598 (Alum. case)
158	39564	38610
160	38449	38453 (Alum. case) 39550 (Zinc case)
162	39564	38610

RP-158, RP-160

Eccentric Stop, No. 39569:

In Replacement Parts, add Stock No. 39569 eccentric stop for record separator support.

RP-158, -160, -162

Slow Speed:

In cases of slow speed, adjust the bottom bearing of turntable spindle to remove binding and to obtain free rotation. Refer to adjustment "B" in Service Data. Check by applying power to the turntable motor, allowing turntable to reach full speed, then pull motor away from turntable drive disc. The turntable should coast for at least twelve revolutions. (In RP-162, disengage motor from turntable by pulling idler away from turntable to observe coast.)

RP-160

Spring for use with Zinc Crystal:

On RP-160 with aluminum pickup arm, and aluminum-cased crystal, the spring that governs pickup pressure is No. 30585: with zinc pickup arm and aluminum-cased crystal, the spring is No. 39673. When installing a zinc-cased crystal in a zinc arm, cut 1½ turns off the spring, or install a No. 39754 spring.

RP-162

Pickup Pressure:

The Service Data for RP-162 incorrectly lists the Sapphire pressure as four ounces: The correct pressure is approximately two ounces.

V-170, V-200, V-201

Rumble:

Rumble is related to motor vibration, combined with high-gain amplifier, and prominent bass response.

The vibration of the motor in these instruments is as low as it can be made: Do not replace it to correct rumble. Rather, reduce the low-frequency response by shunting a 50,000-ohm ½-watt resistor across the crystal pickup terminals.

V-205-A

Using RP-153 Automatic Mechanism:

A limited number of V-205 instruments contain the RP-153 record changer. These are labeled V-205-A. Refer to Service Note on RP-153 for service data and replacement parts.

V-209, -210, -215, -219, -221, -225

Use of GT (Glass) Tubes:

When using the glass equivalent for metal tubes in the above models, the following changes must be made to prevent oscillation with the push-buttons in the "out" position:

6SA7GT glass tube in place of metal tube 6SA7:

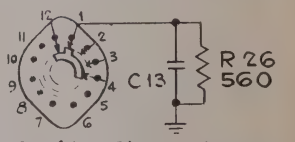
V-209—No changes required.

V-210—Add resistor R26, 560 ohms, ½ watt (RCA Stock No. 12414) in parallel with C13 capacitor, 2200 mmf., as shown in the accompanying sketch.

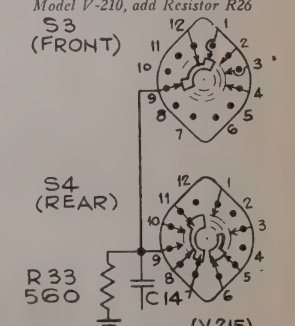
V-215, V-219, V-221, V-225—Add resistor R33, 560 ohms, ½ watt (RCA Stock No. 12414) from terminal 9 of switch S4 (Rear) to chassis ground as shown in the accompanying sketch.

6SK7GT glass tube in place of metal tube 6SK7:

A shield (RCA Stock No. 39074) and a grounding clip (RCA Stock No. 39073) are required for shielding purposes on all models above.



When Using 6SA7GT Glass Tube in Model V-210, add Resistor R26



When Using 6SA7GT Glass Tube in Models V-215, V-219, V-221, V-225, add Resistor R33

CHANGES, NOTES

RCA MFG. CO., INC.

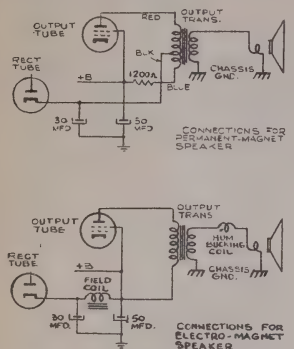
1X, 12X, 14X SERIES

Speaker changed from "PM" to "EM":

First Production of the following models use RL-81-B2 "PM" (permanent-magnet) speaker.

In 2nd Production, the speaker is changed to RL-86-A3 "EM" (electro-magnet) speaker.

The circuit for each type of speaker is shown in the accompanying diagrams.



Circuit for "PM" and "EM" Speakers in 1X, 12X, and 14X Series.

Replacement Parts for the RL-86-A3 "EM" speaker are as follows:

Model Number	Chassis Number	Cone and Voice Coil No.	Output Transformer No.
1X, 1X2	RC-1003	35570	35056
1AX, 1AX2	RC-1003A	35570	35056
12X, 12X2	RC-1001B	35570	38994
12AX, 12AX2	RC-1001C	35570	38994
14X, 14X2	RC-1001D	35570	38994
14AX, 14AX2	RC-1001E	35570	38994

Unit List Price: No. 35570, $1.20
No. 35056, 1.30
No. 38994, 1.30

The Field Coil for RL-86-A3 Speaker is Stock No. 39543.

1X, 1X2, 1AX, 1AX2, 45X5

Line Bypass Capacitor:

In some production, the .005 mfd. line bypass is connected from plate to cathode on the rectifier tube, instead of from plate to chassis.

1X, 1X2, 1AX, 1AX2

2nd Production:

The tuning-knob shaft and its "C" washer are changed as follows:

	Shaft	"C" Washer
1st Prod...	No. 35343 (1⅛-in.) ..	No. 34373
2nd Prod...	No. 38846 (1⅛-in.) ..	No. 33726

Capacitor Changes:

C14 changed from .015 to .02 mfd., No. 36248
C17 changed from .085 to .02 mfd., No. 36248
C24 (1AX, 1AX2) changed from .2 to .1 mfd., No. 43763
R4 changed from 2.2 to 3.3 megs., No. 12928

QB2, QB6

I-F or A-F Transformer Breakdown:

In 2nd production, a 10-megohm, ½-watt resistor is connected across the +B circuit electrolytic capacitor to discharge the capacitor when the set is tuned "off." This eliminates any voltage difference (retained by capacitor) between the chassis and I-F and A-F transformer primaries while the set is "off" and therefore reduces transformer breakdown due to electrolysis in humid climates.

CV-112X CONVERTER

AC Power Unit for QB2, QB5, QB6:

The CV-112X is designed to convert Models QB2, QB5, and QB6 from battery to a-c operation. It differs from the CV-112 in that it has a tapped filament winding to provide correct filament voltage with 4- and 5-tube, or 6-tube receivers. A plug, which fits in a socket on the side of the unit, is used to select the correct tap, as shown in accompanying diagram.

QB3 (RC-539)

C15, 66 mmfd., Stock No. 36072:

In 2nd Production of QB3, C15 is changed to 66 mmfd. (Stock No. 36072, List Price $.30) to improve tracking.

QB6 (RC-529D)

Service Data:

Model QB6 is essential the same as Model QB2, except for the following parts which are used in the QB6:

Stock No.		Unit List Price
37976	Bracket—Tone control support bracket	.25
37999	Dial—Glass dial scale	.75
36103	Decal—Power-volume decal	.05
37839	Decal—Range switch decal	.15
35392	Decal—Trade mark decal	.05
35391	Decal—Tuning decal	.05
37838	Frame—Dial frame complete, less dial and pointer	1.25
35650	Knob—Tone control knob	.25
34861	Knob—Tuning knob	.35
34862	Knob—Vol. control or range switch knob	.35

10X, 2ND PRODUCTION

Chassis No. RC-1001-B:

The 1st production of Model 10X has chassis No. RC-1001, with an "EM" speaker.

In 2nd production, the chassis is No. RC-1001-B, with RL-81B2 "PM" speaker.

The circuit in 2nd production is the same as shown in the Service Note for Model 12X.

For replacement parts, refer to the 10X Service Note, and the following parts which are used in the 2nd production:

Stock No.	Description	Unit List Price
36301	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts, and 1 section of 30 mfd., 150 volts	1.25
11315	Capacitor—.015 mfd.	.20
30189	Resistor—120 ohms, ½ watt	.20
6134	Resistor—1,200 ohms, ½ watt	.22
30492	Resistor—22,000 ohms, ½ watt	.20
14583	Resistor—220,000 ohms, ½ watt	.20
36800	Transformer..Output transformer	1.30
	SPEAKER ASSEMBLIES (RL-81B-2)	
35570	Cone—Cone complete with voice coil	1.20
36153	Fastener—Push-on fastener for back	.10
35078	Knob—Volume control or tuning knob	.15

LOCATING INTERFERENCE

With a Model BP-10:

The Model BP-10 "Personal" loop receiver has been used successfully in tracking down the source of electrical interference, and the location of local rectification in stubborn cases of local cross-modulation and hum-modulation.

The directional pattern of the BP-10 is essentially a figure "8," with a sharp minimum at right angles to the plane of the loop.

The small size, light weight, and high sensitivity of this battery-operated receiver makes it ideally suited for this work.

BP-10 AND 15BP

Oscillator Coil Color Code:

The correct color code for the oscillator coil in these models is as follows:

Lead to oscillator plate	Blue
Lead to +B	Red
Lead to oscillator grid	Green
Lead to chassis	White

SPEAKER GAUGE No. 39598

For BP-10 Elliptical Speaker:

A special gauge, No. 39598, is now available for centering the voice coil in Model BP-10 with elliptical speaker.

CONE CENTERING GAUGE

For BP-10 Round Speakers:

A cone centering gauge for the BP-10 round speaker (Stock No. 36504, Part No. 84991-501) is now available. The gauge is carried as Stock No. 70003.

The cone centering gauge for the BP-10 elliptical speaker is Stock No. 39598 (see Supplementary Information 6 and 7).

Stock No. 70003—Cone Centering Gauge

12X, 12X2, 12AX, 12AX2

Antenna Coupling Coil:

In 2nd production, the shunt resistor R7 across the primary of the antenna coupling coil is omitted, and the antenna coupling coil is changed from Stock No. 37356 to 37962, list price $.75.

14AX, 14AX-2

Changes in 2nd Production:

C3, in grid circuit of 12SQ7, is changed from .015 to .02 mfd., Stock No. 36248.

C5, in 50L6GT plate circuit, is changed from .025 to .02 mfd., Stock No. 36248.

C21, chassis ground to power ground, is changed from .2 to .1 mfd., Stock No. 4839.

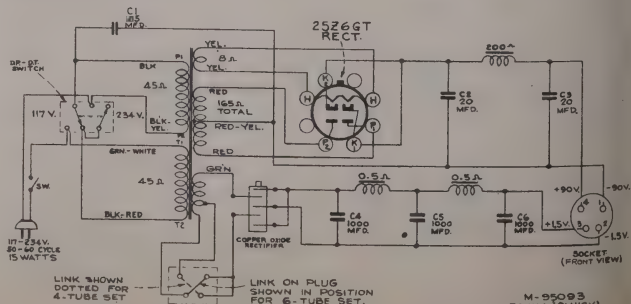
14AX2 (RC-1001E)

Service Data:

The Service Data for Model 14AX applies to Model 14AX2, except for the following parts used in 14AX2:

Stock No.		Unit List Price
36801	Coil—Oscillator coil	.65
37353	Condenser—Variable tuning condenser	2.75
38816	Back—Cabinet back	.25
Y1140	Cabinet	4.50
35071	Knob—Control knob	.15

RL-86-A3 "EM" speaker is used in some production of 14AX2, as specified elsewhere in this supplement.



CV-112X Converter.

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14BT

Battery Cable Change:

In some 14BT production, the +A wire in the battery cable is black or black with red tracer instead of brown.

14X2 (RC-1001D)

Service Data:

The Service Data for Model 14X applies to Model 14X2, except for the following parts used in 14X2:

Stock No.		Unit List Price
38816	Back—Cabinet back	.25
Y1140	Cabinet	4.50
35071	Knob—Control knob	.15

RL-86-A3 "EM" speaker is used in some production of 14X2, as specified elsewhere in this supplement.

15X, 16X-1, -2, -3

Dial Back Plate:

In some production, the dial back plate and pulley assembly is changed from "garnet maroon," Stock No. 36229, to "Black," Stock No. 38767.

Capacitor Changes:

In 2nd Production, the following capacitors are changed:

C5 from 120 to 150 mmfd., Stock No. 12725
C8 from .015 to .02 mfd., Stock No. 36248
C9 from 120 to 300 mmfd.

C9 is built in with C10 (.005 mfd.) and the stock number of the dual unit is 37359.

15X, 16X-1, -2, -3, -4, -11, -13, -14

Speakers RL-81-A5, RL-81-B2, 92161-1, 92161-3:

Four different speakers have been used on these models. The replacement parts are listed below:

SPEAKERS STAMPED "RL-81-A5" or "RL-81-B2"

Stock No.		Unit List Price
32907	Cap—Dust cap	.02
35570	Cone—Cone complete with voice coil	1.20

SPEAKERS STAMPED "92161-1" or "92161-3"

38352	Cone—Cone complete with voice coil	1.35

15X, 16X-1, 16X-2

Substitute Speaker:

On 2nd Production of 15X, 16X-1, 16X-2, RL-86-B1 "EM" speaker is used in place of the original RL-81-A5 "PM" speaker.

Replacement parts for the RL-86-B1 speaker are listed below. The alternate circuit arrangements are shown in accompanying diagrams.

RL-86-B1

Stock No.	Description
32907	Cap—Dust cap
39448	Coil—Field coil, 350 ohms
39447	Cone—Cone and voice coil

The output transformer for this speaker is Stock No. 38994.

17K

Dial Frame is Stock No. 38784:

In the Service Data for Model 17K, change the Stock Number of the Dial Frame from 35799 to 38784.

24BT-1

Substitute Speakers:

The following speakers may have been used as a substitute for Speaker RL-85-6 in Model 24BT-1.

Number Stamped on Speaker	Cone and Voice Coil Stk. No.	Output Trans.
92161-3	38352	39538
92161-4	39535	39538
92161-5	38352	39538
92322-3	39536	39538
92374-1	39537	39538
RL-81-B2	35570	39538

Dust cap for above is No. 32907.

24BT-2, 25BT-2

Speakers RL-85-5, RL-85-6, 92377-1, 92377-3:

Four different speakers have been used on these models. The replacement parts are listed below:

Stock No.	Description
	(RL-85-5, RL-85-6)
32907	Cap—Dust cap
38397	Cone—Cone complete with voice coil
33779	Transformer—Output transformer
	(92377-1)
39849	Cone—Cone complete with voice coil
39850	Transformer—Output transformer
	(92377-3)
39965	Cone—Cone complete with voice coil
39966	Transformer—Output transformer

NOTE: If number stamped on your speaker frame does not appear on above list, order part required by description giving number stamped on your speaker and receiver model.

25BT-2, 25BT-3, 25BK

Delete Speaker Plug and Socket:

In Replacement Parts, delete speaker plug No. 36009, and socket No. 14275.

25BK

8-Inch Round Speaker No. 92378-1:

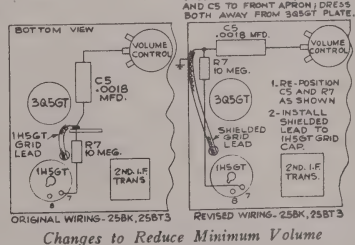
Change the description and identifying number of the speaker in Model 25BK Service Note from 92355-1 (9¼-inch elliptical) to 92378-1 (8-inch round).

The cone, Stock No. 39066, applies to No. 92378-1 speaker.

25BK, 25BT3

Reducing Minimum Volume:

When these models are used near strong local stations, the minimum volume may be too high. This can be remedied by re-positioning the 1H5-GT 1st-audio grid capacitor (C5) and grid resistor (R7), and installing a shielded lead to the grid cap of the 1H5-GT tube. These changes are shown in the accompanying drawing.



Changes to Reduce Minimum Volume in 25BK and 25BT3.

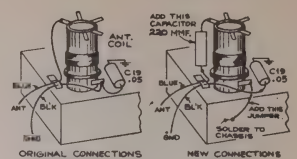
Distortion on Locals:

In Models 25BK and 25BT3, distortion on strong local stations (even with volume control turned low) may be caused by "front-end" overloading due to excessive signal strength. This can be corrected by using a shorter antenna, or by connecting a small capacitor (about 50 mmfd.) in series with the antenna.

25BT3

Hum Modulation with CV-42:

The changes shown in the accompanying sketch are recommended to eliminate hum modulation when using Model 25BT3 with CV-42 "Electrifier." These changes may be made without removing the chassis from the cabinet, and require the addition of only one part, a 220 mmfd. mica molded capacitor.



Circuit Revisions in Model 25BT3 to Eliminate Hum Modulation When Using CV-42 "Electrifier".

25BP

Speakers RL-81-B1, RL-81-B2, 92161-1:

The above speakers were used on the 25BP in addition to those listed in the Service Note.

Use Output Transformer Stock No. 39538 with all speakers used in the 25BP, except: when using a speaker stamped RL-81-B1 use Output Transformer Stock No. 38098.

The replacement parts are listed below:

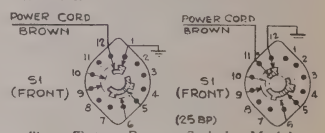
Stock No.	Description
	(RL-81-B1, RL-81-B2)
32907	Cap—Dust cap
35570	Cone—Cone complete with voice coil
	(92161-1)
38352	Cone—Cone complete with voice coil

NOTE: If number stamped on your speaker frame does not appear on above list, order part required by description giving number stamped on your speaker and receiver model.

25BP—2ND PROD. (RC-1020)

Power Switch Change:

In some second production 25BP (RC-1020), the power switch differs from that shown in the Service Note. Connections to clips numbered 12 and 1, on wafer S1—Front, of the switch shown in the Service Note, are to numbers 11 and 12 respectively on the other switch used in this production. All other connections are as shown in the Service Note Schematic.



Two Types Power Switch, Model 25BP—2nd Production

26X-1, -3, -4 Changes in 2nd Production:

In 26X-1 and 26X-3, a 10-mmfd. capacitor, Stock No. 13200, is added in parallel to C24 in the "C" band oscillator circuit.

The Stock No. for C4 (47 mmfd.) oscillator grid capacitor is 13141.

The adjustable core on L5 antenna coil is omitted, and this adjustment is therefore omitted in the alignment procedure.

Q27 (RC-507K) Service Data:

Model Q27 is similar to Model Q25 which is described in the Service Note for Models Q22, QK23, and Q25. Replacement parts for Q27 are same as for Q25, with exception of the following parts used in Q27:

CHASSIS ASSEMBLIES (RC-507K)

37976	Bracket—Tone control mounting bracket	.25
38409	Control—Tone control	1.00
38412	Control—Volume control and power switch	2.00
32634	Cord—Drive cord (approx. 29-in. overall length)	.10
13988	Resistor—10 ohms, ½ watt	.20
14350	Screw—No. 8-32 sq. head set screw for drive drum	.03
35787	Socket—Phono input socket	.15
31261	Spring—Retaining spring for adjustable cord and studs	.01
38761	Support—L.H. pulley support complete with pulley	.50
38762	Support—R.H. pulley support complete with 3 pulleys	.75
35588	Transformer—Power transformer —105-120 volts, 25 cycle	6.30

SPEAKER ASSEMBLIES (92311-1)

38765	Coil—Field coil—1060 ohms	2.70
38766	Cone—Cone complete with voice coil	2.10
5039	Plug—4-prong male plug for speaker	.30
38374	Transformer—Output transformer	1.65

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SUBSTITUTE SPEAKERS, CONES

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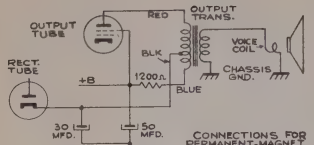
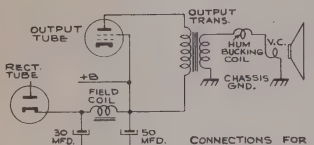


CONNECTIONS FOR PERMANENT-MAGNET SPEAKER



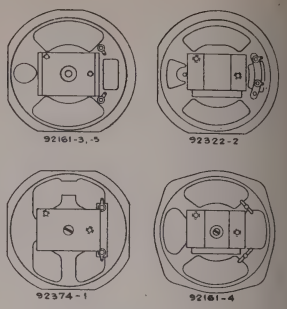
CONNECTIONS FOR ELECTRO-MAGNET SPEAKER

SUBSTITUTE SPEAKERS

In 1st production of the following models, the speaker is RL-81-B2. In later production, several substitute speakers are used, as listed below.

WHEN ORDERING REPLACEMENT PARTS FOR SPEAKERS, NOTE THE IDENTIFICATION NUMBER STAMPED ON THE SPEAKER FRAME. IF THE NUMBER STAMPED ON THE SPEAKER DOES NOT APPEAR IN THE FOLLOWING LIST, ORDER THE REQUIRED PART BY DESCRIPTION, AND SPECIFY THE IDENTIFYING NUMBER STAMPED ON THE SPEAKER AND THE RECEIVER MODEL NUMBER.

Alternate "EM" and "PM" speaker connections are shown in the accompanying diagrams.



Identifying Sketches of Five "PM" Speakers.

MODELS

MODEL NUMBER	CHASSIS NUMBER
1X, 1X-2	RC-1003
1AX, 1AX-2	RC-1003A
6X2	RC-1013
10X (2nd Prod.)	RC-1001B
12X, 12X-2	RC-1001B
12AX, 12AX-2	RC-1001C
14X, 14X-2	RC-1001D
14AX, 14AX-2	RC-1001E
15X	RC-462
16X-1, 16X-2	RC-462A
26X-1	RC-1014
26X-3	RC-1014A
26X-4	RC-1014B

SUBSTITUTE SPEAKERS

NUMBER STAMPED ON SPEAKER	CONE AND VOICE COIL STOCK No.	FIELD COIL STOCK No.	Output Trans. Stock No. for 1X, 1X-2, 1AX, and 1AX-2	Output Trans. for 6X2, 10X (RC-1001B), 12X, 12X-2, 12AX, 12AX-2, 14X, 14X-2, 14AX, 14AX-2, 15X, 16X-1, 16X-2, 26X-1, 26X-3, 26X-4
RL-86-A3	35570	39543	35056	38994
RL-86-B1	39447	39448	35056	38994
RL-86-B4	39447	39448	35056	38994
92161-3	38352	PM	37912	36800
92161-4	39535	PM	37912	36800
92161-5	38352	PM	37912	36800
92322-2	39536	PM	37912	36800
92374-1	39537	PM	37912	36800

NOTE: The following speakers may have been used as a substitute for the RL-81-B2 speaker in any model which originally called for the RL-81-B2:

Speaker Stamping	Cone No.
92161-3	38352
92161-4	39535
92161-5	38352
92322-2	39536
92374-1	39537

REPLACEMENT CONES

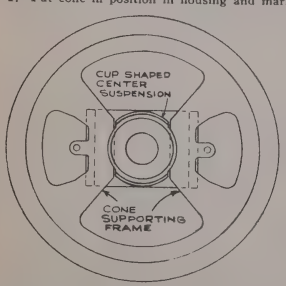
Installation Instructions:

Certain types of replacement loudspeaker cones are now being supplied with a cup-shaped center suspension fastened to the cone instead of the flat suspension and cup-shaped metal plate which were originally used.

These replacement cones can be used without modification on many types of speakers. However, on certain types, the speaker frame extends in so close to the center pole that it interferes with the cup-shaped center suspension; in such cases it is necessary to cut away two edge sections of the suspension, as follows:

1. Put cone in position in housing and mark places on suspension cup where edge of cup must be cut away.
2. Lift cone out of housing and cut away edge of cup where marked.
3. Cement cone into position in the usual way, being careful that the entire edge of the cup is securely cemented down, including the edge at the places that were cut away.
4. Leave the centering gauge in position until cement is thoroughly dry.

The accompanying sketch shows how the flat edge of the cup-shaped center suspension is cut away in two places to provide clearance for the cone supporting frame.



The Cup-Shaped Suspension Must be Cut Away to Accommodate the Cone Supporting Frame in Some Speakers.

REPLACING ELLIPTICAL CONES

In Speakers with Cemented Voice-Coil Supports:

(a) Remove old cone. Clean housing thoroughly.

(b) Apply a thick bead of Du Pont household cement to yoke plate where cone centering support will fit.

(c) Apply a thin coat of Du Pont household cement to housing where cone edge will fit.

(d) Put cone in position using several thin strips of paper to center voice coil.

(e) Press cone edge and centering support down in cement and allow to dry.

(f) After cement is dry remove cone centering strips.

(g) Solder voice coil leads to proper terminals.

(h) Cement center dust cap in position.

STOCK NO. 36077 CONE

Replaces Stock No. 35441

No. 36077 cone replaces No. 35441. The fabric spider of the No. 36077 cone should be cemented to the top pole plate as explained on page 2 of "Supplementary Information No. 4." The metal frame that is used to center the spider on the No. 35441 cone should not be used with the No. 36077 cone.

STOCK No. 155A CRO

Changes, Extending Sweep Range:

Certain applications may require that the lowest frequency sweep range be extended below 15 cycles. This may be accomplished by increasing the capacity of C-7 until the desired low frequency sweep is obtained.

The Chassis Wiring Diagram, Figure 33, in early 155A CRO instruction books shows connections to D1 and D3 of the 906 tube reversed. D1 should connect to R24, while D3 connects to R25.

The Replacement Parts List for the 155A CRO should be corrected as follows:

DELETE:

Stock No.	Description
14561	Resistor — Carbon resistor, 220 ohms, ½ watt (R-10)
30654	Resistor — Carbon resistor, 1500 ohms, ½ watt (R-18)
4814	Socket—Tube socket, 5-contact (for RCA-884).....

ADD:

Stock No.	Description
46705	Capacitor — Electrolytic capacitor, 8 mfd., 450 volts (C16) .....
14086	Cord—Power cord and plug
34766	Resistor — Carbon resistor, 1000 ohms, ½ watt (R-18)
31251	Socket—Tube socket, octal (for RCA-884).....

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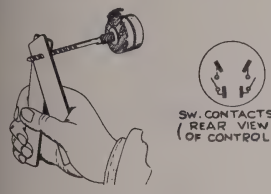
RCA REPLACEMENT CONTROLS

And Shearing Tool No. 38600:

Certain RCA replacement controls have a long notched shaft which can easily be cut to the required length with side cutters, file, or hacksaw, or sheared off at the desired point with two pliers, or with the special RCA shearing tool, Stock No. 38600.

The two pieces of the tool are placed on the shaft, as shown, and then pressed together, thus making a quick clean shear.

Where the original control had a switch, the replacement control has a double-pole, single-throw switch to permit universal application. The arrangement of switch contacts are shown in the sketch.



RCA Stock No. 38600 Shearing Tool to Cut Shafts on RCA Replacement Controls to Required Length.

LOW OUTPUT ON BATTERY SETS

Half of 3Q5GT Filament Open:

Low power output on battery models that use a 3Q5GT output tube may be caused by burnout of one half of the double filament in this tube. Check for continuity between prongs 2 and 8 and between 8 and 7.

RCA STATION ALLOCATOR

Changing Push-Button Ranges:

In locations where most of the popular "push-button" stations are in the upper half of the broadcast band, the push-button frequency ranges of the Station Allocator can be shifted upward by changing C3 and C4 from 1,200 mmfd. to 1,000 mmfd. (Stock No. 12635, two required).

The frequency ranges are then as follows:

Buttons 1, 2	435 to 890 kc
Buttons 3, 4, 5	640 to 1,270 kc
Buttons 6, 7, 8	890 to 1,840 kc

Neon Modulator Circuit Change:

To compensate for varying neon-lamp characteristics, R7 is changed from 1.5 to 2.2 megs. Stock No. 12679, and C9 is changed from 1,800 mmfd. to 1,200 mmfd., Stock No. 44337.

COLOR CODE

For Output Transformers:

Changes have recently been made in the color code of RCA output transformers to conform to R.M.A. standards.

	Old Color Code	New Color Code
Primary start	red	brown
Primary mid-tap	black-red	red
Primary finish	red	blue
Secondary start	blue, or yel.	black
Secondary finish	black	green-red tr. or black

NO. 9824A RECORD PLAYER SWITCH

Loctal Tube Adaptor now Available:

A special adaptor, Stock No. 38945 is now available for quickly and easily connecting the popular No. 9824A record player switch to radio receivers that use a **7B6** or **7C6** loctal 1st-audio tube. The new special adaptor, Stock No. 38945 lists for $1.50.

CONNECTING RECORD PLAYER SWITCH

To AC-DC Sets with Insulated Chassis:

To avoid hum in connecting a record-player switch to AC-DC sets in which the common negative wiring is insulated from the chassis, the shielding on the record-player switch should be connected, through a .25 mfd. capacitor, to the common negative wiring, not to the chassis.

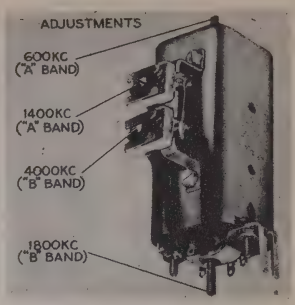
EXTERNAL ANTENNA COUPLER

For Loop Receivers:

The special antenna coupler, Stock No. 9912, for connecting an external antenna to a loop receiver, has low-frequency and high-frequency adjustments on both "A" and "B" bands to ensure adaptability and good performance.

The location of these adjustments, and the approximate alignment frequencies, are shown in the accompanying illustration.

The List Price of the No. 9912 Coupler is $2.25.

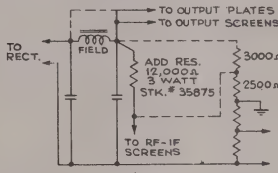


Stock No. 9912 Antenna Coupler.

BLEEDER RESISTOR No. 34537

Used in Models U-45, K-105, V-205, etc.:

If bleeder resistor No. 34537 becomes defective, the set can be repaired, without replacing the bleeder, by changing the circuit as shown in the accompanying diagram.



DOTTED LINES INDICATE ORIGINAL CONNECTIONS - TO BE REMOVED.

In case of Burnout of Bleeder Resistor No. 34537, Repairs can be made by Changing the Circuit as shown above.

This change requires only one part, a 10,000 or 12,000 ohm, 2 or 3 watt resistor (RCA No. 35875).

Procedure

(a) Disconnect leads attached to 3000 and 2500 ohm sections (leave ground connection intact).

(b) Change output stage plate supply from the filter input (rectifier side of speaker field, + 350 volts) to the filter output (load side of speaker field, + 250 volts). This can be done at the speaker plug. Leave the output stage screen lead connected to this same point.

(c) Install a 10,000 or 12,000 ohm, 2 or 3 watt resistor (RCA Stock No. 35875) in series between the RF-IF screen supply lead and the filter output; being sure that the existing 16 mmfd. capacitor is connected to the screen side of the resistor.

This modification slightly lowers the reserve of power output.

RCA RESISTOR-TYPE BALLAST TUBES

Marking	Stock No.	Marking	Stock No.
BK-36-C	30284	86892-2	33812
K-36-F	31005	86892-3	33813
BK-42-B	14649	86892-4	33947
BK-49-B	32544	86892-6	34563
BK-55-B	31198	86892-7	34458
BK-61-B	31585	86892-8	34805
K-61-F	31019	86892-9	35000
K-61-H	32109	86892-10	35183
B-86-A	33793	86892-11	37847
260-K1	30300	91462-1	35748
495-K1	30599	91462-2	35635
83747-6	31577	91462-3	37891
85277-3	32247	91462-5	37988
85277-4	32850	91462-6	39289
85277-5	32849	95178-10	39546
86892-1	33811	920117-1	38702

HUM

With 6AD7-G Tube:

Occasionally a type 6AD7-G tube may have internal leakage which produces hum in the receiver. This leakage may be of such a high value that it is difficult to measure, and such tubes will test OK in a tube checker. When this condition is encountered, the tube should be replaced.

SPOOL, No. 39465

Used in Condenser Drive Assembly:

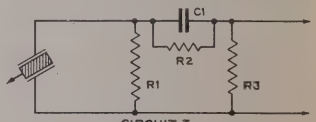
The spool used in condenser drive assemblies in Models M-51, M-89, 118, 128, 211, 224, 281, etc. is available as Stock No. 39465.

Stock No. 39465—Condenser Drive Spool

TONE COMPENSATION

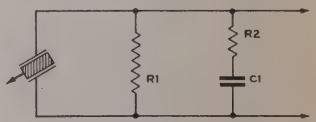
For Pickup Circuits:

Because of the widely varying frequency characteristics of various types of audio amplifiers with which crystal pickups may be used, it may be desirable in some cases to make refinements in the pickup circuit to compensate for the characteristics of the amplifier. The following circuits show examples of compensation adjustments:



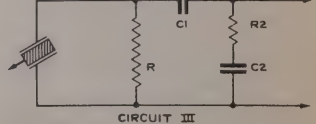
CIRCUIT I

Circuit I:
Increasing R1 increases low frequency response.
Increasing C1 increases high frequency response.
Increasing value of R3 with respect to total value of R2 plus R3 increases the output.



CIRCUIT II

Circuit II:
Increasing R1 increases low frequency response.
Increasing R2 increases high frequency response.
Decreasing C1 increases output.



CIRCUIT III

Circuit III:
Increasing R1 increases low frequency response.
Increasing R2 increases high frequency response.
Increasing value of C1 with respect to total value of C1 plus C2 increases the output.

NOTES

RCA MFG. CO., INC.

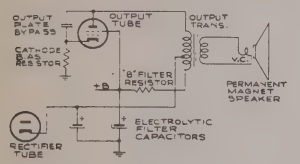
HUM REDUCTION

On AC-DC Models with PM Speaker:

In RCA AC-DC receivers that use a PM (permanent-magnet) speaker, effective hum bucking is obtained through the use of an output transformer with tapped primary. The tap is established at a point where the "ampere turns" of ripple in the direction of the output plate balances the "ampere turns" of ripple in the direction of the screen and other plate circuits.

High residual hum (at zero volume setting) may be due to incorrect balance, and can usually be remedied by one of the following steps:

(a) Output tube with off-standard characteristics.
(b) Filter capacitor too low capacity, or too high internal resistance.
(c) "B" filter resistor not correct value. Measure resistance and change if necessary.
(d) Cathode bias resistor of output tube not correct value.
(e) If hum persists change the output-tube-plate bypass to rectifier cathode instead of to output-tube cathode.
(f) If none of preceeding steps reduces the hum to a satisfactory level, replace the output transformer.



A Tapped Output Transformer is Used for Hum-Bucking in AC-DC Sets Using "PM" Speakers.

EXTERNAL ANTENNA COUPLER

For Loop Receivers:

A specially designed antenna coupler, Stock No. 9912 is available for use in connecting an external antenna to a loop receiver. This coupler will prove valuable for installations where it is desirable to eliminate the loop in order to improve the signal noise ratio and increase sensitivity.

The antenna coupler may also be used as a fixed-tuned substitute for any standard loop antenna to aid in aligning loop receivers in a shop.

The coupler covers "A" and "B" bands, approximately 550 to 1,750 kc, and 1,750 to 5,000 kc. It has low-frequency and high-frequency adjustments on each band to ensure adaptability and good performance on practically any loop receiver.

The circuit is shown in the accompanying diagram. Installation and adjustment instructions are furnished with the unit.

List Price of No. 9912 is $2.25.

SPEAKER PHASING

On Dual Speaker Sets:

On sets with two speakers it is ESSENTIAL that the speaker cones move in and out together. If one cone moves in while the other moves out, the tone will be impaired.

It is necessary to check phasing whenever a new speaker, cone, field coil, or output transformer is installed, or whenever the speaker connections are altered in any way.

There are two general types of dual-speaker sets:

(1) **Two speakers with voice-coils connected in parallel.** This type is the easiest to phase. Connect a dry cell (1½ volts) across the secondary of the output transformer and observe, by sight or feel, whether the cones both move in the same direction. If one cone moves in while the other moves out, reverse the external connections to one of the voice coils.

If one speaker is a PM, and the other is an EM, it is preferable to reverse the voice coil connections to the PM speaker to avoid upsetting the hum-bucking action of the EM speaker.

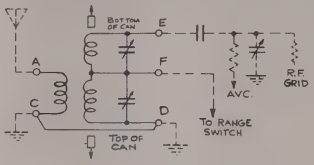
If both speakers are EM, but of different size, reverse the voice coil connections to the smaller one as this will generally have the least effect on hum.

If one or both of the speakers are EM (electro-magnet) it is necessary to have the set in operation (volume control at minimum) to provide field excitation for the EM speaker(s).

(2) **Two speakers with separate output transformers.** In this type of dual-speaker set, it is not possible to use the simple battery check for phasing because the voice coils are not connected in parallel.

The recommended method of phasing in this case is as follows:

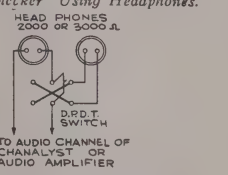
Connect a pair of radio headphones ("2,000 or 3,000 ohm" type) and a double-pole, double-throw toggle switch as shown in the accompanying diagram. Connect the two leads to an audio amplifier that has some form of output meter indicator. The audio channel in the chanalyst is ideal for this purpose.



Circuit of External Antenna Coupler Stock No. 9912

Hold both phones close in front of one speaker. Feed a 400-cycle modulated signal into the receiver and advance the receiver volume control to obtain a reading on the meter. Throw the toggle switch to each position and note the position that gives the greatest output on the meter. Mark this position "in phase." Mark the other position of the toggle switch "out of phase."

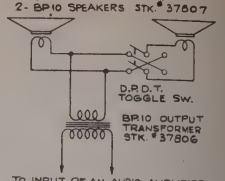
"Phase Checker" Using Headphones.



Place one headphone unit close in front of each of the two speakers, with the 400-cycle signal still fed into the receiver, and with volume control advanced. Move the toggle switch to each position and leave it at the position that gives the greatest output on the meter. Note the switch marking for this position. If it says "in phase," the speakers are correctly phased. If it says "out of phase," the speakers are out of phase and the external connections to the voice coil of one speaker should be reversed. The choice of which speaker to reverse is the same as outlined under (1).

Instead of headphones, it is possible to use two small PM speakers, a D.P.D.T. toggle switch, and an output transformer, connected as shown in the accompanying diagram.

A "phase checker" of this type will prove helpful in any radio shop.


2 - BP10 SPEAKERS STK.* 37607
D.P.D.T. TOGGLE SW.
BP10 OUTPUT TRANSFORMER STK.* 37806
TO INPUT OF AN AUDIO AMPLIFIER, OR TO AUDIO CHANNEL OF CHANALYST, OR TO 200 MICROAMP. A.C. METER.

"Phase Checker" Using Small "PM" Speakers.

REPLACEMENT PHONO MOTOR NO. 38567

Installation Instructions:

No. 38567 motor is 60-cycle replacement for Stock No. 31157 and No. 31163 used in Models U-125, U-126, U-128, U-130, U-132, U-134, etc.

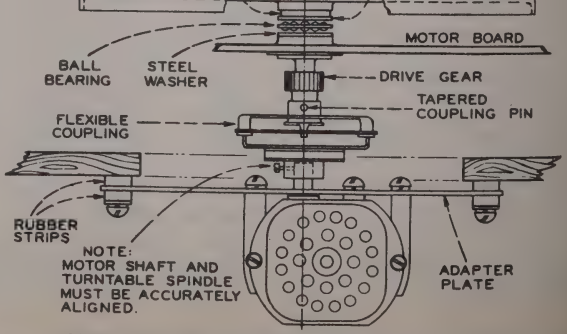
Parts Required	Unit List Price
1—RCA No. 38567 Constant Speed Motor 105-125 V.—60 cycles	$6.80
1—RCA No. 38568 Thrust Bearing Assembly	0.80
1—RCA No. 38569 Motor Support Plate	0.60
	$8.00

INSTALLATION

(a) Remove original motor and support plate assembly from instrument.
(b) Drive out TAPERED COUPLING PIN and lift turntable and spindle assembly from mechanism.
(c) Install Stock No. 38568 Thrust Bearing assembly; consisting of two ground steel washers, one felt washer and ball bearing, as illustrated. Apply slight amount clean oil to this assembly.
(d) Attach coupling to spindle with TAPERED PIN.
(e) Mount motor and support plate, being certain to precisely align turntable spindle and motor shaft. Improper alignment will produce "Wow."
(f) Mesh the flexible coupling as illustrated—same as original arrangement. If rubber strips are worn or deteriorated, replace them using RCA Stock No. 31147.
(g) Connect leads same as for original motor.

GENERAL

(a) Motor No. 38567 is a shaded pole-induction type similar to that used on RP-139 record changers. Speed is non-adjustable. Speed tolerance for extreme voltage and load conditions: 77-81 RPM. Replacements: — FIELD COIL — No. 32954; Spindle and gear—No. 38597.
(b) Remove lower steel washer from thrust bearing assembly if turntable tends to be too high, or DRIVE GEAR does not mesh properly.
(c) If mechanical hum is experienced, check flexible mounting of support plate; loosen if necessary. Cushion-mount motor if adjustment of the plate is ineffective.



Method of Installing Replacement Phono Motor No. 38567

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RCA MFG. CO., INC.

RCA CRYSTAL PICKUP DATA

CRYSTAL CARTRIDGE DRAWING CODE

"A" Top Needle Hole
"B" Viscoloid Damper
"C" Thick (5/16-in.) Mtg. Hole
"D" Thin (7/32-in.) Mtg. Hole
"E" Grounded Lug
"F" Small Weight
"G" Large Weight
"H" Large "Cut" Weight
"J" 5/8-in. Needle Screw
"K" 11/16-in. Needle Screw
"L" 13/16-in. Needle Screw
"M" 15/16-in. Needle Screw

FIG. 1

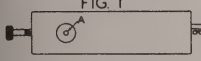


FIG. 2

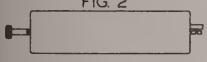


FIG. 3

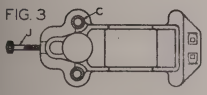


FIG. 4

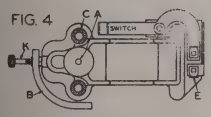


FIG. 5

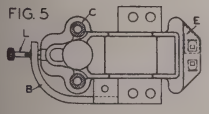


FIG. 6

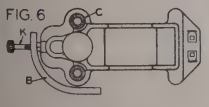
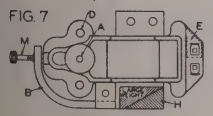


FIG. 7



Model Number	Arm Stock Number	Arm Fig. No.	Crystal Cartridge Stock No.	Crystal Cartridge Fig. No.
QU2-C	33906	3	33905	7
QU3-C	33906	3	33905	7
*QU5	34011	2	33905	7
6QU	33125	5	33122	5
8QU5-C	34305	2	34307	9
U-8	33121	5	33122	5
U-9	33591	5	33122	5
U-10	33591	5	33122	5
*11-QU	31159	1	31156	4
*12-QU	31159	1	31156	4
U-12	33906	3	33905	7
*VA-15	33906	3	35171	7
U-20	33906	3	33905	7
VA-20	9842	4	31050	3
VA-21	33591	5	33122	5
*VA-22	33096	3	31156	4
			33905**	7
*U-25	33096	3	31156	4
*U-26	33096	3	31156	4
*U-30	33096	3	31156	4
*U-40	33906	3	35171	7
*U-42	33906	3	35171	7
*U-43	33906	3	35171	7
*U-44	33906	3	35171	7
*U-45	33906	3	35171	7
*U-46	34011	2	33905	7
O-50	33216	4	33217	6
U-50	33216	4	33217	6
K-60	33591	5	33122	5
R-89	31887	4	31050	3
R-91	9842	4	31050	3
R-93-B	9842	4	31050	3
R-93-C	9842	4	31050	3
R-93-F	33591	5	33122	5
R-94-B	31211	4	31050	3
R-98	33399	1	31156	4
R-100	33121	5	33122	5
V-100	33591	5	33122	5
V-101	33591	5	33122	5
V-102	36768	3	33905	7
R-103-S	33591	5	33122	5
U-104	32227	4	31050	3
U-106	14818	6	14820	1
U-107	14818	6	14820	1
U-109	14818	6	14820	1
U-111	9842	4	31050	3
U-112	9842	4	31050	3
U-115	32137	4	31050	3
U-119	31468	1	31156	4
U-121	32137	4	31050	3
U-122E	31468	1	31156	4
UY-122E	32016	1	31156	4
*U-123	32884	1	31156	4
U-124	31468	1	31156	4
UY-124	32016	1	31156	4
*U-125	31159	1	31156	4
*U-126	31468	1	31156	4
U-127E	32137	4	31050	3
*U-128	31159	1	31156	4
*U-129	33096	1	31156	4
*U-130	31159	1	31156	4
*U-132	31159	1	32632	4
*U-134	31159	1	32632	4
*RP-139A	33906	3	35171	7
*RP-139C	34776	1	34710	10
*RP-145	33906	3	35171	7
*RP-152	33906	3	35171	7
*RP-152A	36321	3	35171	7
*RP-152B	36322	2	37158	11
*RP-152C	36591	3	35171	7
*RP-152D	37181	2	33905	7
*RP-152J	36322	2	37158	11
*RP-153	36513	2	33905	7
*V-170	33906	3	35171	7
*V-200	36321	3	35171	7
*V-201	36321	3	35171	7
*VHR-202	36322	2	33905	7
*V-205	33906	3	37158	11
*VHR-207	36322	2	33905	7
*V-300	33906	3	37158	11
*V-301	36513	2	33905	7
*V-302	36513	2	33905	7
*VHR-307	36322	2	33905	7
*V-405	33906	3	37158	11
*VHR-407	36322	2	33905	7
	33586	4	34225	8
	30707		30708	2

Automatic Record Changers.
**Used on 25 cycle model only.

FIG. 8

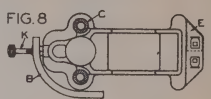


FIG. 9

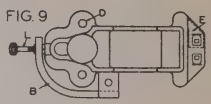


FIG. 10

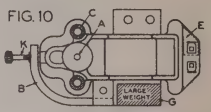


FIG. 11

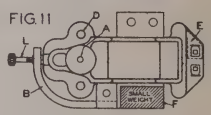


FIG. 1

FIG. 2

FIG. 3

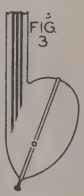


FIG. 4

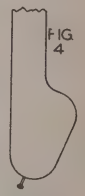


FIG. 5

FIG. 6

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ANALYSIS OF RADIO INTERFERENCE PHENOMENA
Character, Cause, Type Receivers Affected, Where Prevalent, and Service Remedies

Type of Interference	Character of Interference	Cause	Type Receivers Affected	Where Prevalent	Suggested Service Remedies
IMAGE RESPONSE	Heterodyne whistle or second signal when tuned to certain stations	Strong signal at a frequency 2xIF above desired station.	Superhet only. (1) With limited number tuned circuits ahead first detector. (2) With low impedance, high frequency resonant antenna primary circuits.	Locality strong BC stations near high end of band. Vicinity 1610-1750 Kc. Police Stations. Vicinity 1700-2000 Kc. amateur band.	(1) Wave trap tuned to interfering station. (2) Band elimination antenna such as RCA Magic Wave. (3) Re-align I-F.
HARMONIC OF I-F	Heterodyne whistle when tuning a station having same frequency as a harmonic of the I-F.	Second harmonic of station combines with oscillator fundamental forming a spurious I-F.	Superhet only. Selectivity does not affect.	Vicinity of station operating at twice I-F.	(1) Wave trap tuned to station. (2) Wave trap tuned to station second harmonic in mixer grid circuit. (3) Re-align I-F.
DIRECT I-F RESPONSE	Non-tunable code with intensity increasing toward low frequency end of band.	Commercial shore-to-ship code signal having frequency in I-F range, reaching input to I-F system.	Superhet only. (1) With limited selectivity ahead of I-F input and relatively high I-F gain. (2) With high impedance, low frequency antenna system.	Coastal areas near location of commercial stations.	(1) RCA Magic Wave antenna. (2) I-F wave trap. (3) Re-align I-F. (4) Orient loop for minimum.
HARMONICS OF OSCILLATOR	Reception of short wave code or broadcast signals at points in standard broadcast band.	Oscillator harmonics combine with short wave signals producing the required I-F. Especially prevalent on loop receivers due to secondary resonances of loop.	Superhet only. (1) With loop antenna. (2) Having oscillator rich in harmonics.	Rurally or where SW signals of proper frequency are intense.	(1) Use wave trap on interfering station. (2) Orientation of loop. (3) Re-align loop circuit. (4) Reduce oscillator excitation.
COMBINATION OF I-F	Whistle or second station(s) heard on practically all carriers.	Difference in frequency of two strong stations equal to I-F of receiver; the two stations mixing within receiver to form a constant spurious I-F.	Superhet only; having limited selectivity ahead of first detector.	Metropolitan areas, generally.	(1) Check by tracking of RF and antenna circuits. (2) Reduce size or effectiveness of antenna. (3) Install wave trap and tune to frequency of one of interfering stations. (4) Shift I-F.
HETERODYNE OSCILLATOR RADIATION	Whistle on a particular desired station, disappearing or changing frequency at random.	Radiation of receiver's heterodyne oscillator, due to oscillator strength, unusual coupling, resonant antenna, or transmission via power line.	Superhet only. (1) Without good shielding. (2) Without R-F stage.	Metropolitan areas, generally.	(1) Filter power line. (2) Use RCA Magic Wave antenna. (3) Reduce oscillator grid leak. (4) Shift I-F.
CROSS MODULATION WITHIN RECEIVER	Second station(s) appearing in background when tuned to desired station.	Strong interfering station modulating carrier of desired station within a non-linear circuit or element of the receiver; or pickup and detection taking place in audio system.	TRF and Superhet. (1) With limited or no selection ahead of first tube. (2) With exposed grid circuits and wiring associated with early tuned stages. (3) Without variable-mu input tubes.	Metropolitan areas. Vicinity of very strong stations.	(1) Wave trap in antenna tuned to station causing trouble. (2) Filter power line. (3) Install RCA Magic Wave noise reducing antenna. (4) Shield exposed grid leads and wiring of first stages.
CROSS MODULATION EXTERNAL TO RECEIVER	Second station(s) in background on or between other stations.	Detection within, and re-radiation from as power lines, telephone lines, and other aerial metallic structures.	All types of receivers are affected regardless of selectivity or design.	Vicinity of unusually strong stations, especially where open-wire power lines are prevalent. Generally changes with weather.	(1) See that power line and telephone grounds are secure. (2) Ground conduits solidly. (3) Use RCA Magic Wave antenna. (4) Orient loop antenna for minimum interference.
SAME CHANNEL BEAT	Flutter, waver, or growl heard in background when tuned to desired station.	Second station assigned to same channel, but differing very slightly in carrier frequency.	Receivers with high sensitivity and extended bass response.	In areas remote from a usable assortment of strong stations. Wherever signals of two stations on same channel are comparable in strength.	(1) Use directive or loop antenna. (2) Reduce sensitivity of set. (3) Reduce bass response.
ADJACENT CHANNEL BEAT	Steady 10,000 cycle note or whistle.	Adjacent channel carrier beating with carrier to which receiver is tuned.	TRF and Superhet; especially those with limited selectivity and wide range of audio response.	Localities where adjacent channel station is strong compared to desired station.	(1) Suppress adjacent station with sharply tuned wave trap. (2) Re-align receiver carefully. (3) Reduce high-frequency response. (4) Use directive antenna.
MONKEY CHATTER	Unintelligible modulation superimposed upon desired station, having character of "inverted speech".	Side band of adjacent channel overlapping side band and combining with carrier of desired station. Also caused by harmonics from over-modulation of adjacent station.	TRF and Superhet; having wide band selectivity and audio response.	Localities where adjacent channel station is strong. Also aggravated by extended high frequency response of transmitter.	(1) Precisely re-align receiver to make more selective. (2) Reduce high frequency audio response.

RCA MFG. CO., INC.

MODELS MI-12224, MI-12224-A

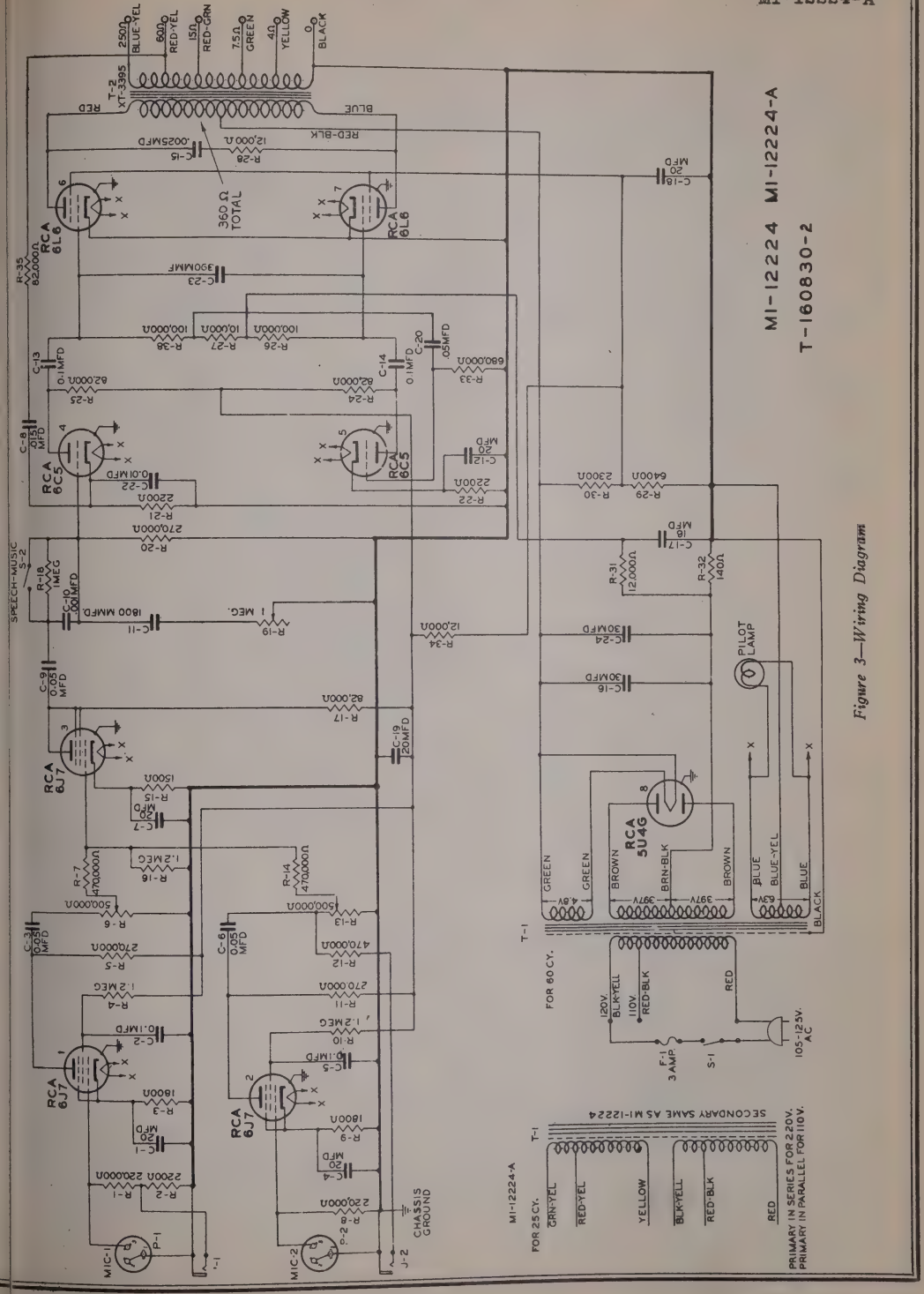

Figure 3—Wiring Diagram

MODELS MI-12224,
MI-12224-A

RCA MFG. CO., INC.

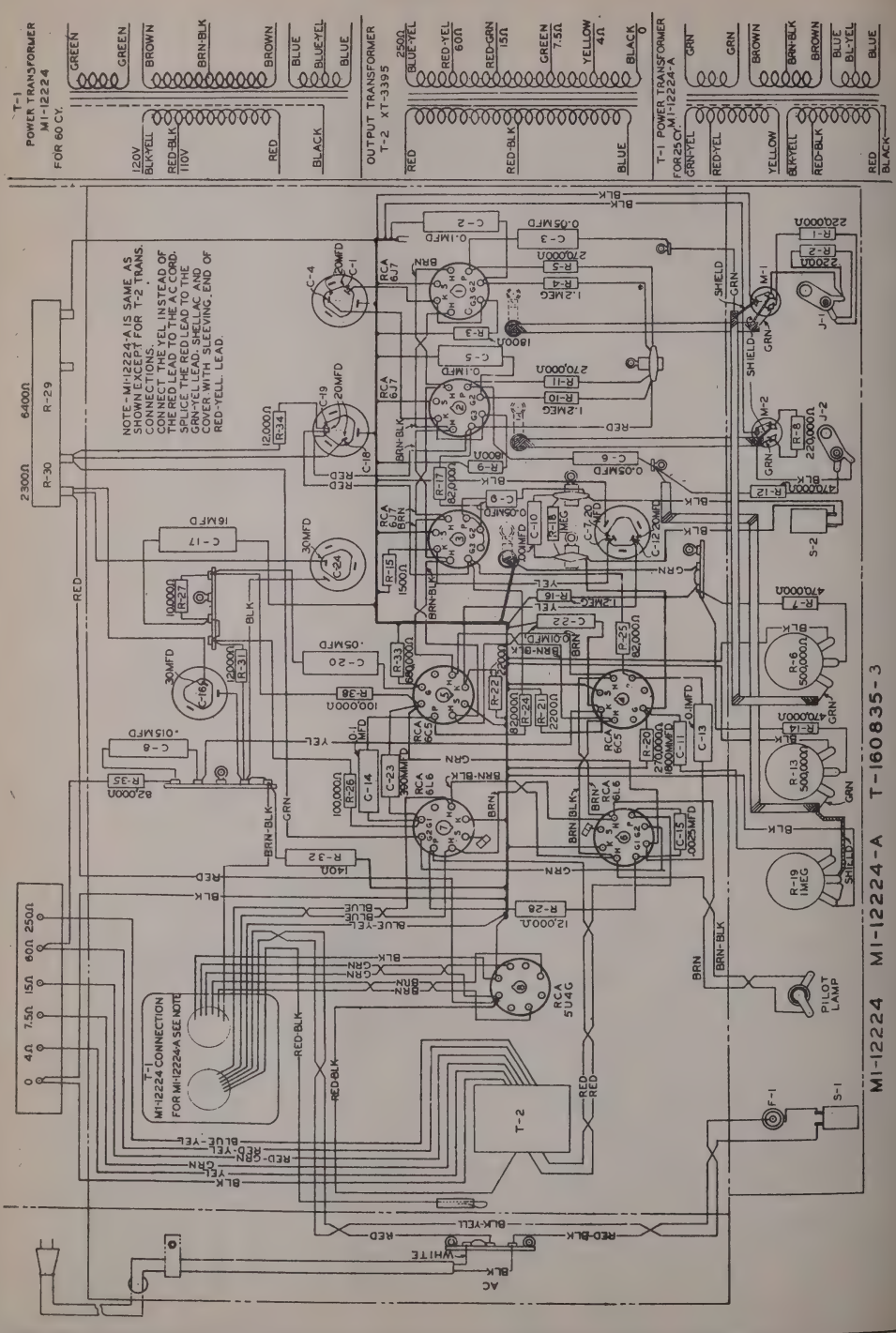

Figure 2—Schematic Diagram

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Radiotron Socket Voltages and Currents

117 AC line; Read on 20,000 ohms per volt voltmeter

Radiotron		Volts Plate to Ground	Volts Screen to Ground	Volts Cathode to Ground	Plate Current	Heater Volts
6J7	Input	70	33	1.5	0.5	6.3
6J7	Input	70	33	1.5	0.5	6.3
6J7	Mixer	90	—	2.7	1.5	6.3
6C5	Driver	100	—	3.7	1.7	6.3
6C5	Phase Inverter	100	—	3.7	1.7	6.3
6L6's	Output	385	325	26.5	57	6.3
5U4G	Rectifier		430 volts heater to ground			5.1

Operating Instructions

1. Connect the speakers to the amplifier. (See "Audio Output Connections.")
2. Insert the tubes in their respective sockets. (Make certain the tubes are of the type marked on the chassis base.)
3. Plug in the microphone and/or phonograph.
4. Adjust the controls as follows:
   (a) Set Tone Control for maximum response (full clockwise).
   (b) Set Volume Controls at minimum (counterclockwise).
   (c) Throw Speech-Music switch to Music position.
5. Plug the AC power cord into the power line outlet.
6. Turn the AC Power Switch to the "On" position and allow sufficient time for tubes to become heated.
7. Advance the Volume Controls for the respective inputs until the desired volume for each is obtained.
8. The fidelity or Tone Control should normally be operated in the full clockwise position for maximum fidelity of tone.
9. For phonograph reproduction it may be desirable to readjust the fidelity controls to obtain the most pleasing results.
10. Better intelligibility of speech results when the Speech-Music switch is thrown to Speech, reducing the amount of low frequency reproduction.
11. To change or fade from one input to another, turn the undesired input control down (counterclockwise), and the other input control up (clockwise) until the desired level is obtained.
12. In the event that mixing is desired between a phonograph pickup and a microphone which are both plugged into the same input channel, it will be necessary to have a separate volume control on the phonograph unit.

Note: Howling and squealing are not faults of the amplifier, but are caused by sound from the loudspeaker reaching the microphone. Each installation will present a different problem, however, the following suggestions may help:

1. Reduce the amplifier volume.
2. Adjust fidelity controls.
3. Change the relative position of speakers and microphones.

General Description

The RCA 25-watt amplifiers, Models MI-12224 and MI-12224A, were designed for use in sound re-enforcing and public address systems in auditoriums, churches, theatres, factories or outside gatherings. The amplifier is complete in one unit and is entirely AC operated. it incorporates two separate input channels for high impedance microphones. Each channel is also provided with a separate phonograph input, channel one for low impedance and channel two for high impedance phonograph. Each channel has a separate volume control which permits mixing of the inputs. A continuously variable high frequency tone control and a Speech-Music switch are provided on the front panel.

In this publication all references made to the MI-12224 amplifier also apply to the MI-12224-A. The difference between the two models being the power line voltage and frequency ratings as noted in the Electrical Specifications.

Electrical and Mechanical Specifications

Application	Sound Amplification
Voltage Rating MI-12224	105-125 volts, 50-60 cycles
MI-12224A	105-125/210-250 volts, 25-60 cycles
Power Consumption	165 watts
Fuse Rating	3 amperes
Source Impedance:	
Microphone (2)	High Impedance
Phonograph (1)	High Impedance
(1)	Low Impedance
Input Levels (Maximum):	
Microphone	0.22 volts
Phonograph (High Impedance)	10.0 volts
(Low Impedance)	0.31 volts
Input Levels (Minimum for Rated Output):	
Microphone	0.0055 volts
Phonograph (High Impedance)	0.5 volts
(Low Impedance)	0.0067 volts
Load Impedance	4, 7½, 15, 60 or 250 ohms
Noise Level:	
Two Channels	.002 watts
Power Output (7% RMS Harmonic Distortion) 400 cycles	25 watts
Maximum	30 watts
Frequency Response (Normal)	±3 db, 30 to 7,000 cycles

MODELS MI-12224 and MI-12224-A

STOCK No.	DESCRIPTION
	MI-12224 AND MI-12224-A
	25-WATT AMPLIFIER
43734	Bracket—Pilot lamp bracket
13894	Capacitor—390 mmfd., 400 volts (C-23)
35406	Capacitor—1,000 mmfd., 600 volts (C-10)
35407	Capacitor—1,800 mmfd. (C-11)
30850	Capacitor—.0025 mfd., 1,000 volts (C-15)
4858	Capacitor—.01 mfd., 500 volts (C-22)
11315	Capacitor—.015 mfd., 400 volts (C-8)
30847	Capacitor—.05 mfd., 400 volts (C-3, C-6, C-9, C-20)
4839	Capacitor—0.1 mfd., 400 volts (C-2, C-13, C-14, C-5)
31323	Capacitor—16 mfd., 150 volts (C-17)
34061	Capacitor—20-20 mfd., 25 volts (C-1, C-4, C-7, C-12)
18530	Capacitor—20-20 mfd., 350 volts (C-18, C-19)
34065	Capacitor—30 mfd., 450 volts (C-16, C-24)
26411	Connector—Mic. connector, female
26412	Connector—Mic. connector, male
35474	Control—Tone control, 1 megohm (R-19)
35473	Control—Volume control, 500,000 ohms (R-6, R-13)
32098	Cord—Power cord
35610	Foot—Felt foot
10907	Fuse—3 ampere (F-1)
28811	Holder—Fuse holder
23421	Jack—Phono jack (J-1, J-2)
43737	Jewel—Pilot lamp jewel
30075	Knob—Knob and set screw
11891	Lamp—Pilot lamp only
45458	Resistor—140 ohms, 10 watt (R-32)
30654	Resistor—1,500 ohms, ½ watt (R-15)
30930	Resistor—1,800 ohms, ½ watt (R-3, R-9)
34767	Resistor—2,200 ohms, ½ watt (R-2, R-21, R-22)
34606	Resistor—8700 ohms, 50 watt, tap at 2,300 ohms (R-29, R-30)
3078	Resistor—10,000 ohms, ½ watt (R-27)
30436	Resistor—12,000 ohms, ½ watt (R-31)
30866	Resistor—12,000 ohms, 1 watt (R-34)
8073	Resistor—12,000 ohms, 2 watt (R-28)
8064	Resistor—82,000 ohms, ½ watt (R-17, R-24, R-25, R-35)
3252	Resistor—100,000 ohms, ½ watt (R-26, R-38)
14583	Resistor—220,000 ohms, ½ watt (R-1, R-8)
30651	Resistor—270,000 ohms, ½ watt (R-5, R-11, R-20)
30648	Resistor—470,000 ohms ½ watt (R-7, R-12, R-14)
30562	Resistor—680,000 ohms, ½ watt (R-33)
30652	Resistor—1 megohm, ½ watt (R-18)
30162	Resistor—1.2 megohms, ½ watt (R-4, R-10, R-16)
30278	Screw—Thumb screw for cover
31319	Socket—Tube socket
7900	Switch—S.P.S.T. (S-1)
34519	Transformer—Output transformer, XT-3395 (T-2)
45463	Transformer—Power transformer (For MI-12224 only) (T-1)
45464	Transformer—Power transformer (For MI-12224-A only) (T-1)

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Installation and Service Data

AUDIO INPUT CONNECTIONS

All audio input connections are made to the amplifier through the use of plugs. A microphone plug for each channel is furnished with the amplifier. Microphones having single conductor shielded cables, connect the conductor to terminal No. 3, shield to No. 1 of the plug. Those using double conductor cables, connect high side to terminal No. 3, low side to No. 2, and shield to No. 1.

PHONOGRAPH CONNECTIONS

Phonograph connections are made by means of a standard phone type plug (not furnished with the equipment). The ground lead or shielding on the phonograph cable should be connected to the sleeve of the plug.

(a) Magnetic

"Phono 1" jack is provided for the connection of any standard magnetic pickup to channel No. 1.

(b) Crystal

"Phono 2" jack is provided for the connection of any standard crystal pickup, to channel No. 2.

RADIO INPUT CONNECTIONS

A simple method of connecting the output of a radio receiver to an amplifier of low impedance input is shown in Figure 4. It is not necessary to remove the chassis to make these connections and is still possible to use the regular speaker, if so desired.

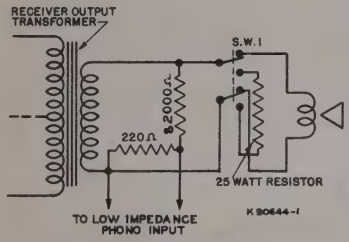


Figure 4—Radio Connections to Amplifier

Connect an 82,000-ohm resistor, stock No. 8064, and a 220-ohm resistor, stock No. 5201, in series across the secondary of the output transformer. Connect a shielded two-conductor cable across the 220-ohm resistor, and run the cable to the input receptacle, J-1, of channel No. 1. Connect a double-pole, double-throw switch to the speaker voice coil and a resistor of the same value as the impedance of the speaker voice coil so that when the speaker is disconnected the loading resistor is connected as a substitute for the voice coil load. This switch is optional, however, the resistor should be substituted if the speaker is not used.

The volume of the receiver should then be adjusted to the desired level for best operation of the input channel.

CAUTION—If voice coil is grounded, make sure ground side is connected to ground side of the amplifier input.

POWER CONNECTIONS

Power connections to the amplifier are made by means of the power cord and plug attached. As described heretofore, the MI-12224 amplifier may be operated from an AC line of 50 to 60 cycles, 105 to 125 volts. The MI-12224-A is designed for operation where the power available may be within the range of 25 to 60 cycles, 105 to 125 volts or 210 to 250 volts.

The "AC" cable on the MI-12224-A Amplifier, as shipped from the factory, is normally connected to the 240-volt transformer leads and should remain so connected unless it is definitely ascertained that the line voltage does not exceed 230 volts. If the line voltage is known to be between 210 and 230 volts, the "AC" cable should be connected to the 220 volt transformer leads.

The color coding of the leads on the power transformer of the MI-12224-A Amplifier is as follows: (See Schematic Diagram.)

Lead Number	Color Code
1	Red
2	Red-Black 50/50
3	Black-Yellow
4	Yellow
5	Red-Yellow 50/50
6	Green-Yellow 50/50

The following connections should be made for the line voltages indicated:

Voltage	Connect Together	Connect AC Cable to
240	3 and 4	1 and 6
220	2 and 4	1 and 5
120	1 and 4; 3 and 6	1 and 4, 3 and 6
110	1 and 4; 2 and 5	1 and 4; 2 and 5

CAUTION: The leads connected together should be soldered and taped securely to prevent short circuits. All unused leads should also be taped.

FUSES

A 3-ampere fuse is provided to protect the amplifier. It is located on the control panel adjacent to the "Power Off-On" switch.

CAUTION—Replacement fuses of the same type and rating should be kept as spare parts. Never replace the fuse with one of higher rating.

AUDIO OUTPUT CONNECTIONS

The amplifier will supply an output of 25 watts to various loudspeaker loads. The output transformer is tapped for load impedance of 250, 60, 15, 7½ and 4 ohms and the taps brought out to a marked terminal board on the back of the amplifier in order that the proper loudspeaker impedance may be obtained. The number of speakers that may be used with the amplifier is limited only by the power output of the amplifier. However, in connecting the speakers, care should be taken that the proper impedance is used so that the amplifier has the correct load. This gives the best possible power output and tone.

The following load impedance can be matched by making connections to the terminals as indicated in the table below:

LOAD IMPEDANCES

Terminal Numbers	Impedance Ohms
4 — 7.5	0.5*
7.5 — 15	1.2*
4 — 15	3.3*
0 — 4	4.0
0 — 7.5	7.5
0 — 15	15
7.5 — 60	26
4 — 60	34
0 — 60	60
15 — 250	145
7.5 — 250	170
4 — 250	192
0 — 250	250

* Use only for light loads, such as for monitoring purposes.

CONNECTING SPEAKERS

1. **Wattage Rating of Speakers.**—The power output of the MI-12224 amplifier is 25 watts. With this power, it is evident that the speaker or speakers must have adequate power handling capacity, or damage may result.

With **only one** speaker connected to the amplifier, the speaker must have a rating of at least 25 watts in order to handle the maximum output.

If the power is divided between two or more speakers, the required wattage of each speaker is determined by—

$$\text{Required wattage of each speaker} = \frac{25}{\text{Number of speakers}}$$

If speakers of a certain wattage rating are available, the required number of speakers is determined by—

$$\text{Required number of speakers} = \frac{25}{\text{Wattage rating of speaker}}$$

2. **Matching Speaker Load to Power Amplifier.**—To secure the highest efficiency and tone quality, it is necessary to match the speaker load to an identical or closely matched impedance on the tapped secondary of the output transformer in the power amplifier.

For example, if only one 15-ohm speaker, capable of handling 25 watts or more, is to be used, it should be connected to terminals 0 and 15.

When several speakers are to be used, they should preferably be connected in parallel.

The impedance of parallel-connected speakers (each of the same impedance) is equal to—

$$\text{Total impedance} = \frac{\text{Impedance of one speaker}}{\text{Number of parallel-connected speakers}}$$

Thus, if two 15-ohm speakers are connected in parallel, the total impedance is 15 divided by 2 or 7.5 ohms. In this case the speakers are connected to terminals 0 and 7.5 on the power amplifier.

3. **Connecting a Quantity of Speakers.**—When a quantity of speakers are to be connected to the amplifier, it is desirable to employ permanent-dynamic speakers, each equipped with a tapped coupling transformer. The RCA MI-6249, MI-6310, MI-6319, MI-6320 or MI-6233 speakers are recommended.

With these speakers and coupling transformers, it is possible to select the desired value of impedance for each speaker so that the total impedance of all in parallel will match an available output impedance on the power amplifier. An additional advantage of this arrangement is that the impedance of some of the speakers may be increased or decreased to secure higher or lower volume from these particular speakers to meet the requirements of any installation.

The various line impedances for single speakers that may be secured by different connections on the speaker coupling transformer are tabulated in Table 1 and Table 2.

The method of determining the correct connections for matching is as follows:

Assume that 40 of the MI-6320 loudspeakers are to be used, all connected in parallel to one MI-12224 power amplifier. Refer to Table 2. If the 5,000-ohm taps are used, the total speaker impedance will be 5,000 divided by 40 or 125 ohms. Since there is no output impedance close to 125 ohms, but by using the 2,400-ohm taps on each speaker, the total impedance will be 2,400 divided by 40, or 60 ohms. There is a 60-ohm output impedance tap, and this will furnish a good match. Therefore use the 2,400-ohm tap on each speaker (red to black leads) and connect the total speaker load to the 60-ohm output terminals on the amplifier (terminals 0 and 60).

Leveling Volume in Large and Small Rooms.—With a quantity of speakers connected in parallel, if identical connections are made on the coupling transformer of each speaker, the same amount of power will be delivered to each speaker. Therefore, when the master volume control is adjusted to give satisfactory volume level for an average-size room, it may be found that this volume setting is too low for a large room, and too high for a small room.

To correct this condition, it is necessary to alter the connections to the coupling transformers on the speakers in these rooms:

To secure greater volume from a room speaker, select connections that will give a **lower line impedance** for the speaker, so that this speaker will receive more power than the others connected in parallel with it.

To secure lower volume from a room speaker, select connections, that will give a **higher line impedance** for the speaker, so that this speaker will receive less power than the others connected in parallel with it.

TABLE 1
AVAILABLE IMPEDANCES
RCA-MI-6233 and MI-6249 Permanent-magnet Speakers

(MI-12315 Coupling Transformer)

Voice coil impedance	6 ohms
Blue to green-red tracer	2 ohms
Yellow to green-red tracer	6 ohms
Blue to yellow	15 ohms
Black to green-red tracer	36 ohms
Blue to black	55 ohms
Red to black	225 ohms
Red to yellow	342 ohms
Red to green-red tracer	438 ohms
Red to blue	500 ohms

Note: As shipped from factory, MI-6233 Speakers have red and blue leads connected to terminal board.

TABLE 2
AVAILABLE IMPEDANCES
RCA-MI-6310, MI-6319 or MI-6320 Permanent-magnet Dynamic Speakers

(Using MI-12345 Transformer)

Blue to green-red tracer	2 ohms
Blue to yellow	6 ohms
Black to yellow	400 ohms
Black to blue	500 ohms
Yellow to black-red tracer	1,080 ohms
Blue to black-red tracer	1,250 ohms
Red to black	2,400 ohms
Red to yellow	4,500 ohms
Red to blue	5,000 ohms

QUANTITY OF SPEAKERS

For hotel rooms, and similar quiet installations, each MI-12224 power amplifier may be used to operate approximately 300 MI-6310 or MI-6233 loudspeakers.

For installations such as schools, where the room noise level may be high, it is advisable to allow one power amplifier for 40 speakers.

RADIO FREQUENCY INTERFERENCE

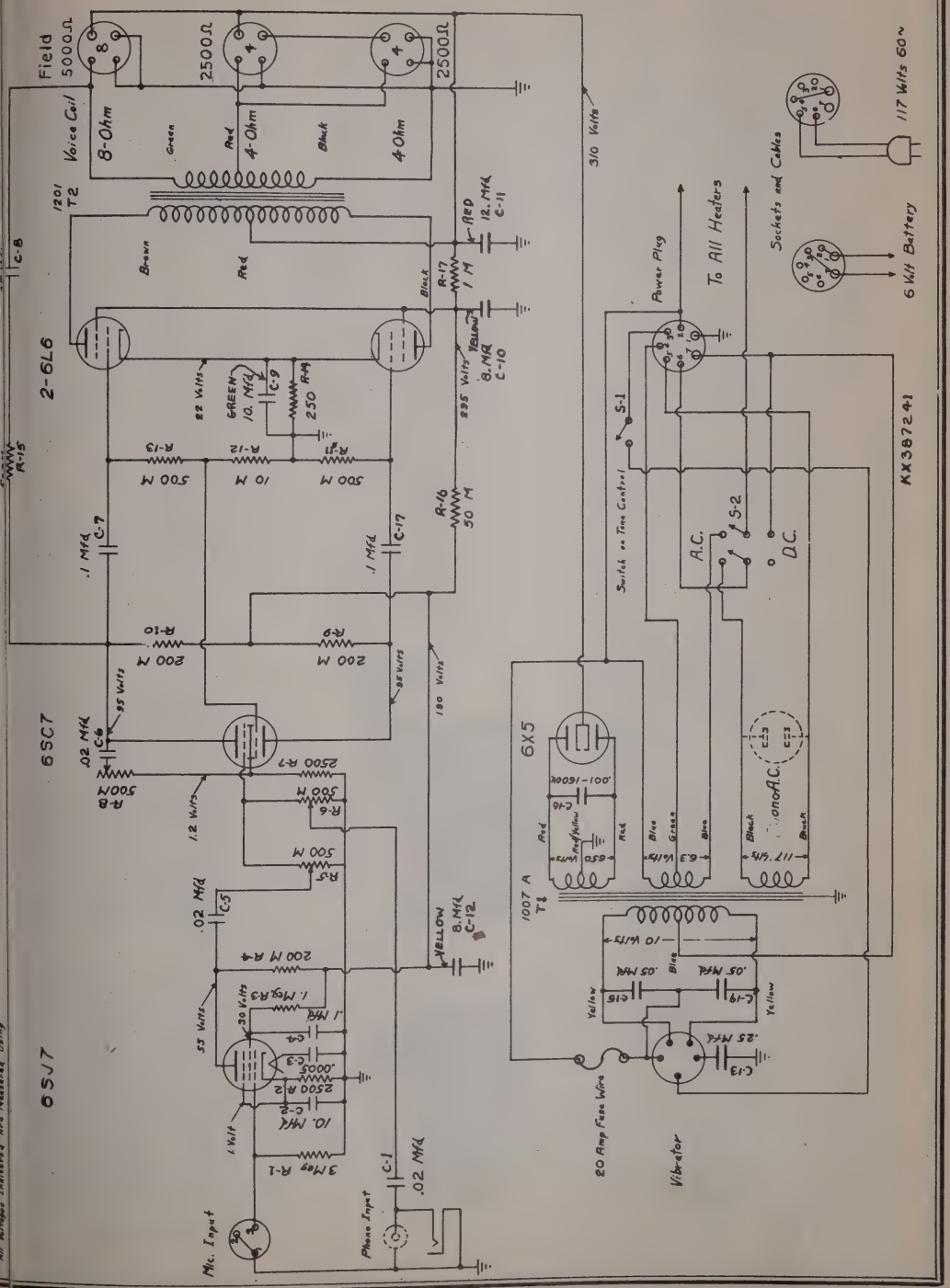
R-F interference may be experienced when an amplifier is operated in close proximity to a radio transmitter. This interference is usually caused by a high frequency station and may enter the amplifier through many ways. Any external connection to the amplifier, such as input, power or output leads, may be the collecting medium. Inasmuch as the signal frequency, manner of interference, etc., are subject to such variations, it is difficult to recommend a cure for all conditions. In general, however, a suitable means of correcting this difficulty is to by-pass, to ground with small condensers, each side of the line causing the trouble. It is not possible to specify exact values to use because of varying conditions, usually values within the range of 50 to 500 mmfd. will be satisfactory.

ELECTRO-DYNAMIC LOUDSPEAKERS

This amplifier is designed for use with permanent-magnet dynamic loudspeakers. If it is desired to use electro-dynamic speakers a separate field supply is required, as no provision has been made in this amplifier to excite speaker fields.

RCA MFG. CO., INC.

MODELS MI-12232, MI-12763



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MI-12232 AMPLIFIER & COVER ONLY
MI-12763 AMPLIFIER & RECORD PLAYER

Electrical and Mechanical Specifications

Amplifier

Application	Sound Re-enforcement
Installation	Permanent or Mobile
Voltage Rating AC	105/125 volts, 50/60 cycles
DC	6-8 volts DC
Power Consumption AC	80 watts
DC (6-volt supply)	9.5 amps. operating 3 amps. standby
Fuse DC	20 amperes
Input Impedance Microphone	High Impedance
Phonograph	High Impedance
Load Impedance	4 or 8 ohms
Frequency Range	60 to 10,000 cycles
Power Output—AC or DC Operation	15 watts
Input Level—Max. permissible Microphone	0.33 volts
Phonograph	10.0 volts
Min. for rated output Microphone	0.003 volts
Phonograph	0.33 volts
Hum Level—Max. AC Operation (input terminated 40,000 ohms)	0.00015 watts
DC Operation (input terminated 40,000 ohms)	0.00038 watts

Record Player Motor

Voltage Ratings AC	105/125 volts, 60 cycles
Power Consumption AC	20 watts

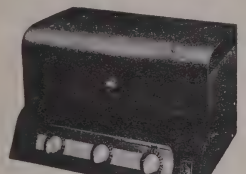


Figure 2—MI-12232

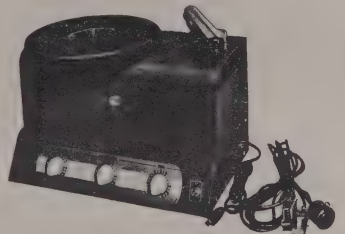


Figure 1—MI-12763

Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
46716	Arm—Pickup arm complete with base and cable (MI-12763 only)	46712	Knob—Control knob
		46714	Motor—Phono motor (MI-12763 only)
46723	Arm—Pickup arm shell only (MI-12763 only)	46736	Plate—Dial plate
46724	Base—Pickup arm base (MI-12763 only)	46716	Pulley—Idler pulley (MI-12763 only)
46722	Cable—Pickup cable (MI-12763 only)	46717	Pulley—Motor pulley (MI-12763 only)
46729	Capacitor—.0005 mfd., 600 volts (C3)	13218	Resistor—250 ohms, 2 watts (R14)
46720	Capacitor—.001 mfd., 1,600 volts (C16)	14720	Resistor—1,000 ohms, ½ watt (R17)
4570	Capacitor—.02 mfd., 400 volts (C1, C5, C6)	14024	Resistor—2,500 ohms, ½ watt (R2, R7)
4896	Capacitor—.05 mfd., 400 volts (C2, C14, C15)	14559	Resistor—10,000 ohms, ½ watt (R15)
30849	Capacitor—.25 mfd., 400 volts (C13)	3114	Resistor—50,000 ohms, ½ watt (R16)
4539	Capacitor—0.1 mfd., 400 volts (C4, C7, C17)	11676	Resistor—200,000 ohms, ½ watt (R4, R9, R10)
46707	Capacitor—10 mfd., 25 volts (C9)	30648	Resistor—500,000 ohms, ½ watt (R11, R12, R18)
46721	Capacitor—Filter capacitor (C8, C10, C11, C18)	13720	Resistor—1 megohm, ½ watt (R3)
46739	Capacitor—Motor capacitor	25514	Resistor—3 megohms, ¼ watt (R1)
46727	Connector—AC cord—7 contact female	33792	Socket—Phono AC
46728	Connector—AC-DC connector—7 contact male	4794	Socket—Speaker plug socket—4 contact
28418	Connector—Microphone—3 contact male	31219	Socket—Tube socket—8 contact
28411	Connector—Microphone—3 contact female	46702	Socket—Vibrator socket—5 contact
25787	Connector—Pickup input, female (For MI-12763 only)	46719	Spring—Idler pulley tension spring (MI-12763 only)
31048	Connector—Pickup cable plug (MI-12763 only)	46715	Support—Pickup arm support clip (MI-12763 only)
31697	Control—Tone control—500,000 ohms—inclusive AC switch (S8)	46734	Switch—AC-DC switch with plate
25672	Control—Microphone and phono. volume control —2,000,000 ohms (R5, R6)	32975	Switch—Phono motor switch (MI-12763 only)
		46733	Transformer—Output transformer (T2)
46740	Cord—DC cord with clips	46732	Transformer—Power transformer (T1)
46731	Crystal—Pickup crystal unit only (MI-12763 only)	46730	Turntable—complete (MI-12763 only)
28481	Jack—Phono jack	46735	Vibrator—complete

General Description

The MI-12763 Amplifier and Record Player consists of a 15-watt amplifier, together with a turntable and pickup assembly as shown in Figure 1. This equipment can be operated from either a 6-8-volt DC supply or a 110-volt, 60-cycle supply. Two power supply cables are furnished with their associated plugs, one for DC operation and the other for AC operation. It is only necessary to use the proper cable corresponding to the available power supply and throw AC-DC power switch to the corresponding position. See installation instructions.

The MI-12232 Amplifier is identical to the MI-12763, except a plain cover is supplied in place of the phono-pickup and turntable.

Input.—There are three jacks on the amplifier unit. 1—A polarized microphone jack for high impedance microphone; 2—A telephone type jack for external high impedance phonograph input; 3—A pin type, single conductor, shielded jack for the output of the crystal pickup supplied with the MI-12763 equipment. Both microphone and phonograph may be used independently or simultaneously. Two separate volume controls are provided, one for microphone and the other for the two phonograph inputs which are paralleled in the amplifier. Any suitable high impedance microphone may be used. See installation instructions for connections to amplifier.

Output.—The amplifier output connections are brought out to receptacles on the rear of the chassis.

Installation Instructions

AC OPERATION.—The MI-12763 Amplifier and Turntable will operate from 105 to 125 volts AC, 60 cycles. The MI-12232 Amplifier may be used on an AC supply of 50-60 cycles if desired. The power input receptacle to the amplifier is located on the rear of the chassis, and is used for either AC or DC power supplies, with the proper cable.

Insert the tubes in their respective sockets. Make certain that they are firmly in place. Insert the plugs on the turntable assembly in the receptacles on top of the amplifier chassis. Place the cover over the amplifier chassis and secure in place by the four screws provided.

Input.—The audio input connections are made to the chassis through the use of plugs. A standard amphenol microphone plug is used with this equipment. Connect the shield to terminal No. 1 (red dot), the low side to terminal No. 2, and the high side to terminal No. 3. The following microphones are suitable for use with this amplifier: MI-6202, MI-6205, MI-6207, and MI-4036-K. The MI-6202 is recommended for speech use as special compensation is provided to insure maximum intelligibility. When the MI-12232 amplifier is used with an external turntable, use the input jack on the side of the chassis. Connect shield and/or ground side to sleeve of a telephone type plug, and the high side to the tip of the plug.

CAUTION: Care should be exercised in keeping the AC power line away from the microphone cable or terminals. Otherwise, a hum may be heard in the loudspeaker(s).

Output.—The output receptacles are connected, as it leaves the factory, to match load impedances of 4 or 8 ohms. If one speaker is to be used it should have an impedance of either four (4) or eight (8) ohms. The voice coil connections should be made to the two **small** prongs of the proper speaker receptacle. Two fifteen (15) ohm speakers should be connected in parallel and placed in the socket marked "8."

Field Supply.—If required, these amplifiers can also be used to supply loudspeaker field current. If a single speaker is used, the field should have a resistance between 5,000 and 10,000 ohms. It should be connected across the **large** prongs of the output receptacle marked "8."

If two speakers are to be used, each should have a field resistance of between 2,500 and 5,000 ohms. Connect one across the **large** prongs of each of the output receptacle marked "4."

DC OPERATION.—DC operation is identical to AC operation, except that DC power cable should be inserted into the amplifier power receptacle in place of the AC cord.

IMPORTANT: When the amplifier is used in an automobile, truck or on any 6-volt battery supply, the clip marked YELLOW on the black battery cable must always be connected to the frame or ground side of the battery, regardless of whether the "+" or "–" side of the battery is grounded.

The toggle switch marked "AC-DC," located on the front panel is used as the ON-OFF switch. When the amplifier is connected to a battery (DC) it is "off" when the switch is in the AC position. When connected to an AC 110-volt line the amplifier is "off" when the switch is in the DC position.

Operating Instructions

1. **Speakers** should be properly connected to their respective output terminals.
2. **Microphone** connections should be made to the 3-terminal "MIC" receptacle on the end of the chassis.
3. **Phonograph** connections (external) are made through a two-way plug to the "Phono" jack on the end of the chassis.
4. **Power Cord.** Connect the proper power cord to the receptacle on the rear of the chassis and to the source of power.
5. **AC-DC Switch.** The AC-DC switch acts as an ON-OFF switch. When the amplifier is connected to an AC source the "off" position is at the DC point. When a DC source of power is used the "off" position is at the AC point.
6. **Microphone and Phonograph Controls** should be turned to maximum counterclockwise position. **Tone Control** to the maximum clockwise position.
7. **DC Standby Switch.** When the Tone Control is in the counterclockwise position the DC Standby Switch is in "off" position. In this position the tube filaments are lighted, but the vibrator high-voltage supply is turned off, reducing the battery drain during the time the amplifier is not in actual use.
8. **Phono-Switch.** On the MI-12763 Amplifier the phono-switch is located on the end of the amplifier cover just above the "MIC" input connection.
9. **Volume and Tone Controls** should be adjusted for the desired levels and tone quality.

Tube Socket Voltages

115-Volt AC Line. 1,000 Ohms Per Volt Meter.

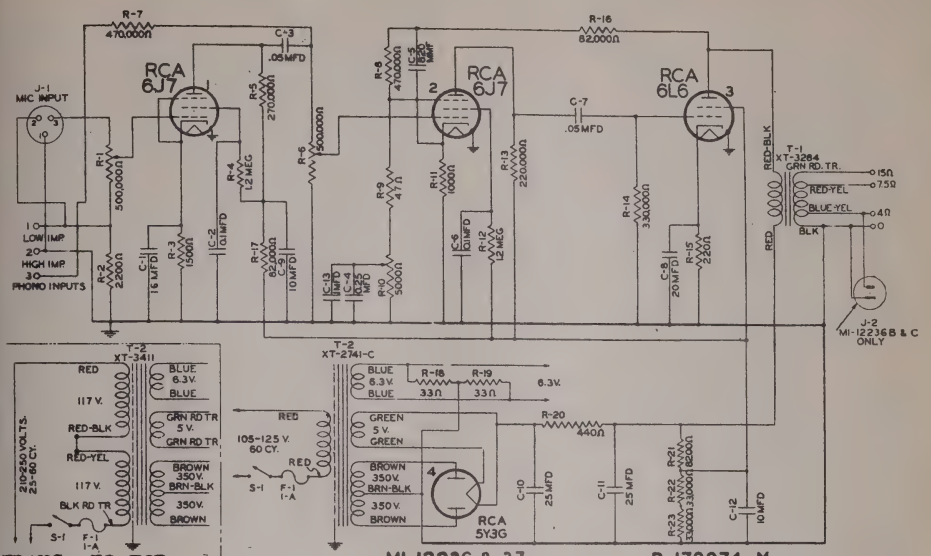
	Radiotron	Plate MA	Plate Volts	Screen Volts	Bias Volts	Heater Volts
(1)	RCA-6S7	0.25	55	36	1.8	6.35
(2)	RCA-6SC7	0.2	95	——	1.6	6.35
(3)	RCA-6L6	42.	295	300	22	6.35
(4)	RCA-6L6	42.	295	300	22	6.35
(5)	RCA-6X5	——	310/310	——	——	6.35

Total "B" current, 85 ma.

All voltages read to ground except Heater Volts.

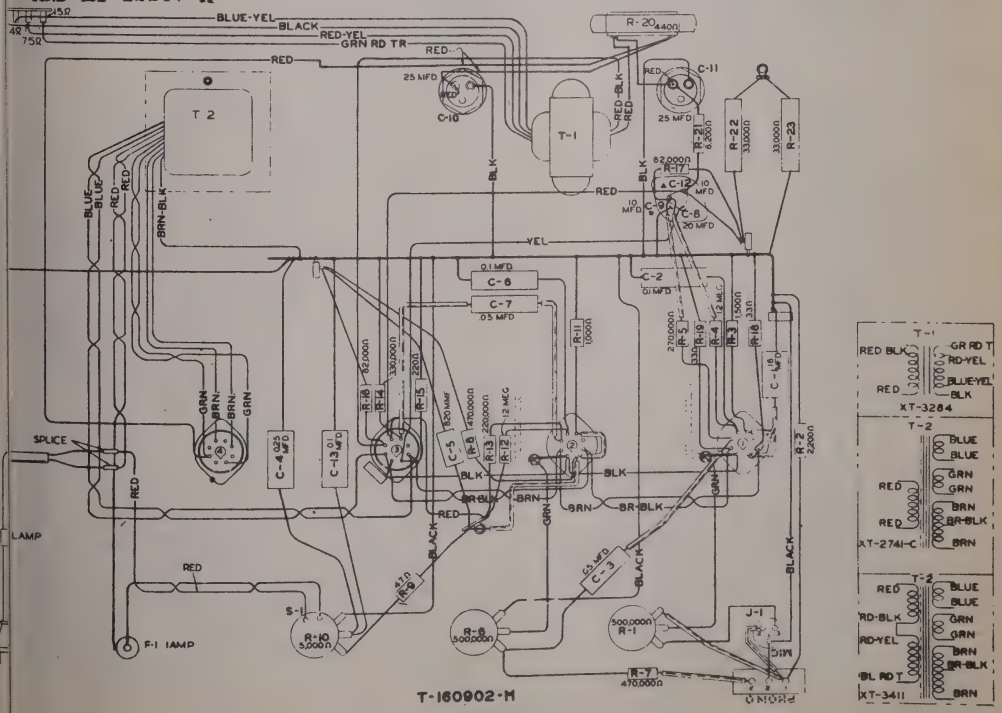
RCA MFG. CO., INC.

MODELS MI-12236,-A
MI-12237,-A



TRANS. T2 FOR MODELS MI-12236-A AND MI-12237-A

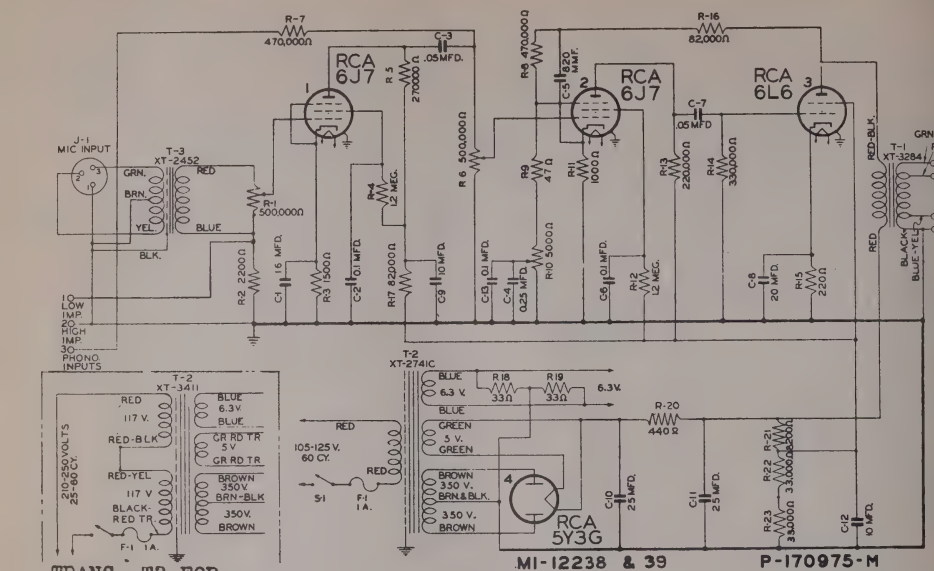
Schematic Diagram



Wiring Diagram

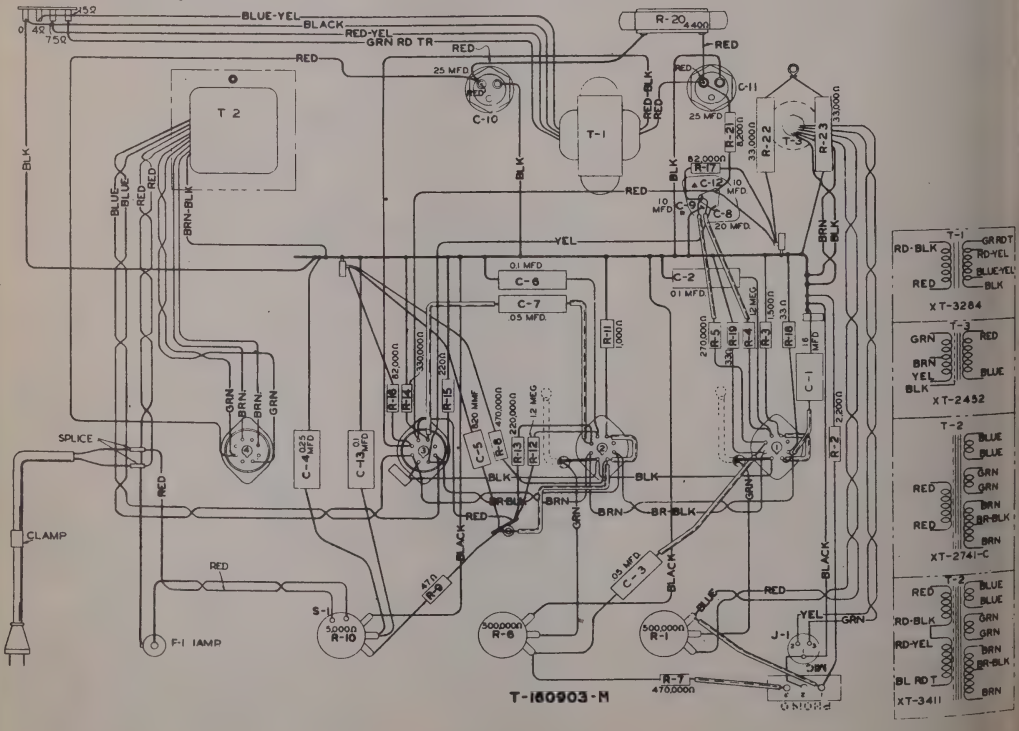
MODELS MI-12238,-A
MI-12239,-A

RCA MFG. CO., INC.



TRANS. T2 FOR
MODELS MI-12238-A
AND MI-12239-A

Schematic Diagram



Wiring Diagram

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MI-12237 & MI-12237-A
MI-12239 & MI-12239-A
INCLUDING COVER MI-12318-A
MI-12236 & MI-12236-A
MI-12238 & MI-12238-A
WITHOUT PERFORATED COVER

RCA MFG. CO., INC.

MODELS MI-12236,-A
MI-12237,-A
MODELS MI-12238,-A
MI-12239,-A

RCA PAGE 14-83

General Description

The type MI-12236 and MI-12237 amplifier units are designed as general purpose amplifiers for use in sound re-enforcing, public address, and paging systems. Each is completely AC operated, and will deliver an output of 6 watts. Each is equipped with a receptacle for high impedance microphone and a terminal board having provisions for two separate phonograph inputs, one for high impedance and the other a low-impedance pickup. Two separate Volume Controls and a combination Tone Control-Power Switch are provided. The one marked "Volume" is an input control in the grid circuit of the first tube and controls the microphone input level. The other or "Master" volume control operates in the grid circuit of the second stage and controls the overall volume for all inputs.

The type MI-12238 and MI-12239 amplifiers are identical to the above except they include a 250 ohm input transformer.

Electrical and Mechanical Specifications

Application	Sound Re-enforcement
Power Supply (MI-12236, MI-12237, MI-12238 and MI-12239)	105/125 volts, 50/60 cycles
(MI-12236-A, MI-12237-A, MI-12236-A and MI-12239-A)	105-125/210-250 volts, 25/60 cycles
Power Consumption	75 watts
Fuse	1.0 amp.
Source Impedance:	
(1) Microphone (MI-12236 and MI-12237)	Minimum, 1,000 ohms
(MI-12238 and MI-12239)	250 ohms
(2) Phonograph (Terminals Nos. 1 and 2)	Magnetic Pickup
(3) Phonograph (Terminals Nos. 2 and 3)	Crystal Pickup
Load Impedance	4, 7½ or 15 ohms
Power Output (7.5% R.M.S. Harmonic Distortion), 1,000 cycles	6 watts
Maximum	12 watts
Input Levels:	
Maximum Permissible:	
(1) Microphone (MI-12236 and MI-12237)	2.0 volts
(MI-12238 and MI-12239)	0.15 volts
(2) Phonograph (Low Impedance)	0.135 volts
(3) Phonograph (High Impedance)	20 volts
Minimum for Rated Power Output:	
(1) Microphone (MI-12236 and MI-12237)	0.0045 volts
(MI-12238 and MI-12239)	0.0003 volts
(2) Phonograph (Low Impedance)	0.0045 volts
(3) Phonograph (High Impedance)	2 volts
Frequency Response	±2 db. 70 to 10,000 cycles
Total Noise Level (Inputs open—output 15-ohm load)	(–20 db.*) .00006 watts

* Zero db—0.006 watts, zero ref. level.

Audio Output Connections

Wattage Rating of Speakers.—With one speaker connected to an amplifier, the speaker must have a power rating at least equivalent to the power output of the amplifier in order to handle the maximum output. If the power is divided between two or more speakers, the required wattage of each speaker is determined as follows:

Required wattage of each speaker=

$$\frac{\text{Total Amplifier Output}}{\text{Number of Speakers}}$$

Matching Speaker Load to Power Amplifier.—To secure the highest efficiency and tone quality, it is necessary to connect the speaker load to an identical or closely matched impedance on the tapped secondary of the output transformer in the power amplifier. For example, if one 15-ohm speaker, capable of handling the rated output of the amplifier, is to be used, it should be connected between the 0 and 15-ohm tap on the amplifier.

When several speakers are to be used, they should preferably be connected in parallel.

The impedance of parallel-connected speakers (each of the same impedance) is equal to:

Total impedance=

$$\frac{\text{Impedance of one speaker}}{\text{Number of parallel-connected speakers}}$$

Thus, if two 15-ohm speakers are connected in parallel, the total impedance is 15 divided by 2 or 7.5 ohms. In this case, the speakers are connected between the 0 and 7.5 tap on the power amplifier.

Tube Socket Voltages

117 VOLT AC LINE—METER 20,000 OHMS PER VOLT

Tube	Plate Volts	Plate Current MA.	Screen Grid Volts	Cathode Volts	Heater Volts
RCA-6J7	77	7	33	1.1	6.3
RCA-6J7	107	1.2	35	1.3	6.3
RCA-6L6	290	65	250	17	6.3
RCA-5Y3G	350*	35*	—	—	4.8

* Each Plate

AC Power Connections

A power cord and plug is supplied connected to the amplifier for plugging into a line receptacle. The MI-12236-A, MI-12237-A, MI-12238-A and MI-12239-A are shipped from the factory connected for 220 volt operation. A 1-ampere protective line fuse is provided on the right side of the amplifier base. **Caution: Should it be necessary to replace fuse, use one of the same current rating. Never use one of higher rating.**

Audio Input Connections

Microphone.—Microphone connections are made by means of the microphone plug furnished with the equipment. Connect the cable shield to pin No. 1 and the two leads to pins No. 2 and No. 3 of the plug. **Make sure pins No. 1 and No. 2 are not common connected or the low-impedance phonograph terminals will be shorted when the microphone plug is inserted.**

Phonograph—Magnetic Pickup.—Phonograph connections, when using a magnetic type pickup, are made to the "PHONO" terminal strip on the front of the amplifier. If single-conductor shielded cable is used, connect the shield to terminal No. 2 and the conductor to terminal No. 1. This connects the pickup directly across the 2,200-ohm series resistor R-2.

Phonograph-Crystal Pickup.—To connect a crystal pickup unit to the amplifier use "PHONO" terminals No. 2 and No. 3. A shielded cable, either single or two-conductor, should be used. The shield and ground lead on the phonograph cable should be connected to terminal No. 2 and the conductor to terminal No. 3.

With phonograph inputs, it is important to keep the input signal at a sufficiently low level, to prevent overloading the amplifier. It is necessary to provide a volume control on the phonograph to independently control the phonograph volume and provide mixing between phonograph and microphone input.

Operating Instructions

1. Connect Amplifier to proper power source and insert tubes in their respective sockets.
2. Connect Speakers to Amplifier as specified under Audio Output Connections.
3. Plug in Microphone and/or connect Phonograph to proper input terminals.
4. Turn amplifier ON ("TONE" control knob full clockwise).
5. Turn "MASTER" volume control about three-quarters ON.
6. Turn "VOLUME" control clockwise until the desired Microphone output level is obtained.
7. In the event that mixing is desired between microphone and a phonograph, it will be necessary to add an external volume control in the phonograph circuit. By adjusting this and the Microphone "VOLUME" control, the desired mixing can be obtained.
8. Retard "TONE" control if desired for pleasing reproduction of speech.

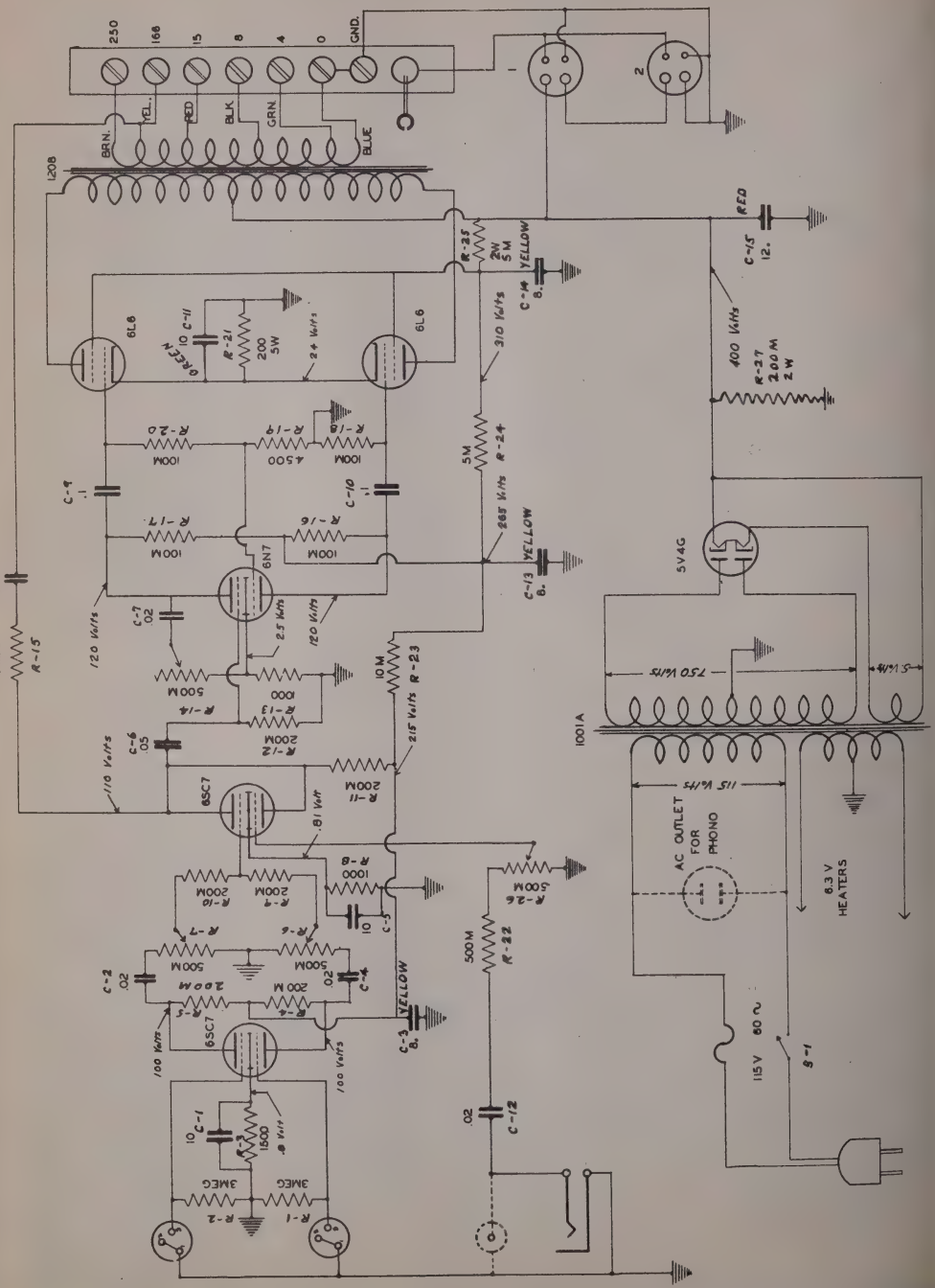
Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
4886	Capacitor—.05 mfd. (C-3, C-7)	35316	Resistor—440 ohms (R-20)
4839	Capacitor—0.1 mfd. (C-2, C-6, C-13)	34766	Resistor—1,000 ohms, ½ watt (R-11)
12484	Capacitor—0.25 mfd., 200 volts (C-4)	30654	Resistor—1,500 ohms, ½ watt (R-3)
32240	Capacitor—Comprising 2 sections of 10 mfd., 450 volts, and 1 section of 20 mfd., 25 volts (C-8, C-9, C-12)	34767	Resistor—2,200 ohms, ½ watt (R-2)
		14250	Resistor—8,200 ohms, ½ watt (R-21)
31323	Capacitor—16 mfd., 150 volts (C-1)	28744	Resistor—33,000 ohms, 2 watts (R-22, R-23)
31568	Capacitor—25 mfd. (C-10, C-11)	8064	Resistor—82,000 ohms, ½ watt (R-16, R-17)
39650	Capacitor—820 mmfd. (C-5)	14383	Resistor—220,000 ohms, ½ watt (R-12)
26413	Connector—Cable connector	30651	Resistor—270,000 ohms, ½ watt (R-5)
26411	Connector—Chassis connector	30784	Resistor—330,000 ohms, ½ watt (R-14)
35319	Control—5,000 ohms, tone control (R-10, S-1)	30648	Resistor—470,000 ohms, ½ watt (R-7, R-8)
35317	Control—500,000 ohms (R-6, R-1)	30162	Resistor—1.2 meg. (R-4, R-12)
32098	Cord—Power cord	35308	Socket—Tube socket, 8-contact (moulded type)
14193	Fuse—1 amp. (F-1)	33084	Socket—Tube socket, 8-contact (wafer type)
32059	Holder—Fuse holder (screw type)	34456	Transformer—Output transformer (T-1)
28811	Holder—Fuse holder (riveted type)	34731	Transformer — Power transformer — 105-125/210-250 volts, 25-60 cycles
30075	Knob—Control knob		
28452	Plate—Capacitor mounting plate	31380	Transformer—Power transformer—105-125 volts, 50-60 cycles (T-2)
30789	Resistor—33 ohms, ½ watt (R-18, R-19)	MI-12301	Transformer—Input transformer (T-3) (types MI-12238 and MI-12239 only)
30723	Resistor—47 ohms, ½ watt (R-9)		
5201	Resistor—220 ohms, 2 watts (R-15)		

MODELS MI-4839,
MI-12233

RCA MFG. CO., INC.



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MI-4839
AMPLIFIER & RECORD PLAYER

Figure 1—MI-4839

MI-12233
AMPLIFIER & COVER ONLY

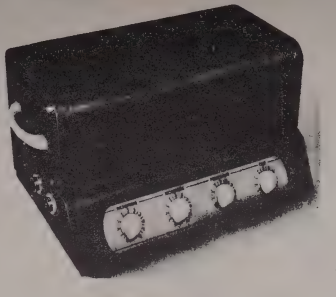

Figure 2—MI-12233

Electrical and Mechanical Specifications

Amplifier

Application	Sound Re-enforcement
Installation	Permanent or Mobile
Voltage Rating	105/125 volts, 50/60 cycles
Power Consumption	130 watts
Fuse	2 amperes
Input Impedance Microphone (2)	High Impedance
Phonograph	High Impedance
Load Impedance	4, 8, 15, 166, 250 ohms
Frequency Range	±2 db, 50 to 10,000 cycles
Power Output—(8% Total Harmonic Distortion)	25 watts
Input Level—Max. permissible Microphone	0.2 volts
Phonograph	10.0 volts
Min. rated output Microphone	.0017 volts
Phonograph	.065 volts
Hum Level—(Input terminated 40,000 ohms)	0.006 watts

Record Player

Voltage Ratings	105/125 volts, 60 cycles
Power Consumption	10 watts

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
46716	Arm—Pickup arm complete with base and cable (For MI-4839 only)	46713	Plate—Dial plate
46723	Arm—Pickup arm shell only (For MI-4839 only)	46718	Pulley—Idler pulley (For MI-4839 only)
46724	Base—Pickup arm base (For MI-4839 only)	46717	Pulley—Motor pulley (For MI-4839 only)
46722	Cable—Pickup cable (For MI-4839 only)	46711	Resistor—200 ohms, 5 watt (R-21)
4670	Capacitor—.02 mfd., 400 volts (C-3, C-4, C-7, C-12)	24726	Resistor—1,000 ohms, ¼ watt (R-5, R-13)
4886	Capacitor—.05 mfd., 400 volts (C-6, C-8)	30654	Resistor—1,500 ohms, ½ watt (R-3)
4639	Capacitor—0.1 mfd., 400 volts (C-9, C-10)	30494	Resistor—4,500 ohms, ½ watt (R-19)
46707	Capacitor—10 mfd., 25 volts (C-1, C-2)	4426	Resistor—5,000 ohms, ¼ watt (R-25)
46706	Capacitor—Filter capacitor (C-3, C-11, C-13, C-14, C-15)	17246	Resistor—5,000 ohms, 2 watt (R-25)
26411	Connector—8 contact female microphone	3076	Resistor—10,000 ohms, ¼ watt (R-22)
33792	Connector—Phono A.C. (For MI-4839 only)	3252	Resistor—100,000 ohms, ½ watt (R-16, R-17, R-18, R-20)
31948	Connector—Pickup cable plug (For MI-4839 only)	6580	Resistor—200,000 ohms, 2 watt (R-27)
35787	Connector—Pickup input female (For MI-4839 only)	30648	Resistor—500,000 ohms, ½ watt (R-22)
35473	Control—Microphone and phono volume control—500,000 ohms (R-6, R-7, R-26)	35814	Resistor—3 megohms, ½ watt (R-1, R-2)
31637	Control—Tone control—500,000 ohms—includes A.C. switch (R-14, R-1)	30671	Resistor—5 megohms, ½ watt (R-15)
14086	Cord—A.C. cord	4794	Socket—Speaker plug socket—4 contact
46721	Crystal—Pickup crystal unit only	31319	Socket—Tube socket—8 contact
10907	Fuse—3 ampere fuse (F-1)	46719	Spring—Idler pulley tension spring (For MI-4839 only)
45851	Holder—Fuse holder	46715	Support—Pickup arm support clip and screw (For MI-4839 only)
23461	Jack—Phono jack (J-1)	33875	Switch—Phono motor switch (For MI-4839 only)
46712	Knob—Control knob	46710	Transformer—Output transformer (T-2)
46714	Motor—Phono motor (For MI-4839 only)	46709	Transformer—Power transformer (T-1)
		46720	Turntable—Complete (For MI-4839 only)

General Description

The MI-4839 Amplifier and Record Player consists of a 25-watt amplifier, together with a pickup and turntable assembly as shown in Figure 1. This equipment operates from 105/125-volt, 60-cycle supply.

The MI-12233 Amplifier comes complete with plain cover and incorporates the same amplifier unit as is used in the MI-4839 Equipment. It operates from 105/125-volt, 50/60-cycle supply.

Input.—There are four input jacks on the amplifier unit. 1 & 2—polarized microphone jacks for high impedance microphone; 3—a telephone type jack for external high impedance phonograph input; 4—a pin type, single-conductor, shielded jack for the output of the crystal pickup supplied with the MI-4839 Equipment. Both microphones and phonograph may be used independently or simultaneously. Separate volume controls are provided for each microphone, and another for the two phonograph inputs which are paralleled in the amplifier. Any suitable high impedance microphone may be used. See installation instructions for connections to amplifier.

Output.—The amplifier output connections are brought out to a terminal board on the rear of the chassis, to give the following nominal output impedances 4, 8, 15, 166, and 250.

Installation Instructions

The MI-4839 Equipment will operate from 105 to 125 volts AC, 60 cycles. If the MI-12233 Amplifier is to be used, a 105 to 125 volt AC supply of 50-60 cycles may be used if desired.

Insert the tubes in their respective sockets. Make certain that they are firmly in place. Insert the plugs on the turntable assembly in the receptacles on top of the amplifier chassis. Place the cover over the amplifier chassis and secure in place by the four screws provided.

The audio input connections are made to the amplifier through the use of plugs. Standard three-prong Amphenol type receptacles are provided on the side of the amplifier. Connect the shield lead of a two conductor shielded microphone cable to terminal No. 1 (red dot), the low side to terminal No. 2, and the high side to terminal No. 3. When a microphone with a single conductor shielded cable is used, connect the shield to terminal No. 1 and the conductor to terminal No. 3. The following microphones are suitable for use with this equipment: M1-6202, M1-6205, M1-6207, and M1-4036-K. The M1-6202 is recommended for speech use as special compensation is provided to insure maximum intelligibility. When the MI-12233 amplifier is used with an external turntable, use the input receptacle-telephone type jack on the side of the chassis. Connect shield and/or ground side to sleeve at a telephone type plug, and the high side to the tip of the plug.

CAUTION: Care should be exercised in keeping the AC power line away from the microphone cable or terminals. Otherwise, a hum may be heard in the loudspeaker(s).

The output terminal board is connected, as it leaves the factory, to give the following standard load impedances: 250/166/15/8/4 ohms. Other impedance values can be obtained by making connections to the terminals as shown in the following table.

Terminals	Impedances
0- 4	4 ohms
0- 8	8 ohms
15-250	145 ohms
0-166	166 ohms
4-250	192 ohms
0-250	250 ohms

The proper matching impedance for loudspeaker or combination of loudspeakers can be readily selected from this table.

In connecting speakers to the amplifier, make sure that the impedance of the group of speakers is equal to or slightly greater (never less) than the amplifier output impedance that is used. For example, never connect a speaker load of 200 ohms impedance across the 250-ohm output terminal of the amplifier. The correct match would be from terminal 4 to 250, giving 192 ohms.

Radiotron Socket Voltages

115-volt line, using 2,000 ohms per volt voltmeter

	Volts, Plate to Ground	Volts, Screen to Ground	Volts, Cathode to Ground	Heater Volts
RCA-6SC7	160	—	1.5	6.3
RCA-6SC7	100	—	0.9	6.3
RCA-6N7	145	—	3.0	6.3
RCA-6L6	340	300	21	6.3
RCA-5V4G	320 AC		(350 V DC Heater to Gnd.)	5.0

Operating Instructions

1. Insert tubes in their proper sockets.
2. Connect amplifier to proper power source, 115 volts, 50/60 cycles or 115 volts, 60 cycles, if phonograph is to be used.
3. Connect microphone(s) to receptacle(s) on side of amplifier.
4. If external phonograph is to be used, connect the output to a standard telephone-type plug and insert in the jack on the side of the amplifier. The ground lead and/or shield of the phonograph cable should be connected to the sleeve of the plug.
5. Connect loudspeakers to output terminal board (See output connections).
6. Turn MICROPHONE and PHONOGRAPH volume controls full counter clockwise. Turn amplifier ON by turning TONE control clockwise, operating power switch.
7. Allow approximately one minute for amplifier to warm up.
8. Turn MICROPHONE and/or PHONOGRAPH volume controls clockwise until desired volume level is obtained.
9. Adjust TONE control for desired tone quality.

MODEL MI-12354

RCA MFG. CO., INC.

ALARM SIGNAL GENERATOR

MI-12354

USING TYPE MI-12209 AMPLIFIER

General Description

The MI-12354 Alarm Signal Generator has been designed primarily as a tone signal source supplying either a constant or warble tone, rich in harmonics for use in conjunction with paging and sound systems in schools, factories, hotels, etc. In small installations, the signal generator can be used to directly drive loudspeakers, provided the total power requirements is not in excess of 10 watts.

In larger installations, the signal generator can be used to drive single or multiple power amplifiers such as MI-12211, MI-12217, MI-4288, MI-12214 or MI-12235, depending upon the number and size of areas to be covered.

The signal generator produces a distinctive penetrating note of either warble or steady type. Toggle switches are provided on the left side of the unit, one for changing from constant to warble tone and the other for changing from a signal generator to a straight driver amplifier which may be used in conjunction with a high impedance microphone or a low impedance phonograph for conveying verbal instructions or music to the areas covered by the system.

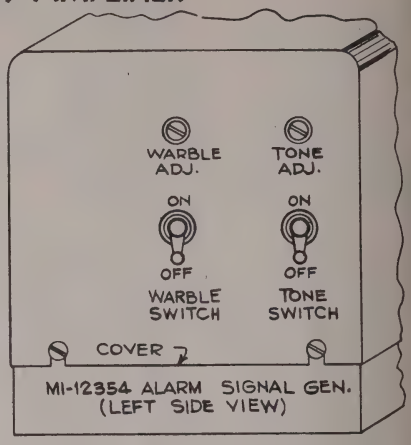

Figure 1

Operating Instructions

1. Turn amplifier ON-TONE control knob full clockwise.
2. For CONSTANT TONE throw TONE SWITCH to ON, and WARBLE SWITCH to OFF.
3. Advance the MASTER control sufficiently to produce the desired signal level.
   Note: The VOLUME control has no effect on the level of the signal.
4. For WARBLE TONE throw both TONE and WARBLE SWITCHES to their ON positions.
5. To stop either TONE it is only necessary to throw the TONE SWITCH to its OFF position.
6. To change from one tone to the other with the TONE SWITCH ON, it is only necessary to throw the WARBLE SWITCH either to ON for WARBLE TONE or to OFF for CONSTANT TONE.
7. For operation using microphone, throw TONE SWITCH to OFF and adjust VOLUME control clockwise until the desired output level is obtained.
   Note: Both VOLUME and MASTER controls affect the microphone output level.

Electrical and Mechanical Specifications

Power Supply	105/125 volts, 50/60 cycles
Power Consumption	75 watts
Fuse	1.0 ampere
Source Impedance: (As normal amplifier)	
(1) Microphone	Minimum 1000 ohms
(2) Phonograph (Low Impedance)	Magnetic Pickup
Output Impedance	Use as low impedance source
Power Output (Signal)	10 watts

Installation Instructions

1. Connect amplifier to proper source and insert tubes in their respective sockets.
2. Connect the output to the transmission line feeding the power amplifiers located in the areas to be served.

   Note: If a balanced transmission line is used, it will be necessary to remove the ground from the secondary of the output transformer. If grounded center tap is required, a center tap resistor having a total resistance of approximately five times the impedance of the portion of the secondary used, should be connected across the line. The center tap of this resistor may then be grounded.
3. The frequencies of both the warble and constant tones have been set at the factory for optimum penetration. Should it be desired to change these frequencies, proceed as follows:
   A. Turn amplifier ON and with TONE SWITCH thrown to ON, and the WARBLE SWITCH thrown to OFF, adjust the TONE ADJUSTMENT potentiometer for the desired constant frequency tone.
   B. Throw WARBLE SWITCH to the ON position and adjust WARBLE ADJUSTMENT potentiometer to give the desired warble frequency. A period of approximately three times per second produces a very satisfactory warble tone.

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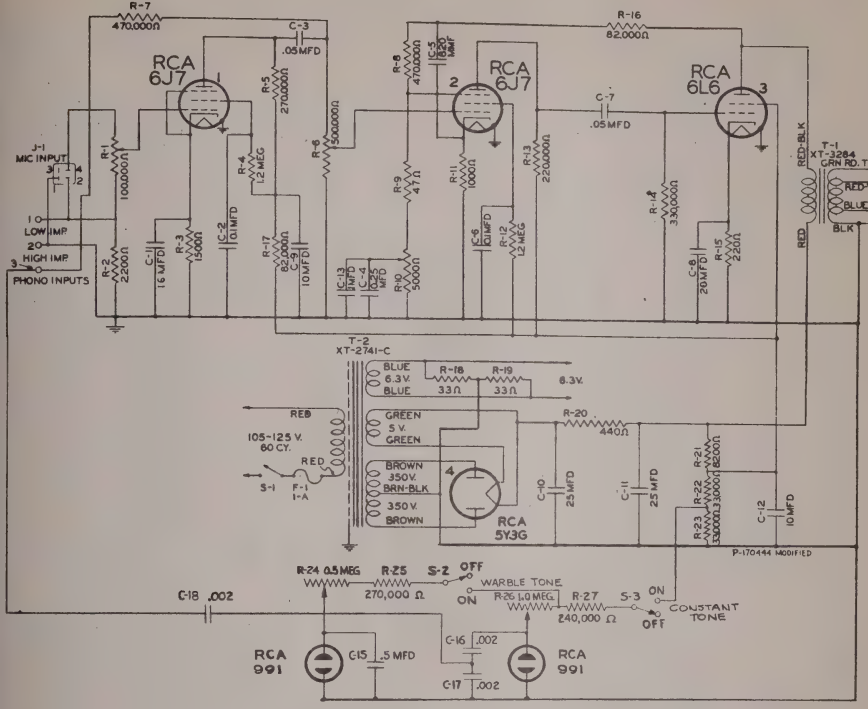
MODEL MI-12354

RCA MFG. CO., INC.



RCA Tube Complement

RCA-6J7	First Amplifier
RCA-6J7	Second Amplifier
RCA-6L6	Power Output
RCA-5Y3G	Rectifier
RCA-991	Signal Generator
RCA-991	Warble Generator

STOCK NO.	DESCRIPTION	STOCK NO.	DESCRIPTION
4886	Capacitor—.05 mfd. (C-3, C-7)	30732	Resistor—47 ohms, ½ watt (R-9)
4839	Capacitor—0.1 mfd. (C-2, C-8, C-13)	13218	Resistor—220 ohms, 2 watts (R-15)
2484	Capacitor—0.25 mfd., 350 volts (C-4)	35316	Resistor—440 ohms (R-20)
2240	Capacitor—Comprising 2 sections of 10 mfd., 400 volts, and 1 section of 20 mfd., 25 volts (C-8, C-9, C-12)	4687	Resistor—1,000 ohms, ½ watt (R-11)
		30654	Resistor—1,500 ohms, ½ watt (R-3)
		3526	Resistor—2,200 ohms, ½ watt (R-2)
1332	Capacitor—16 mfd., 150 volts (C-1)	14250	Resistor—8,200 ohms, ½ watt (R-21)
1568	Capacitor—25 mfd. (C-10, C-11)	12487	Resistor—33,000 ohms, 2 watts (R-22, R-23)
2536	Capacitor—820 mmfd. (C-5)	8064	Resistor—82,000 ohms, ½ watt (R-16, R-17)
8157	Capacitor—0.5 mfd. (C-15)	14583	Resistor—220,000 ohms, ½ watt (R-13)
6008	Capacitor—.002 mfd. (C-16, C-17, C-18)	30651	Resistor—270,000 ohms, ½ watt (R-5, R-25)
5319	Control—5,000 ohms, tone control (R-10, S-1)	30784	Resistor—330,000, ohms, ½ watt (R-14)
5318	Control—100,000 ohms, volume control (R-1)	30648	Resistor—470,000 ohms, ½ watt (R-7, R-8)
5317	Control—500,000 ohms, master control (R-6)	30162	Resistor—1.2 meg. (R-4, R-12)
4173	Control—.5 meg. (R-24)	14324	Resistor—240,000 ohms, ½ watt (R-27)
2361	Control—1.0 meg. (R-26)	32055	Socket—Microphone plug socket (J-1)
6823	Cord—Power cord	35308	Socket—Tube socket, 8 contact, for 6L6, 5Y3G tubes
4133	Fuse—1 amp. (F-1)	33084	Socket—Tube socket, 8 contact, for 6J7 tubes
2059	Holder—Fuse holder	23555	Socket—RCA-991 socket
7960	Knob—Control knob	7900	Switch—Single pole single throw
2054	Plug—Microphone plug	34456	Transformer—Output transformer (T-1)
5941	Plug—Power cord plug	31380	Transformer—Power transformer, 105-125 volts, 50-60 cycles (T-2)
0789	Resistor—33 ohms, ½ watt (R-18, R-19)		

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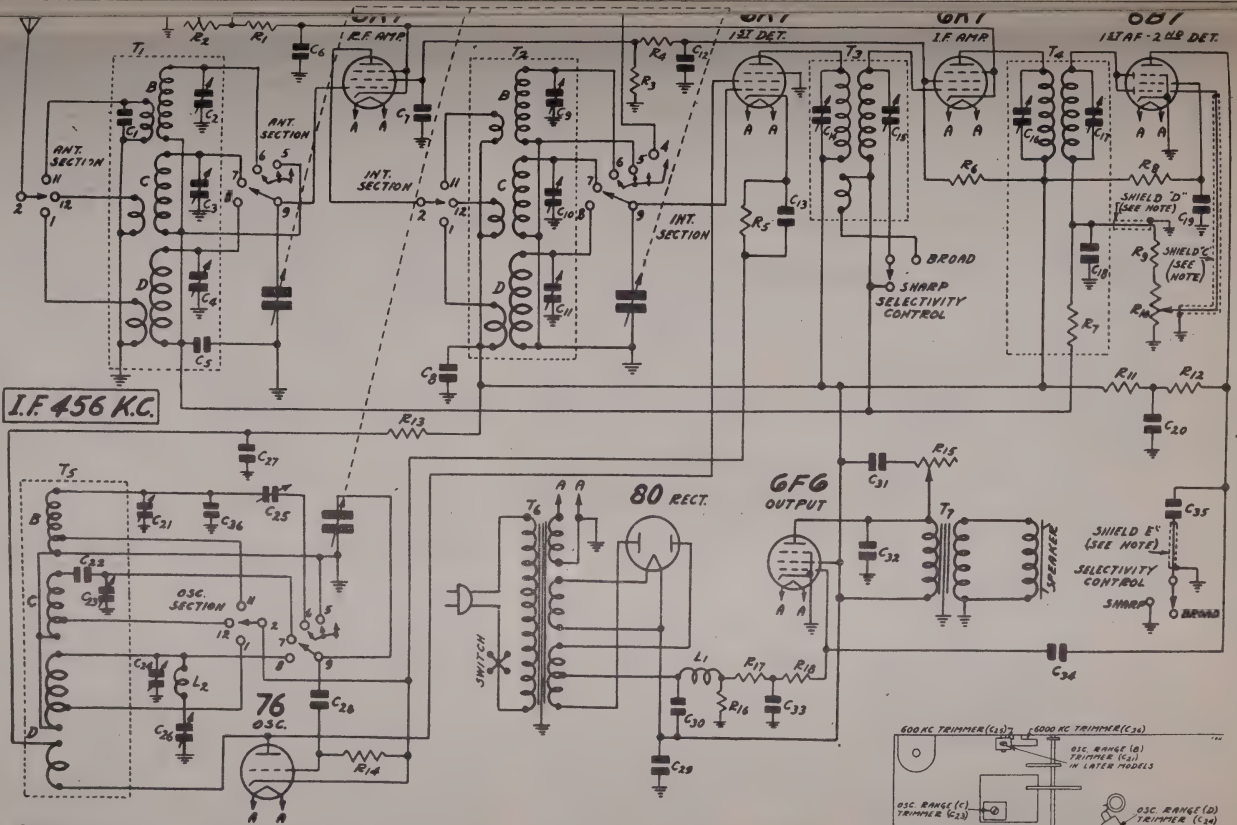
C 1	350 mmf.
C 3	2-25 mmf.
C 4	2-25 mmf.
C 5	.05 mf. 180 V.
C 6	.25 mf. 180 V.
C 7	.05 mf. 240 V.
C 8	.10 mf. 360 V.
C 9	2-25 mmf.
C10	2-25 mmf.
C11	2-25 mmf.
C12	.25 mf. 240 V.
C13	.05 mf. 780 V.
C14	70-150 mmf. } ONE
C15	70-150 mmf. } UNIT
C16	70-150 mmf. } ONE
C17	150-250 mmf. } UNIT
C18	50 mmf.
C19	.25 mf. 360 V.
C20	.25 mf. 360 V.
C21	2-25 mmf.
C22	1400 mmf.
C23	2-25 mmf.
C24	2-25 mmf.
C25	300-600 mmf. } ONE
C26	40-100 mmf. } UNIT
C27	.10 mf. 360 V.
C28	35 mmf.
C29	18 mf. 300 V.
C30	14 mf. 400 V.
C31	.05 mf. 600 V.
C32	.002 mf. 600 V.
C33	.03 mf. 180 V.
C34	.01 mf. 480 V.
C35	.004 mf. 600 V.
R 1	150 ohm .2 W.
R 2	2500 ohm } Dual Vol.
R10	500000 ohm } Control
R 3	30000 ohm .5 W.
R 4	6000 ohm .5 W.
R 5	25000 ohm .2 W.
R 6	16000 ohm 2.0 W.
R 7	2.0 Megohm .2 W.
R 8	300000 ohm .5 W.
R 9	50000 ohm .2 W.
R11	20000 ohm .2 W.
R12	60000 ohm .5 W.
R13	25000 ohm 1.0 W.
R14	80000 ohm .2 W.
R15	150000 Tone Cont.
R16	235 ohm 2.0 W.
R17	100000 ohm .2 W.
R18	500000 ohm .2 W.
T 1	Antenna R.F. Trans.
T 2	Interstage R.F. Trans
T 3	1st. I.F. Trans.
T 4	2nd I.F. Trans.
T 5	Osc. Inductors
T 6	Power Trans.
T 7	Output Trans.
L 1	Speaker Field
L 2	Osc. Tracking Coil



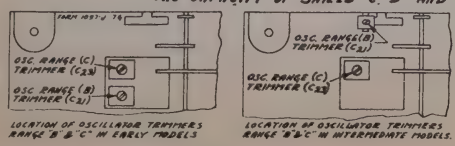

OSC. RANGE (C) TRIMMER (C23)
OSC. RANGE (B) TRIMMER (C21)
OSC. RANGE (B) TRIMMER (C21)
OSC. RANGE (C) TRIMMER (C23)
LOCATION OF OSCILLATOR TRIMMERS RANGE "B" & "C" IN EARLY MODELS
LOCATION OF OSCILLATOR TRIMMERS RANGE "B" & "C" IN INTERMEDIATE MODELS.

Fig. 4—Oscillator Trimmer Location

ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE (B)	POSITION 2 SHORT WAVE (C)	POSITION 3 SHORT WAVE (D)
ANT. & OSC. SECTION	5 6 7 8 9 11 12 1 2	5 6 7 8 9 11 12 1 2	5 6 7 8 9 11 12 1 2
INT. SECTION	4 5 6 7 8 9 11 12 1 2	4 5 6 7 8 9 11 12 1 2	4 5 6 7 8 9 11 12 1 2

CONTACT LOCATIONS 3, 4 AND 10 IN ANT. AND OSC. SECTIONS AND 3 AND 10 IN INT. SECTION ARE BLANK.

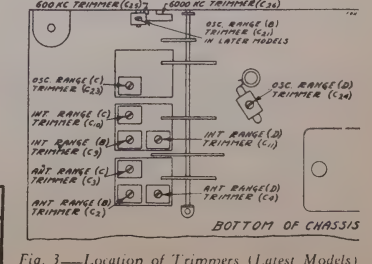

600 KC TRIMMER (C25)
6000 KC TRIMMER (C24)
OSC. RANGE (B) TRIMMER (C21) IN LATER MODELS
OSC. RANGE (C) TRIMMER (C23)
OSC. RANGE (D) TRIMMER (C24)
INT. RANGE (C) TRIMMER (C9)
INT. RANGE (B) TRIMMER (C8)
INT. RANGE (D) TRIMMER (C11)
ANT. RANGE (C) TRIMMER (C5)
ANT. RANGE (B) TRIMMER (C4)
ANT. RANGE (D) TRIMMER (C6)
BOTTOM OF CHASSIS

Fig. 3—Location of Trimmers (Latest Models)

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Circuit

This model is a three band receiver with a tuning range in each band as shown in the specifications above. Three band coverage is accomplished by means of three sets of R. F. and oscillator coils and a three section triple throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R. F. transformer assemblies and T5 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively. The three sections of the band switch are designated in the schematic as the antenna, interstage and oscillator sections.

The band switch completes connections to the coils in use. It also short circuits the R. F. transformer secondary and oscillator coil of lower frequency not in use.

The antenna transformer with tuned secondary feeds into a type 6K7 R. F. amplifier tube. The output of this tube is fed through the interstage R. F. transformer with tuned secondary into another 6K7 tube which functions as the 1st detector.

A separate type 76 tube is employed in the oscillator circuit. Referring to the oscillator assembly T5, Fig. 2, B, C and D refer to the standard wave, 1st short wave and 2nd short wave oscillator coils respectively. The oscillating circuit is always resonant at 456 KC above the frequency to which the R. F. amplifier is tuned.

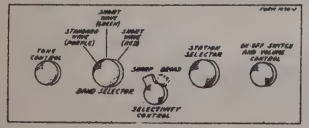


Fig. 1—Arrangement of Controls

The oscillator potential is fed into the cathode circuit of the 6K7 first detector tube. This results in the intermediate or beat frequency of 456 KC being present in the plate circuit of this tube.

One stage of I. F. amplification is employed using a 6K7 tube. The primaries and secondaries of the first and second I. F. transformers are tuned by small trimmer condensers.

Selectivity Control—Referring to the 1st I. F. transformer T3 in Fig. 2, it will be noted that there is a coupling winding shown in the illustration below the primary. Refer also to the by-pass arrangement in the pentode plate circuit of the 6B7.

When the selectivity control is in the sharp position the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer results in high selectivity. High audio frequencies are by-passed to ground through condenser C35.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

In order to allow passage of the higher audio frequencies in the broad position, the capacity of the by-pass condenser to ground is greatly reduced (C35 and the capacity of shield E in series).

Dual Volume Control—A dual manual volume control is employed. In one section the audio voltage applied to the 1st audio section of the 6B7 tube is varied (R10). In the other section the R. F. and I. F. bias is varied (R2). The purpose of the latter section is to reduce the sensitivity of the receiver at low volume settings in order to cut down noise pick-up between stations. The variable section R2 is shorted out through contact No. 4 of the interstage section of the band selector when in the 2nd short wave position.

A type 6B7 duo diode pentode tube functions as the second detector and a one stage audio amplifier. The two diode plates are connected together. AVC voltage is applied through isolating resistors to the control grid circuits of the R. F. and I. F. tubes. The audio voltage developed across volume control resistor R10 is applied through the movable arm to the control grid of the 6B7 tube. Resistance coupling is used between the first audio stage and the output stage which employs a type 6F6 output pentode tube. A type 80 full wave rectifier tube is used in the power unit.

Alignment and Calibration

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity switch to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 6.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C21) until maximum output is obtained. The location of this trimmer is shown in Figs. 3 and 4.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

There is a lever arm in front of the large gear on the tuning condenser shaft by means of which the position of the station pointer may be adjusted. Set the station pointer at the 1500 KC mark on the dial scale by adjusting this lever arm.

Adjust the interstage Range B trimmer (C9) and antenna Range B trimmer (C2) to maximum.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

Adjust the oscillator Range C trimmer (C23) until maximum output is obtained. See Figs. 3 and 4 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

Adjust the oscillator Range D trimmer (C24) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C11) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Tuning Frequency Range

B Range - - - - - - - - - - 535 to 1730 KC.
C Range - - - - - - - - - - 1715 to 5800 KC.
D Range - - - - - - - - - - 5750 to 18300 KC.

Sensitivity

B Range Average - - - - 0.5 Microvolts Absolute
C Range Average - - - 1.0 Microvolts Absolute
D Range Average - - - - 2.0 Microvolts Absolute

Power Consumption - 68 Watts (At 115 volts 60 cycles)

Power Output - - - - - - 3 Watts Undistorted

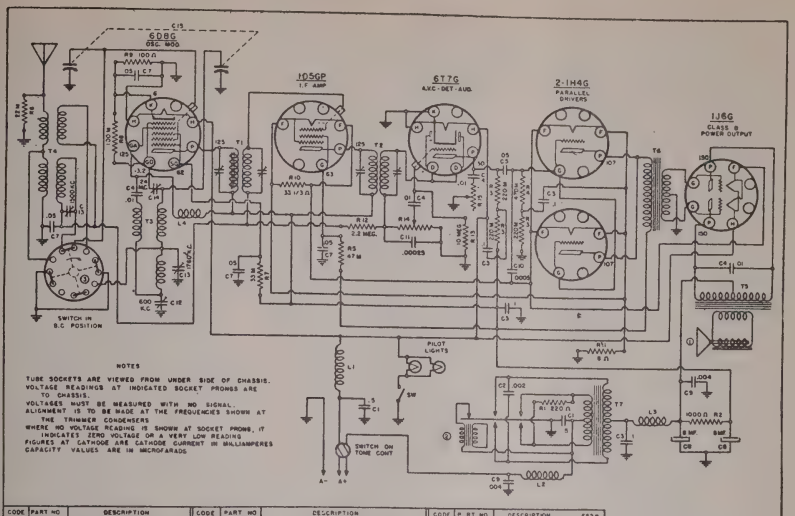
Selectivity - 28 KC Broad at 1000 times Signal (Sharp)

Intermediate Frequency - - - - - - - 456 KC.

Speaker - - - - - - - - - 6" and 8" Dynamic

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

MODEL D3
MODEL D5


6D8G
OSC. MOD.
105GP
I.F. AMP
6L7G
A.V.C.-DET.-AUD.
2-1H4G
PARALLEL DRIVERS
1J6G
CLASS B POWER OUTPUT
SWITCH IN B.C. POSITION
PILOT LIGHTS
SWITCH ON TONE CONT
NOTES
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING
FIGURES AT CATHODE ARE CATHODE CURRENT IN MILLIAMPERES
CAPACITY VALUES ARE IN MICROFARADS

I.F. PEAK 455 kc

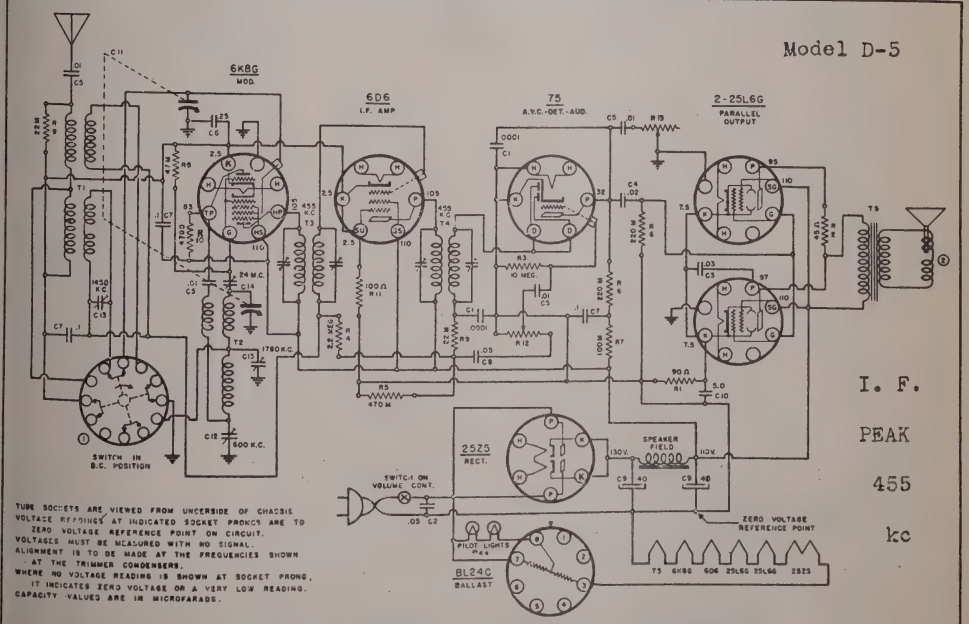
CODE	PART NO	DESCRIPTION
R1	60-199	220 OHM 1/2 W RESISTOR
R2	60-200	1000 " 1W "
R3	60-180	220 M " 1/2 W "
R4	60-178	470 M " " "
R5	60-177	47 M " " "
R6	60-185	22 M " " "
R7	60-196	33 M " " "
R8	60-197	100 M " " "
R9	60-191	1 MEG " " "
R10	60-202	33 1/2 " 1/2W "
R11	60-178	9 " " "
R12	60-179	2.2 MEG 1/2W "
R13	60-193	10 " " "
R14	24-124	VOLUME CONTROL 1 MEG.
R15	24-118	TONE CONTROL .5 MEG.

CODE	PART NO	DESCRIPTION
C1	16-112	.5 MFD 200 V TUB. CONDENSER
C2	16-126	.002 " 1000 V BUFFER "
C3	16-118	.1 " 200 V TUB. "
C4	16-119	.01 " 400 V. " "
C5	1607	.05 " " " "
C7	1622	.05 " 200 V. " "
C8	16-133	8-8 MFD 350 V ELECTROLYTIC
C9	1603	.004 " MICA CONDENSER
C10	15-112	.0005 " " "
C11	1604	.00025 " " "
C12	80-117	300-600 MFD. PADDING CONDENSER
C13	2032	2 PLATE TRIMMER
C14	80-118	1 PLATE "
C15	19-133	VARIABLE CONDENSER

CODE	P RT NO	DESCRIPTION 652B
1	19-254	SPEAKER 6" P.M.
2	54-102	VIBRATOR
3	54-103	WAVE BAND SWITCH
L1	33-215	OSC. CHOKE
L2	33-275	VIBRATOR "
L3	10-246	R.F. "
L4	10-243	OSC. COIL (R.F.)
T1	10-247	1ST I.F. TRANSFORMER
T2	10-248	2ND I.F. "
T3	10-238	OSCILLATOR "
T4	10-237	ANTENNA "
T5		SPEAKER "
T6	80-164	AUDIO "
T7	80-161	VIBRATOR "

Model D-3

Model D-5


6K8G
MOD.
6D6
I.F. AMP
75
A.V.C.-DET.-AUD.
2-25L6G
PARALLEL OUTPUT
SWITCH IN B.C. POSITION
2525
RECT.
SPEAKER FIELD
SWITCH ON VOLUME CONT.
PILOT LIGHTS
BL24C
BALLAST
ZERO VOLTAGE REFERENCE POINT
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO ZERO VOLTAGE REFERENCE POINT ON CIRCUIT.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
CAPACITY VALUES ARE IN MICROFARADS.

I. F. PEAK 455 kc

CODE	PART NO.	DESCRIPTION
R1	60-204	30 OHM 1 WATT WIRE WOUND RES.
R2	60-187	470 M " 1/2 W "
R3	60-183	10 MEGOHM 1/2 W. CARBON "
R4	60-179	2.2 " " " "
R5	60-178	470M OHM " " "
R6	60-170	220 M " " "
R7	60-196	100 M " " "
R8	60-197	47 M " " "
R9	60-185	22 M " " "
R10	60-198	4700 " " "
R11	60-197	100 " " "
R12	24-123	VOLUME CONTROL 1 MEG.
R13	24-118	TONE CONTROL .5 MEG.

CODE	PART NO.	DESCRIPTION
C1	1601	.0001 MFD. MICA CONDENSER
C2	1601	.015 " " 400 V. TUBULAR COND.
C3	1648	.03 " " " "
C4	1603	.02 " " " "
C5	16-119	.01 " " " "
C6	16-132	.1 " 200 V. " "
C7	16-115	1 " " " "
C8	1672	.05 " " " "
C9	18-237	40 & 40 MFD ELECTROLYTIC
C10	18-238	5 MFD 25 V ELECTROLYTIC
C11	19-133	VARIABLE CONDENSER 2 GANG
C12	80-117	300-600 MFD. PADDING CONDENSER
C13	2032	2 PLATE TRIMMER
C14	80-118	1 PLATE TRIMMER

CODE	PART NO.	DESCRIPTION 749
T1	10-237	ANTENNA TRANSFORMER
T2	10-239	OSCILLATOR "
T3	10-246	1 ST I.F. "
T4	13-245	2 ND. I.F. "
T5		OUTPUT TRANS. (ON SPEAKER)
T6	53-1.5	WAVE BAND SWITCH
Z		SPEAKER

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The automatic tuning feature of your radio makes it possible to set up 6 favorite American broadcast stations and tune them in quickly with the automatic tuner. Choose stations for push-button operation heard with good volume at all times.

MODELS D3 and D5

Follow the procedure outlined below, in order to adjust the push-buttons properly:

1. By means of the Station Selector Knob tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the lowest frequency—that is, your selected station which is tuned in nearest the right-hand side of the dial.

2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of lowest frequency and the Call Letter Tab for this station should be at the extreme right of the Call Letter Holder.

Follow through with this same procedure, setting up the other 5 stations in the order of their frequency—that is, the second station set up will be second lowest in frequency and the third station set up will be third lowest in frequency.

Carefully check each Push-Button for the accuracy of the setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

MODELS D3 and D5

ALIGNMENT PROCEDURE

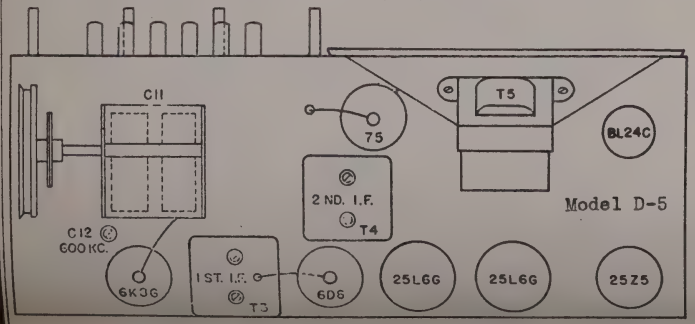
The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or microvolter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

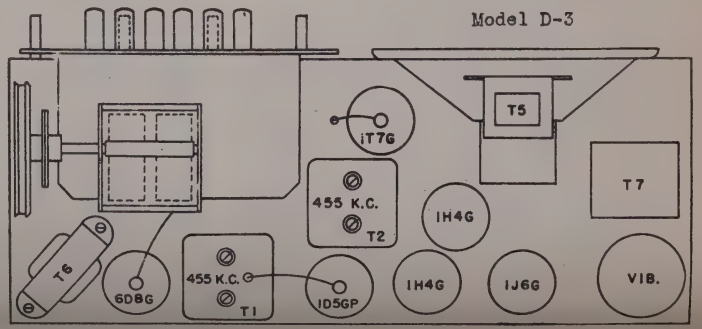
All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 10,000 ohms, to plate of output tube and B+, or a low voltage A. C. meter may be used connected across speaker voice coil. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6D8G tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 455 K.C. signal. Adjust first and second I.F. trimmers for maximum output. Refer to chassis lay-out for location of trimmers.

Turn the dial to the extreme high frequency end. Feed a 1760 K.C. signal to the receiver antenna lead through a .00025 MF mica condenser. Adjust the 1760 K.C. oscillator trimmer until maximum output is shown. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. antenna trimmer to the maximum output. Then impress a 600 K.C. signal into the receiver antenna lead and tune in this signal on the receiver. Adjust oscillator padding condenser to the maximum output. For the alignment of the short wave band open variable condenser to minimum capacity. With an impressed signal of 24 M.C. adjust trimmer designated as C14 in schematic diagram for maximum output. Follow through with this procedure several times in order to obtain the best alignment adjustment possible. This completes the alignment.





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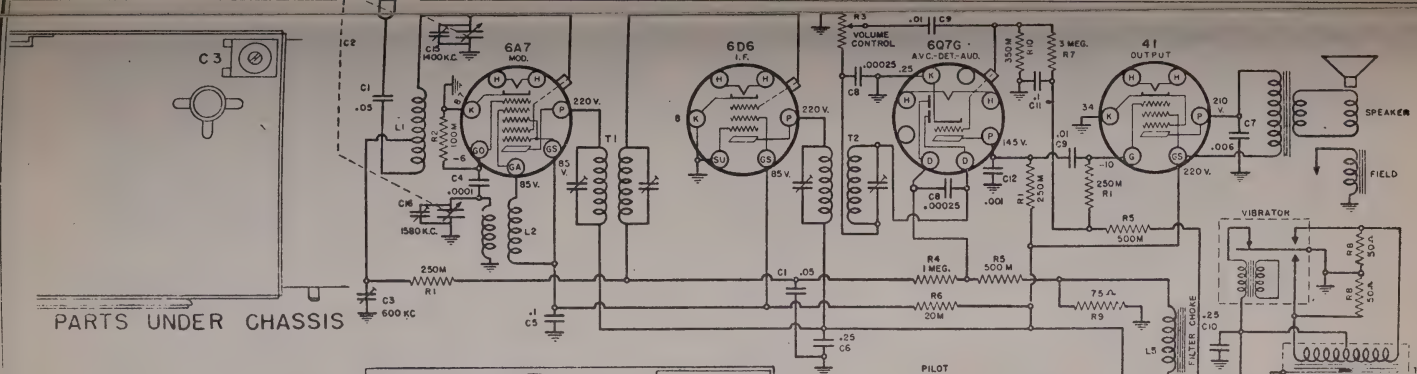

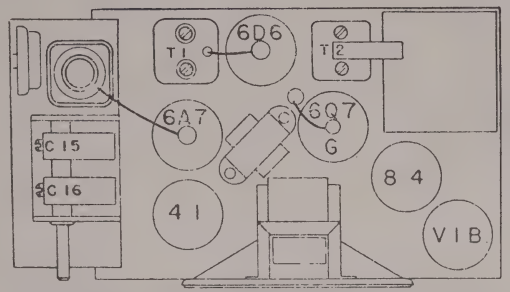

LOCATIONS OF PARTS ON TOP OF CHASSIS

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES
CAPACITY VALUES ARE IN MICROFARADS.

PRELIMINARY

Output Meter Connections	Across Loud Speaker Voice Coil
Output Meter Reading to Indicate 1 Watt	1.85 Volts
Generator Ground Lead Connection	Receiver Chassis
Dummy Antenna Value to Be in Series with Generator Output	See Chart Below
Connection of Generator Output Lead	See Chart Below
Generator Modulation	30%, 400 Cycles
Position of Volume Control	Fully On

Position of Variable	Generator Frequency	Dummy Antenna	Generator Connection	Trimmer Adjustments (In Order Shown)	Trimmer Function
Closed	456 KC	.1 mfd.	6A7 Grid	T2, T1	I. F.
Fully Open	1580 KC	.0002 mfd.	Antenna Conn.	C16	Oscillator Trimmer
1400 KC	1400 KC	.0002 mfd.	Antenna Conn.	C15	Antenna Trimmer
600 KC	600 KC	.0002 mfd.	Antenna Conn.	C3	Antenna Padder

The variable condenser should be at 600 k.c. for antenna adjustment.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy. A final adjustment of antenna padder condenser C3 is always made after the receiver is installed in the car, in order to match the car antenna.

Always keep the output power from the generator at its lowest possible value to prevent the A.V.C. of the receiver from interfering with accurate alignment.

MODEL D6

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

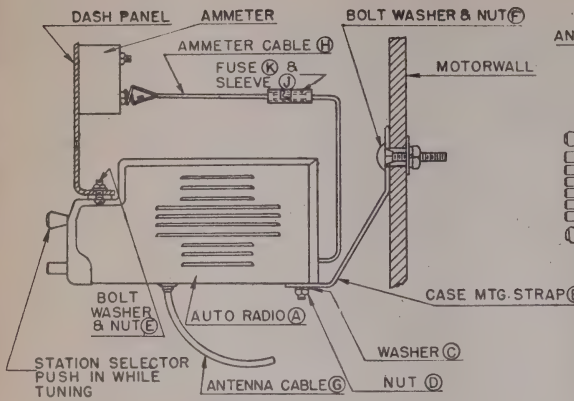

FIG.3

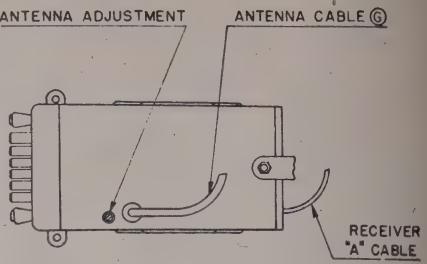

FIG 4

IMPORTANT: ANTENNA ADJUSTMENT

The antenna adjustment control is located close to the antenna cable receptacle as shown in Figure 4. To make the adjustment first, remove plug button from bottom of case by inserting a screwdriver between case and plug button, then tune in a weak station with full volume at or very close to 600 kilocycles (60) on the dial. Second, insert a small screwdriver into the antenna adjustment screw shown in Figure 4 and turn the screwdriver either to the left or right until the volume of the station is at its maximum point. While adjusting the antenna adjustment screw it is advisable to vary the station selector knob a degree or two to obtain the best adjustment. Now insert plug button into case. The receiver is now balanced and no further radio electrical adjustments are necessary.

HOW TO ADJUST AND OPERATE THE AUTOMATIC PUSH-BUTTON TUNING

The automatic tuning feature of your radio makes it possible to set up 6 favorite American broadcast stations and tune them in quickly with the Automatic Tuner.

The Automatic Tuner has 6 adjustable Push-Buttons. Each button can be adjusted for one of your favorite stations. CHOOSE STATIONS FOR PUSH-BUTTON OPERATION HEARD WITH GOOD VOLUME AT ALL TIMES. It is not necessary to use all six buttons, if it is not desired.

INDEX TABS

Cut the call letters of your 6 selected stations from the list supplied (See "N" in Fig. 1) with your receiver and slip them into the Tab Holder FROM THE TOP with the clear celluloid (see "O" in Fig. 1) in front of the call letters to protect them. Arrange the call letters in the Tab Holder from right to left. Have the call letters of the lowest frequency staiton at the extreme right and work progressively to the left so that the highest frequency call letters will be at the extreme left.

SETTING PUSH-BUTTONS

1. By means of the Station Selector Knob, tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the lowest frequency—that is, your selected station which is tuned in nearest the right-hand side of the dial.

2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of lowest frequency and the Call Letter Tab for this station should be at the extreme right of the Call Letter Holder.

Follow through with this same procedure, setting up the other 5 stations in the order of their frequency—that is, the second station set up will be second lowest in frequency and the third station set up will be third lowest in frequency.

Carefully check each Push-Button for the accuracy of its setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your auto radio automatically or manually. To receive any one of your six selected stations for automatic operation, merely push in ALL THE WAY the Button set up for that station.

To receive all other stations in the regular manner, push in the Station Selector Knob and turn it to the frequency of the station desired.

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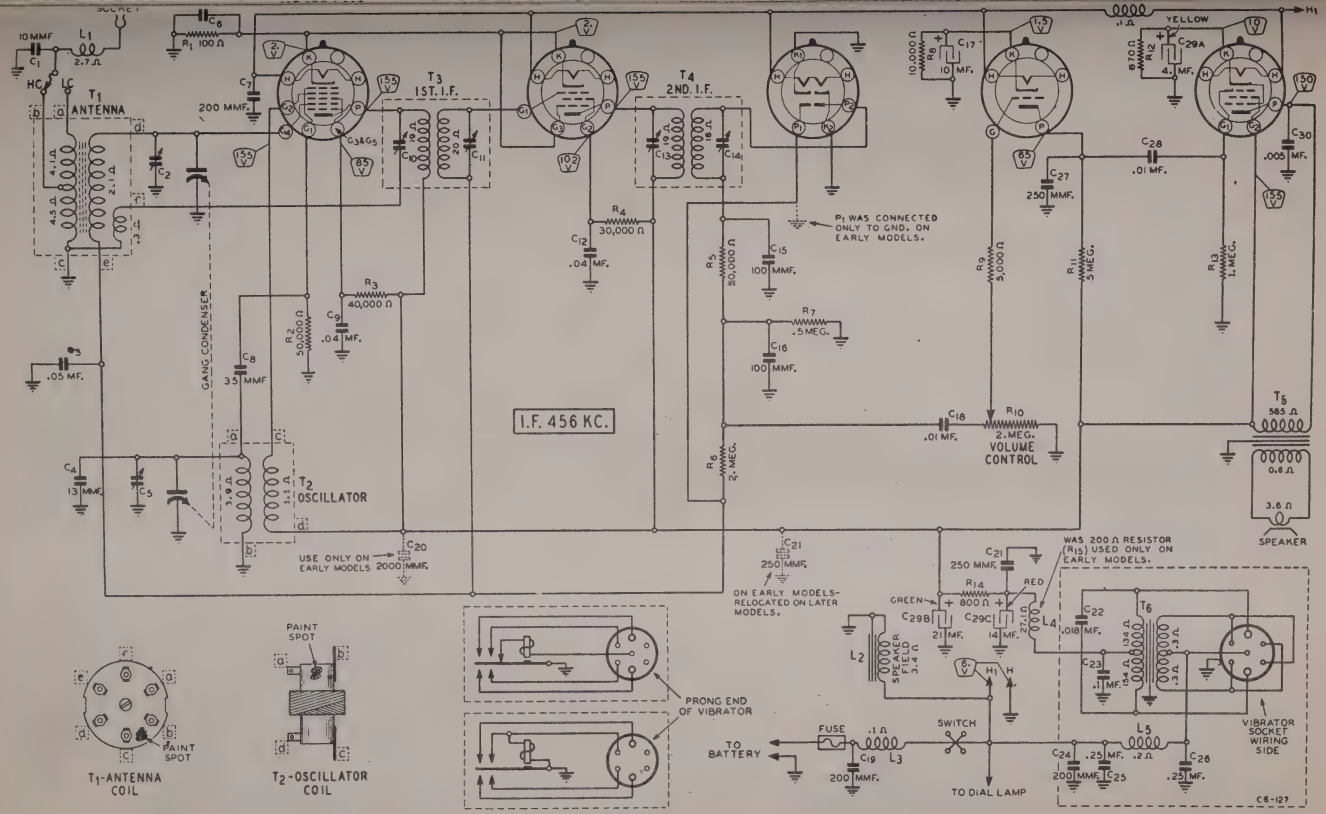

Fig. 1—Schematic Circuit Diagram

Power Consumption - - 5.5 Amperes at 6.3 Volts	Tuning Frequency Range - - - 528 to 1550 KC
Power Output - - - - - - - .8 Watt Undistorted	Intermediate Frequency - - - - - - 456 KC
Sensitivity - - 10 Microvolts at .5 Watt Output	Speaker - - - - - - - - - - - 6" Dynamic
Selectivity - 42.5 KC Broad at 1000 Times Signal	

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LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

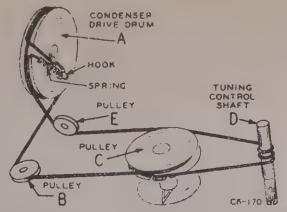


Fig. 2—Replacing Drive Cord—Rotating Pointer Models

Drive Cord Replacement—Rotating Pointer Models

Tie a knot with a small loop at one end of the new drive cord. The free end of the drive cord is tied to the tension spring. The distance between knots should be 23⅛ inches.

Turn the gang condenser to full open position.

Place the looped end of the drive cord over the hook on condenser drive drum A—See Fig. 2 (Shown with gang condenser half open). Bring the cord up through the slot in the drum rim and wind one-half turn to the rear (from front of chassis) around the drive drum. Pass cord around the pulley B as shown. Wind one turn clockwise (from front of chassis) around pointer disc pulley C. Loop cord through the notches on the outside rim of the pointer disc pulley as shown. Wind 2½ turns clockwise, progressing from a point midway between the bracket arms toward the chassis, on tuning control shaft D. Bring cord to the left under pointer disc pulley C and around pulley E as shown. Pass cord to top of drive drum A and wind one turn to the rear around the drum rim.

Pass the remaining drive cord and tension spring through the slot in the drum rim. Place free end of spring over the hook on the condenser drive drum.

Setting Pointer Disc—Tune in an 800 KC signal. Hold the tuning shaft and turn the pointer disc until the pointer is at the correct position when the chassis front cover is put back in place.

Drive Cord Replacement—Sliding Pointer Models

Remove the celluloid dial scale. Open the clamps on the back of the dial pointer in order to remove the old drive cord.

It is not necessary to remove the dial and drive bracket assembly in order to replace the drive cord.

Tie a knot with a small loop at one end of the new drive cord. Slide a ½ inch length of fabric tubing on the cord. Tie the free end of the drive cord to the tension spring. The distance between knots should be 28⅝ inches.

Turn the gang condenser to full open position.

Place the looped end of the drive cord over the hook on condenser drive drum A—See Fig. 3. Bring the cord up through the slot in the drum rim.

Turn the drive drum to the position shown in Fig. 3.

Wind one turn down and around drive drum A and around pulley B as shown. Wind 3½ turns on tuning control shaft C, progressing from a point midway between the two bracket arms toward the chassis. Bring cord under pulley D and around pulleys E and F as shown. See that the fabric tubing is now between pulleys E and F. Bring the drive cord to the rear around drive drum A and through the slot in the drum rim as shown.

Turn the gang condenser to full open position and place the free end of the tension spring over the hook on drive drum A.

Dial Pointer Adjustment—Mount the celluloid dial scale on the dial bracket. Tune in a signal of known frequency near one end of the dial scale. Move the pointer assembly to this frequency on the dial scale and tighten the clamps with long nose pliers.

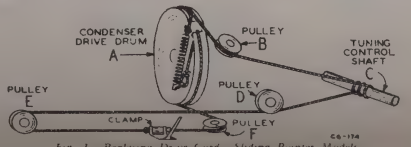


Fig. 3—Replacing Drive Cord—Sliding Pointer Models

Alignment Procedure

Remove the bottom and front chassis covers. Directions for removing the bottom cover are in the instruction book.

To remove the front cover, first pull the knobs and buttons off the shafts. Remove the 2 screws at the top and the 2 screws at the sides of the front cover. Press in the sides of the chassis case to release the lugs at the sides of the front cover. Pull outward on the bottom of the front cover and then push the cover up until the lugs at the top are released.

Do not remove the back of the chassis case. This back can be taken off of the No. 2 and later issue sets.

Set the signal generator for 456 KC and connect the output of the signal generator through a .05 mf. condenser to the control grid of the 1st Detector. Connect the ground lead of the signal generator to the chassis. Set the volume control at maximum. Attenuate the signal from the signal generator to prevent the leveling off action of the AVC.

Then adjust the 4 I.F. trimmers until maximum output is obtained. These trimmers can be reached through the 4 holes in the back wall of the chassis case. It will be necessary to pull out the fiber insulating sheet a slight amount.

Insert the antenna cable plug in the antenna socket on the chassis.

Rotating Pointer Models—If the antenna is connected at the HC terminal and the entire 60-inch shielded cable (70 mmf.) is being used, connect the antenna wire at the other end through a 120 mmf. condenser to the antenna post of the signal generator.

If the antenna is connected at the LC terminal, the antenna cable has been cut as explained in the instructions. If cut in half (30-inch length), the capacity of the antenna cable is approximately 35 mmf. Connect the antenna wire, in this case, through a 25 mmf. condenser to the antenna post of the signal generator.

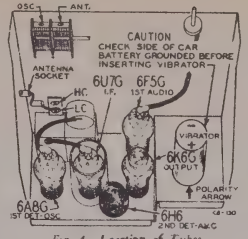


Fig. 4—Location of Tubes

Sliding Pointer Models—If the antenna is connected at the HC terminal and the 60-inch shielded cable (70 mmf.) is being used, connect the antenna wire at the other end through a 230 mmf. condenser to the antenna post of the signal generator.

If the antenna is connected at the LC terminal and the short shielded cable (19 mmf.) is being used, connect the antenna wire, in this case, through a 20 mmf. condenser to the antenna post of the signal generator. If the long cable has been cut to length and is being used, the total capacity of the cable and the series condenser should be 38 to 40 mmf.

Both Models—Set the signal generator for 1550 KC. Turn the rotor of the tuning condenser to the full open position. Adjust the trimmer of the oscillator section of the gang condenser until maximum output is obtained. See Fig. 4 for location of this trimmer.

Set the signal generator for 1400 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained. Adjust the trimmer of the antenna section of the gang condenser for maximum output.

Calibration—Rotating Pointer Models—To obtain dial scale calibration, tune in an 800 KC signal. Hold the tuning shaft and turn the pointer disc until the pointer is at the correct position when the chassis front cover is put back in place.

Calibration—Sliding Pointer Models—The pointer assembly is clamped to the drive cord and it is seldom necessary to reset it to obtain proper dial calibration. If re-calibration is required, loosen the clamps with a screw driver, bringing the pointer assembly first down to one end of the dial scale and then down to the other end. Tune in a signal of known frequency near one end of the dial scale. Move the pointer assembly to this frequency on the scale and tighten the clamps with long nose pliers.

Inserting Vibrator Unit

IMPORTANT—The vibrator unit can be inserted in two ways. The proper method of insertion will depend on which terminal of the car battery is grounded. If the POSITIVE (+) terminal of the car battery is grounded, line up the + mark on the top of the vibrator with the arrow on the chassis base. If the NEGATIVE (—) terminal of the car battery is grounded, line up the — mark on the top of the vibrator with the arrow on the chassis base.

Antenna Capacity

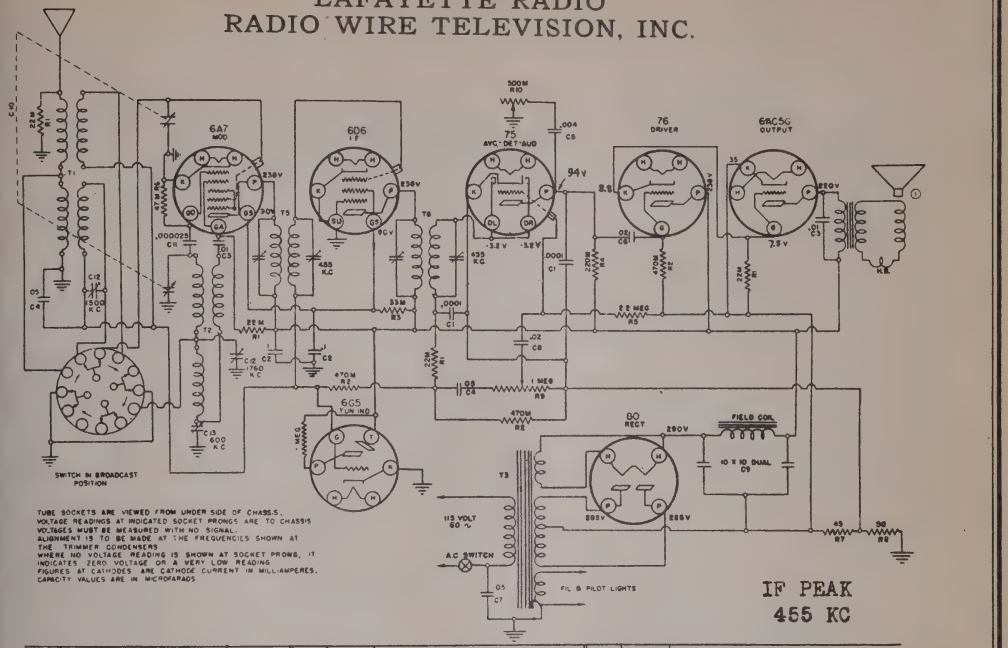
Rotating Pointer Models—The antenna coil is designed for car antennas with a capacity of 190 mmf. for the HC connection and 60 mmf. for the LC connection. This capacity is the total capacity of the antenna and the shielded lead.

Complete information regarding car antenna installation will be found in the instruction book packed with the radio.

Sliding Pointer Models—The information for this type of radio is the same as above except that the HC capacity is 300 mmf. and the LC capacity is 38 mmf.

MODELS D4, D64

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITY VALUES ARE IN MICROFARADS

IF PEAK
455 KC

CODE	PART NO	DESCRIPTION
R1	60-185	27 M OHM 1/3 WATT RESISTOR
R2	60-178	470M " " "
R3	60-186	33M " " "
R4	60-1901	330M " " "
R5	60-179	2.2 MEGOHM 1/3 WATT RESISTOR
R6	60-177	47M OHM 1/3 WATT RESISTOR
R7	60-187	47 " 1/2 " ±10%
R8	60-191	80 " " " ±10%
R9	24-428	1 MEGOHM VOLUME CONTROL & SW
R10	24-418	500M OHM TONE CONTROL

CODE	PART NO	DESCRIPTION
C1	.1501	100 MMF MICA CONDENSER
C2	16-116	8 MFD 400 V TUBULAR CONDENSER
C3	1606	.05 MFD 600 V " "
C4	1622	.05 " 200 V " "
C5	1851	.004 MFD 600 V " "
C6	16-108	.02 " " " "
C7	1607	.03 " 400 V " "
C8	16-123	.02 " 200 V " "
C9	18-228	10 X 10 MFD 400 W V ELECTROLYTIC CONDENSER
C10	19-135	2 GANG VARIABLE CONDENSER

CODE	PART NO	DESCRIPTION
C11	.1510	25 MMF MICA CONDENSER
C12	2052	TRIMMERS 3-30 MFD
C13	20-117	PADDING CONDENSER 300-600 MMFD
L1	10-237	ANTENNA COIL
L2	10-238	OSCILLATOR COIL
T3	19-159	POWER TRANSFORMER
T5	10-227	1ST I F
T6	10-228	2ND I F
1	75-745	SPEAKER

PUSH BUTTON ADJUSTMENT

After receiver is installed and antenna and ground properly connected, plug line cord into a convenient outlet. Then turn the volume control to about the center of rotation. This will turn the receiver on and put it in an operating condition. Time must be allowed for the tubes to heat up before stations can be tuned in. This time is approximately one-half minute.

The automatic tuning feature of your radio makes it possible to set up 6 favorite American broadcast stations and tune them in quickly with the automatic tuner. Choose stations for push-button operation heard with good volume at all times.

Cut the call letters of your 6 selected stations from the list supplied with your receiver and slip them into the Tab Holder from the top, with the clear celluloid in front of the call letters to protect them. Arrange the call letters in the Tab Holder from right to left. Have the call letters of the lowest frequency station at extreme right and work progressively to the left so that the highest frequency call letters will be at the extreme left.

Follow the procedure outlined below, in order to adjust the push-buttons properly:

1. By means of the Station Selector Knob tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the lowest frequency—that is, your selected station which is tuned in nearest the right-hand side of the dial.

2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of lowest frequency and the Call Letter Tab for this station should be at the extreme right of the Call Letter Holders.

Follow through with this same procedure, setting up the other 5 stations in the order of their frequency—that is, the second station set up will be second lowest in frequency and the third station set up will be third lowest in frequency.

Carefully check each Push-Button for the accuracy of the setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your radio automatically or manually. To receive any one of your four selected stations for automatic operation, merely push in ALL THE WAY the Button set up for that station.

ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent service men having the proper equipment. Re-alignment is very seldom needed and is usually only required after some major part has been replaced because of damage to the receiver.

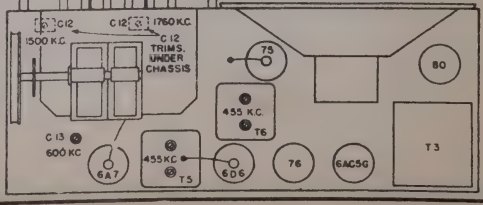
The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or microvolter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to plate of output tube and B+, or a low voltage A. C. meter may be used connected across speaker voice coil. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 455 K.C. signal. Adjust first and second I.F. trimmers for maximum output. Refer to chassis lay-out for location of trimmers.

Turn the dial to the extreme high frequency end. Feed a 1760 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1760 KC oscillator trimmer until maximum output is shown. Set the generator to 1500 KC and tune in this signal on the receiver. Then adjust the 1500 KC antenna trimmer to the maximum output. Then impress a 600 KC signal into the receiver antenna lead and tune in this signal on the receiver. Adjust oscillator padding condenser to the maximum output. Follow through with this procedure several times in order to obtain the best alignment adjustment possible. This completes the alignment.



MODEL BB11

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

Power Consumption - - 82 Amperes at 6.6 Volts
Power Output (6.6 Volts) - - 8.0 Watts Undistorted
10.0 Watts Maximum
Sensitivity - - - - - 1 Microvolt at .5 Watt Output

Selectivity - - - 38 KC Broad at 1000 Times Signal
Tuning Frequency Range - - - - - 540 to 1600 KC
Intermediate Frequency - - - - - - - - 456 KC
Speaker - - - - - - - - - 6" Electro-Dynamic

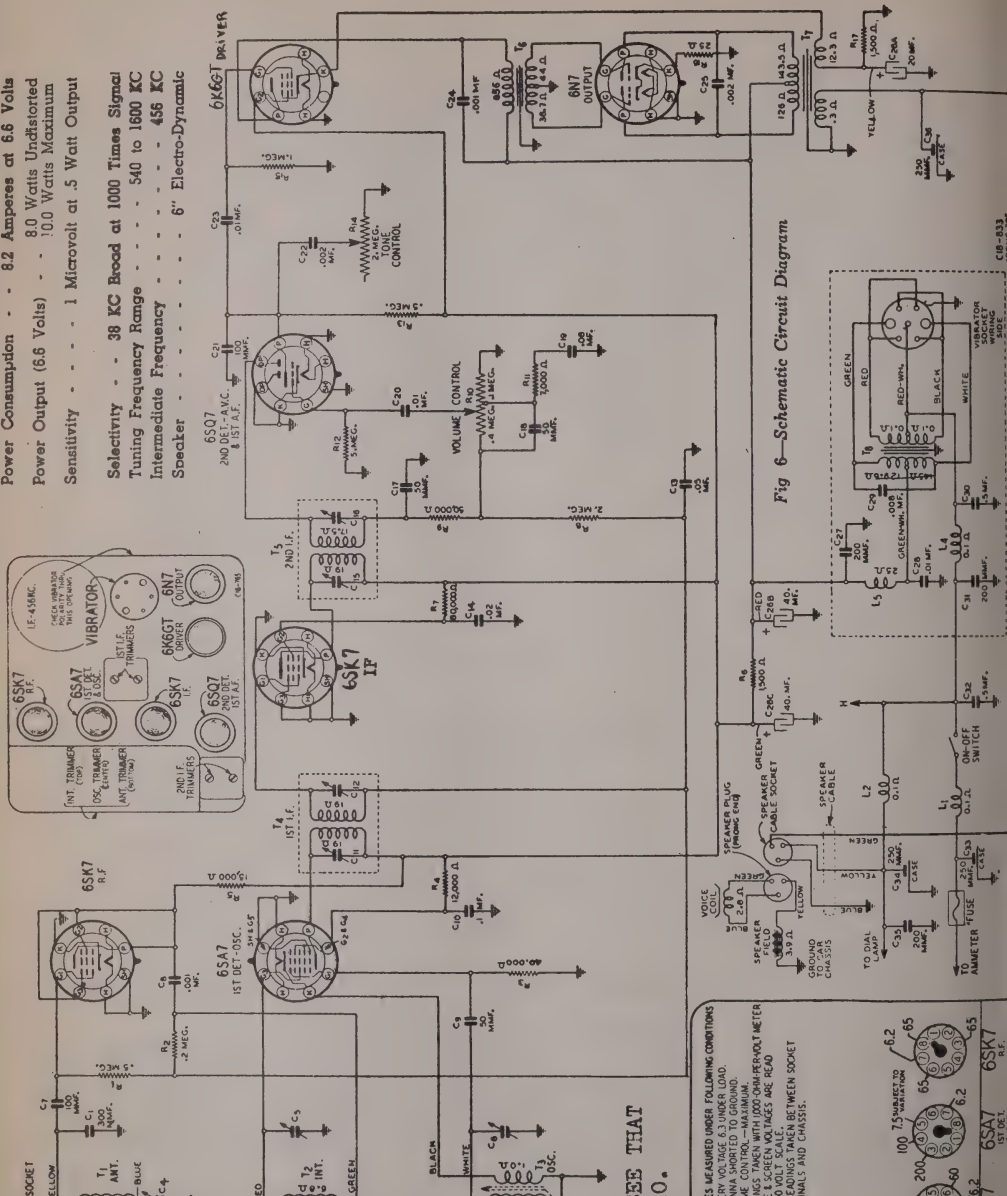


Fig 6—Schematic Circuit Diagram

FOR ALIGNMENT, SEE THAT
FOR MODEL BB 110.

VOLTAGES MEASURED UNDER FOLLOWING CONDITIONS
BATTERY VOLTAGE 6.3 UNDER LOAD.
ANTENNA SHORTED TO GROUND.
VOLUME CONTROL—MAXIMUM.
ALL VOLTAGES MEASURED WITH 1000-VOLT-PER-VOLT METER
PLATE & SCREEN VOLTAGES ARE READ ON 300 VOLT SCALE.
ALL READINGS TAKEN BETWEEN SOCKET TERMINALS AND CHASSIS.

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MODEL B13

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

Power Consumption - 67 Watts (At 117 volts 60 cycles)
Power Output - - - - 2.5 Watts Undistorted 4.5 Watts Maximum
Selectivity - 36 KC Broad at 1000 times Signal (Sharp)
Intermediate Frequency - - - - 456 KC.
Speakers - - - - 8", 10" or 12" Dynamic
Tuning Frequency Range
B Range ..... 1810 to 6350 KC.
C Range ..... 6300 to 22000 KC.
D Range ..... 9 Microvolts Average
Sensitivity
B Range ..... 8 Microvolts Average
C Range ..... 13 Microvolts Average
D Range ..... 9 Microvolts Average
117-234 VOLT POWER TRANS. CONNECTIONS
TRANSFORMER PLUG PIN SIDE
SWITCH
PHONO CONNECTIONS
PHONO JACK
PHONO PLUG PIN SIDE
PHONO SOCKET WIRING SIDE
NOTE: FOR CORRECT TUBE NUMBER, SEE INSTRUCTION BOOK OR TUBE LAYOUT LABEL.
6J7 6J7G 1ST. DET.
6K7 6U7G I.F.
6H6 2ND. DET.
6F5 6F5G AUDIO AMP.
6F6 6F6G OUTPUT
6C5 6C5G OSC.
6G5 TUNING INDICATOR
5Y3G RECT.
ANTENNA
GND
ANT
I.F. 456 KC.
T2 OSCILLATOR
GANG CONDENSER
BAND SWITCH
BROAD SHARP SELECTIVITY CONTROL
VOLUME CONTROL
INTER STATION SILENCER SHOWN ROTATED
USED ONLY ON TELEPHONE DIAL MODELS
NOT USED ON TELEPHONE DIAL MODELS
TO DIAL LAMPS
VOICE COIL
SPEAKER FIELD
SWITCH
CONNECTIONS PRESENT IN BAND SWITCH
STANDARD WAVE B 1-4,10-12
1ST SHORT WAVE C 2-4,9-10-11
2ND SHORT WAVE D 3-4,1-2-9-10-12
DUAL INSULATED CLIP
END NEAREST CHASSIS
SWITCH CONTACT LOCATION NUMBERING
NOTE: RESISTANCES OF WINDINGS LESS THAN 0.1Ω ARE NOT SHOWN.

MODEL B13

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C29) & (C30)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C23) & (C24)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C14)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	1st Ant. Range B (C7) 2nd Ant. Range B (C4)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C12)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C10)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C11)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C9)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Antenna Range D (C2)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C8)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

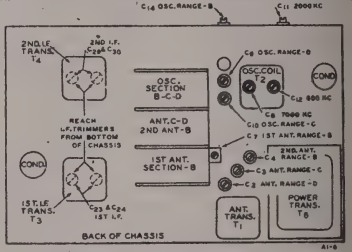
NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

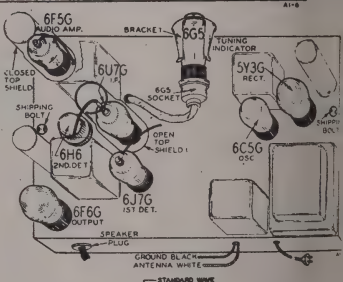
In sets using the moving beam of light indicator, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until the beam is at the 1500 KC mark on the dial. Retighten the screw.

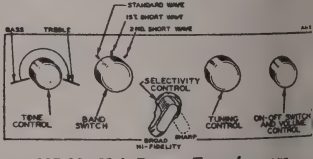
NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

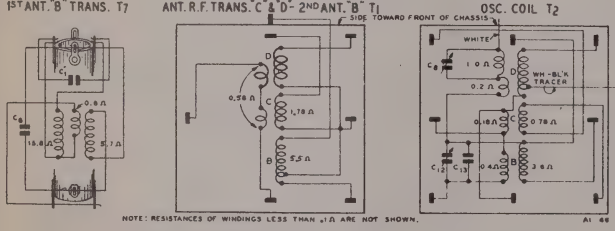
CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.








1ST ANT. "B" TRANS. T7
ANT. R.F. TRANS. "C" & "D" 2ND ANT. "B" T1
OSC. COIL T2
SIDE TOWARD FRONT OF CHASSIS
WHITE
WH.-BLK. TRACER
NOTE: RESISTANCES OF WINDINGS LESS THAN .1 Ω ARE NOT SHOWN.

Coil Terminal Arrangement and D.C. Resistance of Windings

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter.
Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated) Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6J7 6J7G	1st Det.	0	6.1(1)	220	100	7.9		6.1(1)	7.9
6C5 6C5G	Osc.	0	6.1(1)	140				6.1(1)	0
6K7 6U7G	I.F.	0	6.1(1)	220	100	2		6.1(1)	2
6H6	2nd Det.	0	6.1(1)		0			6.1(1)	0
6F5 6F5G	Audio Amp.	0	6.1(1)		75			6.1(1)	0(2)
6F6 6F6G	Power	0	6.1(1)	215	220			6.1(1)	0(3)
5Y3G	Rectifier	0	4.9(4)		610(5)		610(5)		4.9(4)
6G5	Tuning Indicator	Plate to Ground 20		Target to Ground 220		Cathode to Ground 0		Across Heater 6.1 A. C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R15.
(3) Bias (14 volts) as read across resistors R15 and R16.
(4) A.C. voltage as read across filament terminals 2 and 8.
(5) A.C. voltage as read across terminals 4 and 6.

117-234 Volt Power Transformers

Some models are equipped with a 117-234 volt 40 to 60 cycle power transformer. Connections as shown in Fig. 2 are completed to a special octal socket mounted on the back panel of the chassis. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

If one of these transformers is to be installed in a chassis equipped with a regular transformer, there is a 1½ inch round knockout on the back panel which may be removed to permit installation of the octal socket mentioned above.

Twenty-five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

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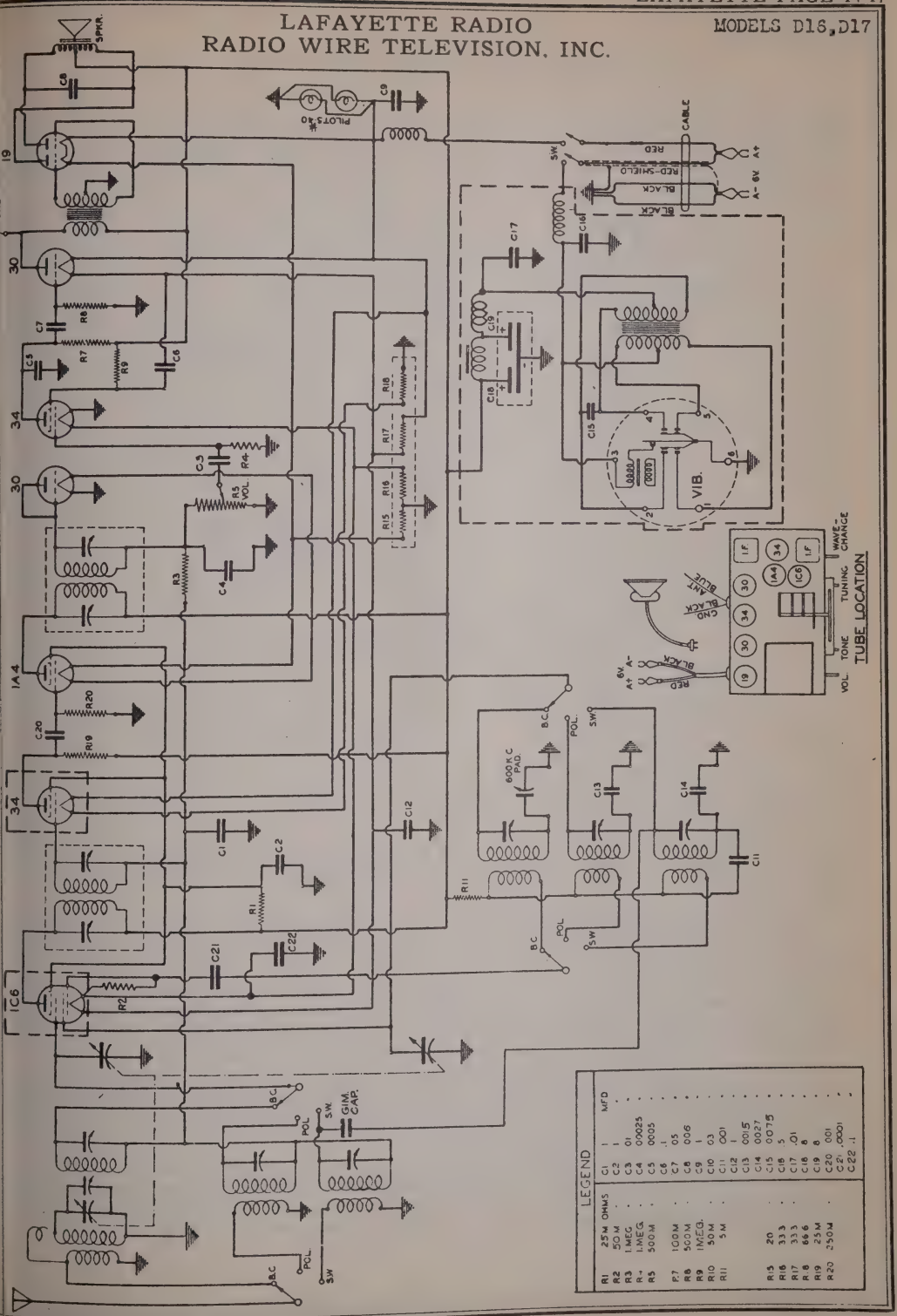
LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

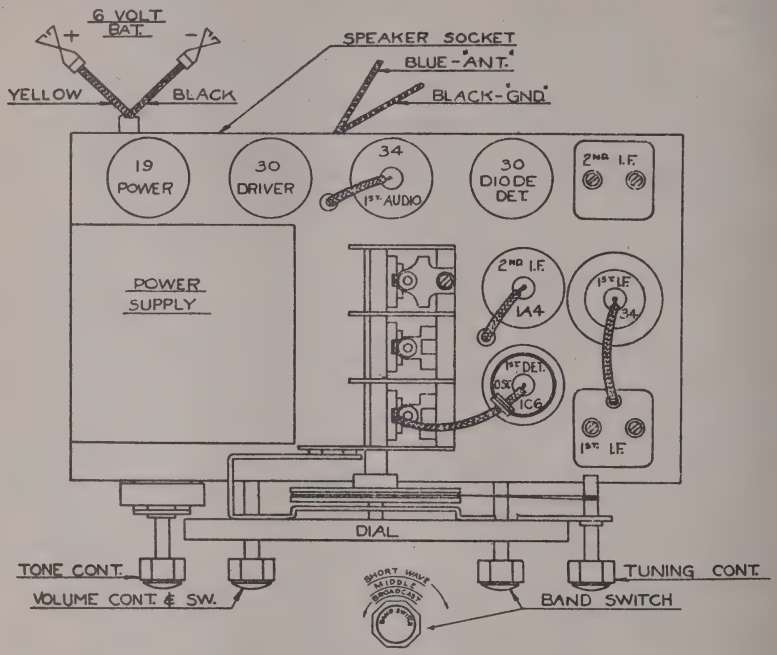
MODELS D16, D17



MODELS D16,D17
MODEL D15

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

The frequency range covered by this receiver is as follows: Broadcast band 537 KC to 1730 KC. Middle wave band 1.8 megacycles to 5.7 megacycles, short wave band 5.7 megacycles to 18.3 megacycles and any of these bands are selected at will by a flip of the band change switch. Extreme left broadcast—Center position —middle band—Extreme right short wave.



Use a test oscillator and connect an output meter from plate to plate of the 19 output tube.

I. F. Alignment:

Connect the oscillator through a .1 condenser to the grid of the 1C6 tube and set the oscillator to 456 kilocycles. Peak each I. F. stage to resonance as indicated by maximum output on the output meter.

R. F. Alignment:

With the wave change switch in the broadcast position. set the oscillator to 1700 kilocycles and connect in series with a .00025 condenser to the antenna of the receiver. Rotate the variable condenser to the 1700 setting of the dial and adjust the trimmer condenser of the broadcast oscillator to resonance. This trimmer is located on the right side of the chassis, second position from the front. Reset the test oscillator to 1400 kilocycles and adjust the antenna trimmer located on rear section of variable condenser. Adjust 1st detector trimmer under the chassis across preselector. Now set oscillator to 600 kilocycles and adjust padder located on side of chassis. Check alignment at 1000 kilocycles.

For aligning the police band, set test oscillator to 5 megacycles and switch to the police band position on the set. With the condenser rotated to this frequency setting as indicated on the dial, adjust oscillator trimmer located on the right side of the chassis, first position from the front. Now adjust antenna trimmer located on the front of the chassis, left position, to resonance.

The short wave band is aligned by setting the condenser to 18 megacycles and adjust the oscillator trimmer located on the right side of the chassis, third position from the front to resonance with an 18 megacycle signal from the test oscillator. Turn dial to 16 M. C. Set test oscillator to 16 M. C. and adjust antenna trimmer through right hand hole in front of chassis, rocking variable condenser slightly back and forth to get maximum peak.

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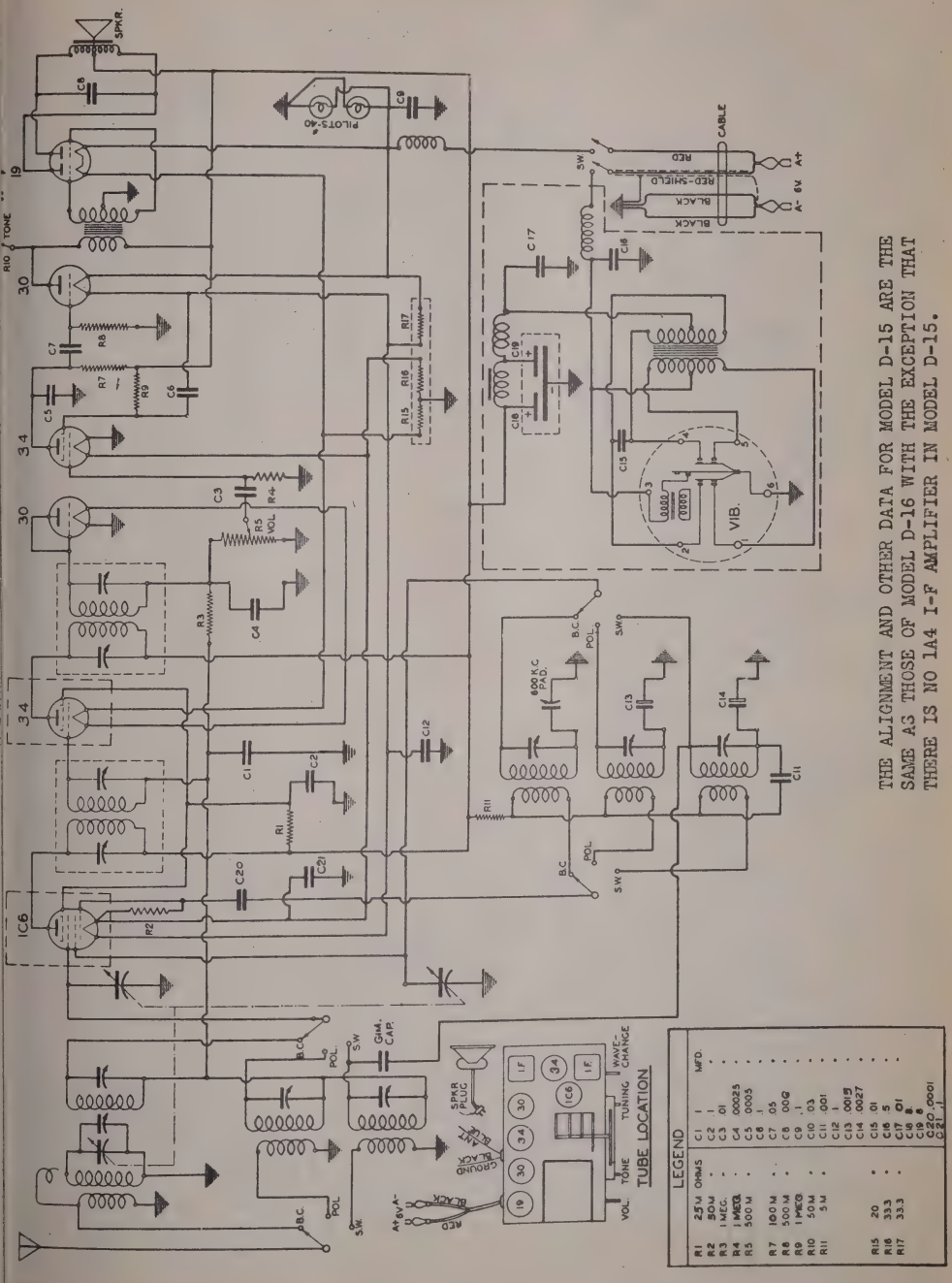
MODEL D15

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.


SPKR.
PILOTS-40
CABLE
RED
RED-SHIELD
BLACK
BLACK
A+ 6V
A- 6V
SW
TONE
VOL
C17
C18
C19
C15
VIB.
B.C.
POL.
SW
600 K.C. PAD
C13
C14
C11
C12
C1
C2
C3
C4
C5
C6
C7
C8
C9
C20
C21
R1
R2
R3
R4
R5 VOL
R7
R8
R9
R10
R11
R15
R16
R17
IC6
34
30
19
GRID
PLATE
GRID
BLACK
RED
A+ 6V A-
GRID
BLACK
SPKR. FIELD
GRID
PLATE
GRID
BLACK
GRID
PLATE
GRID
BLACK
GRID
PLATE
GRID
BLACK

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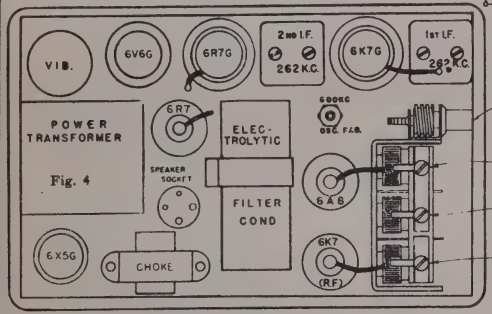
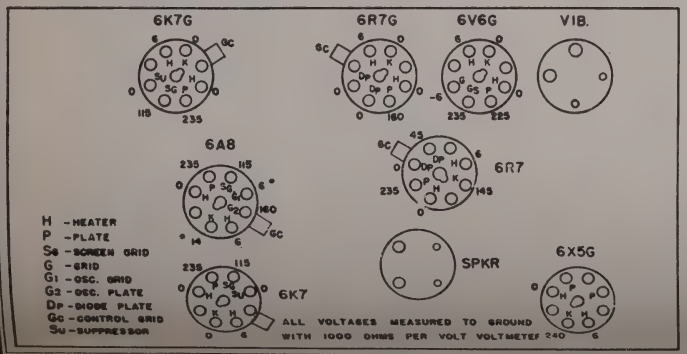
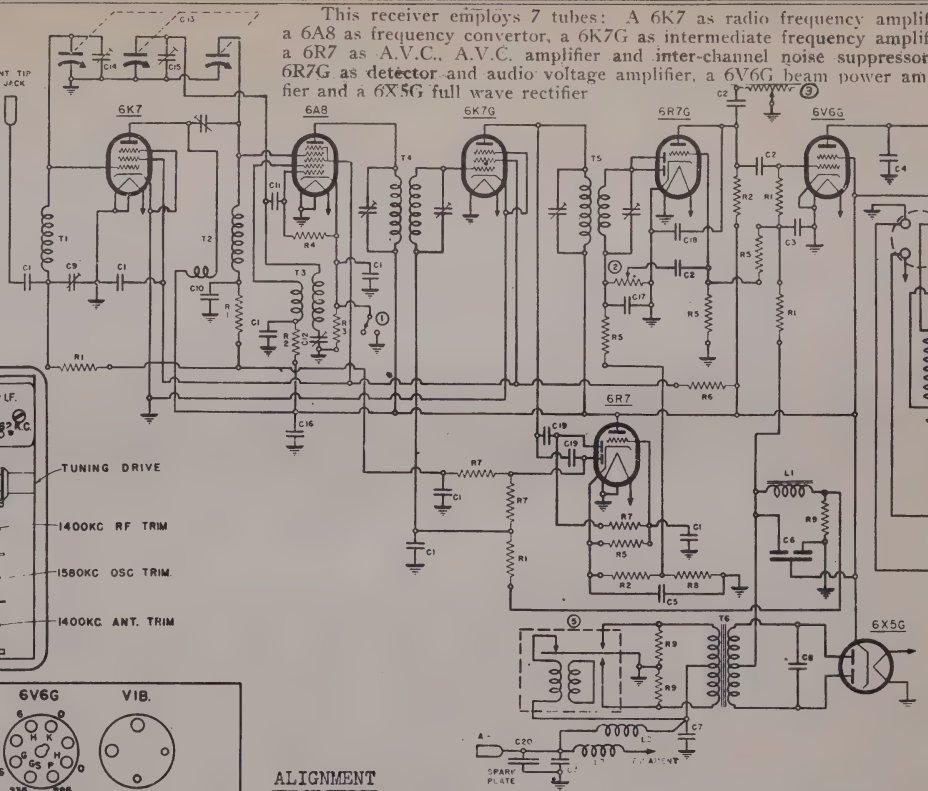
This receiver employs 7 tubes: A 6K7 as radio frequency amplifier, a 6A8 as frequency convertor, a 6K7G as intermediate frequency amplifier, a 6R7 as A.V.C. A.V.C. amplifier and inter-channel noise suppressor, a 6R7G as detector and audio voltage amplifier, a 6V6G beam power amplifier and a 6X5G full wave rectifier

PART NO	DESCRIPTION
C1 1622 .05 MFD 200 V.	
C2 1607 .05 " 400 V.	
C3 1635 .5 " 180 V.	
C4 1604 .01 " 600 V.	
C5 16-115 .1 " 200 V.	
C6 18-221 8 X 8 " 350 V.	
C7 16-112 .5 " 200 V.	
C8 16-113 .005 " 1600 V.	
C9 20-116 300 MFD. - 1200 MFD. PADDER	
C10 18-109 1200 MMF. FIXED COND.	
C11 1501 100 MMF. MICA	
C12 20-117 300 MFD. - 600 MFD. PADDER	
C13 19-126 3 GANG COND (TRIM. C14 & C15)	
16-116 .1 MFD. 400 V.	
C17 16-112 500 MMF. MICA	
C18 16-111 1000 MMF. MICA	
C19 1504 250 MMF. MICA	
C20 99-1 SPARK PLATE	

PART NO	DESCRIPTION 747
R1 60-163 250 M OHMS 1/2 W. CAR RES.	
R2 60-164 20 M " " "	
R3 60-176 1500 " " "	
R4 60-165 50 M " " "	
R5 60-167 1 MEG. " " "	
R6 60-171 20M " 1 W. "	
R7 60-168 500 M " 1/2 W. "	
R8 60-174 2000 " " "	
R9 60-169 50 " " "	
T1 10-206 ANTENNA COIL	
T2 10-209 R.F. COIL	
T3 10-210 OSC. COIL	
T4 10-211 1ST. I.F. TRANSFORMER	
T5 10-212 2 ND. I.F. TRANSFORMER	
T6 80-154 POWER TRANSFORMER	
L1 33-213 FILTER CHOKE	
L2 33-207 R.F. CHOKE (VIB.)	
L3 33-206 R.F. CHOKE (IGNITION)	
1 69-119 SENSITIVITY SWITCH	
2 24-103 VOLUME CONTROL	
3 26-114 TONE CONTROL	
4 79-242 SPEAKER	
5 34-101 VIBRATOR	







ALIGNMENT

IF Through o.1 mfd. dummy antenna, adjust trimmers at 262 KC.

BC Through 0.00025 dummy, adjust osc. trimmer at 1580 KC. Adjust antenna trimmer at 1400 KC. Adjust padder at 600 KC. Adjust antenna compensator at 600 KC. for best sensitivity with signal.

Any type of automobile antenna, such as a roof type, a whip, an under car plate, or insulated running boards may be used as the receiver has an antenna compensating trimmer.

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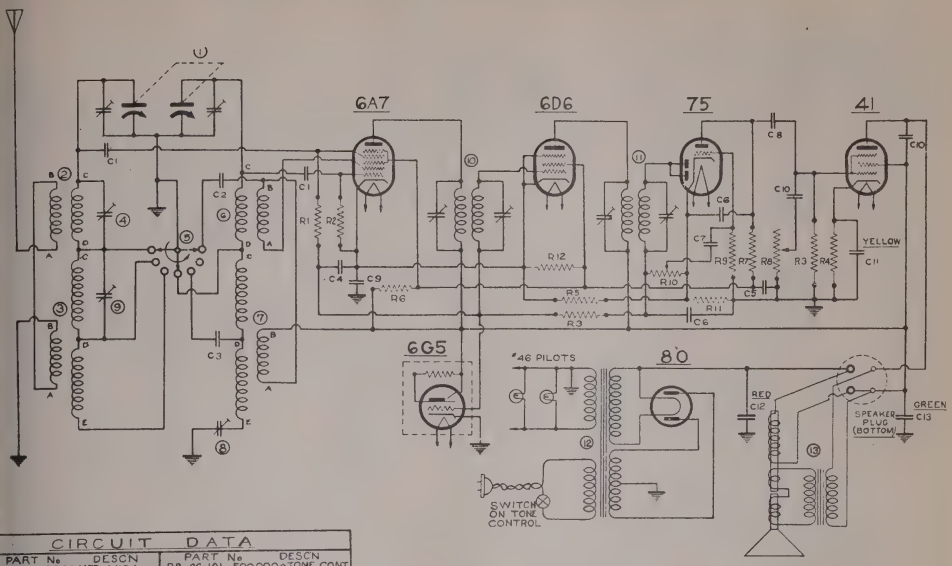
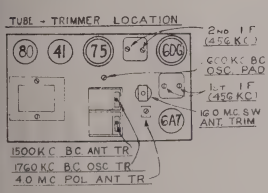
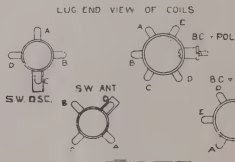


CIRCUIT DATA

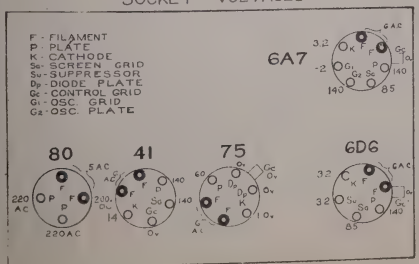
PART No.	DESCN.
1501	.0001 MFD MICA
1509	.002 " "
18-101	.00157 " " 3%
1622	.05 " " 200v
1607	.05 " " 400v
1504	.00025 " MICA
1603	.01 " 400v
1603	.01 " 400v
1614	.25 " 200v
1951	.004 " 600v
18-102	4 MFD -25v ELECTC.
	.8 " 50v "
	.4 " 250v "
G020	2 MEG OHM 1/3 W
G028	40,000 " "
G018	500000 " "
G052	800 " "
G011	100 " "
G105	10,000 " 1/2 W
G056	200,000 " 1/3 W

PART No.	DESCN.
R8 26-101	500000 ohm TONE CONT
R9 6017	1 MEG OHM 1/3 W
R10 24-101	500,000 " VOL CT
R11 6003	50 " 1/3 W
R12 6117	25,000 " 1/2 W
1	19-107 GANG COND.
2	10-126 SW. ANT COIL
3	10-129 POL + BC ANT "
4	2052 SW ANT TRIMMER
5	29-102 WAVE SWITCH
6	10-127 SW OSC COIL
7	10-128 POL + BC OSC COIL
8	20-100 600 KC BC OSC PAD
9	2054 POL ANT TRIMMER
10	1123 1ST I F
11	1124 2ND I F
12	80-104 POWER TRANSFMR
13	SPEAKER


TUBE - TRIMMER LOCATION
2ND I F (456 KC)
600 KC BC OSC. PAD
1ST I F (456 KC)
16.0 MC SW ANT. TRIM
1500 KC BC ANT TR.
1760 KC BC OSC TR.
4.0 MC POL ANT TR.



SOCKET VOLTAGES



DESCRIPTION

This receiver is a 6 tube alternating current operated superheterodyne

The tubes used are a 6A7 oscillator as modulator, a 6D6 as I. F. amplifier, a 75 as A.V.C. and audio rectifier and audio voltage amplifier, a 41 as power audio amplifier, an 80 as a power rectifier, and a 6G5 as tuning indicator.

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1760 K. C. to 540 K. C., the middle or police band which has a frequency range of from 5. M. C. to 1.6 M. C. and high frequency or foreign band which is from 19 M. C. to 5. M. C.

ALIGNMENT PROCEDURE

The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or microvolter) This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to the 2 small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a 1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Leaving the wave switch on broadcast position turn the dial to the extreme high frequency end. Feed a 1760 K. C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1760 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. broadcast antenna trimmer and the 1500 K. C. broadcast preselector trimmer for maximum output. Set the generator to 600 K. C. and adjust the 600 K. C. broadcast oscillator pad to maximum output **while tuning the receiver back and forth** across the signal from the generator. This completes the alignment of the broadcast band.

The police band is aligned by feeding 4.0 M.C. signal to the receiver antenna lead through the .00025 condenser. Turn the wave switch to the center position and tune the receiver to this signal. Adjust the 4.0 M.C. police antenna trimmer for best output

The short wave band is aligned in the same way using a 15 M.C. signal and adjusting the 15 M.C. short wave antenna trimmer after having turned the wave switch to the right hand position.

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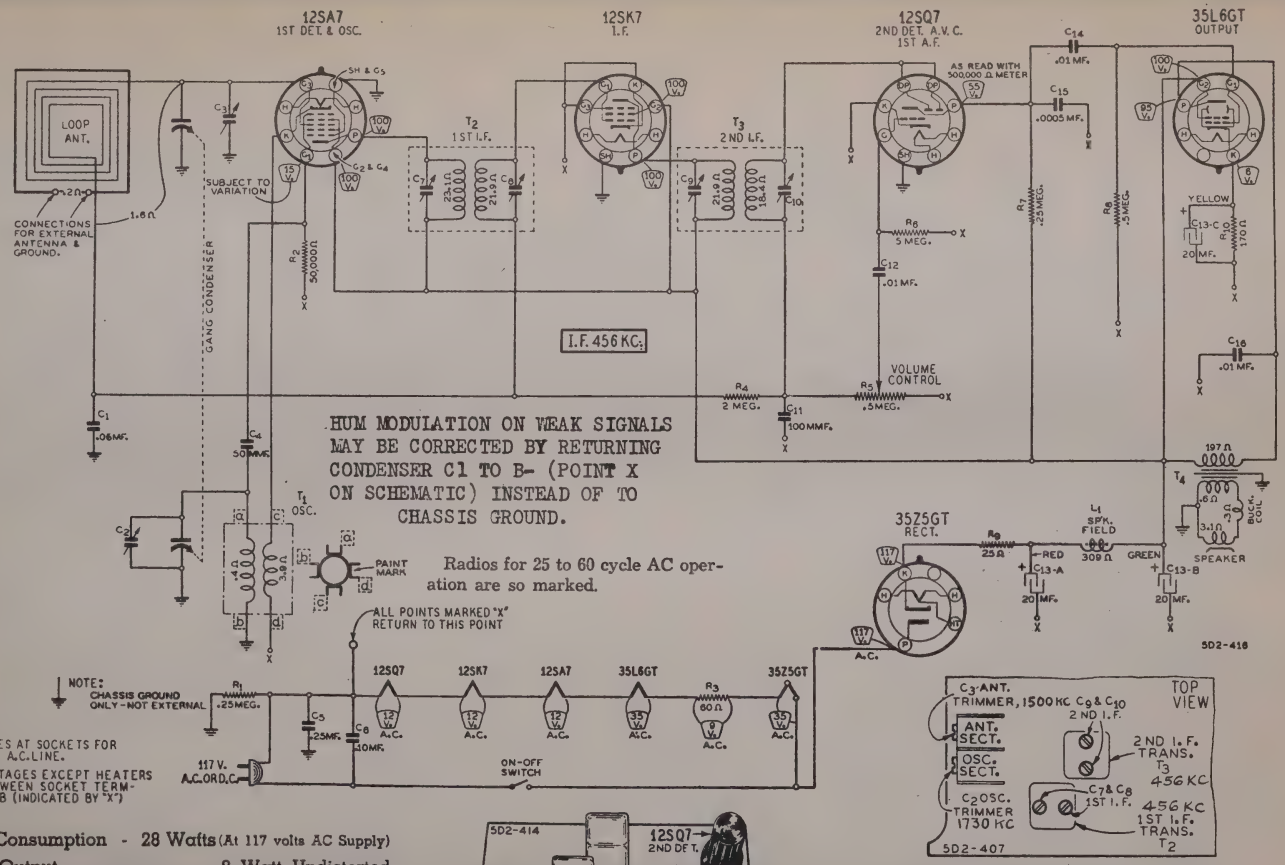
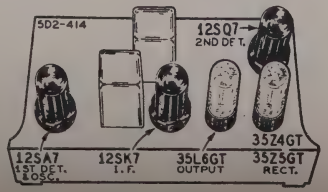


HUM MODULATION ON WEAK SIGNALS MAY BE CORRECTED BY RETURNING CONDENSER C1 TO B- (POINT X ON SCHEMATIC) INSTEAD OF TO CHASSIS GROUND.

Radios for 25 to 60 cycle AC operation are so marked.

VOLTAGES AT SOCKETS FOR 117 VOLT A.C. LINE.

ALL VOLTAGES EXCEPT HEATERS ARE BETWEEN SOCKET TERMINAL & -B (INDICATED BY "X")



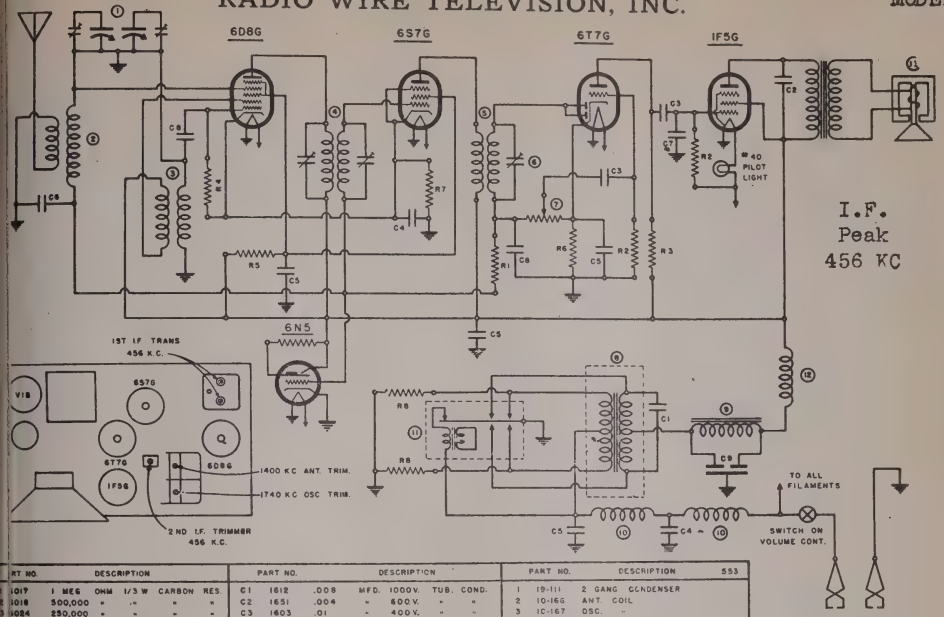
Power Consumption	28 Watts (At 117 volts AC Supply)
Power Output	.8 Watt Undistorted
Selectivity	60 KC Broad at 1000 times Signal
Intermediate Frequency	456 KC
Speaker	5" Electro Dynamic
Tuning Frequency Range	528 to 1730 KC
Sensitivity (For .05 Watt Output)	35 Microvolts per Meter Average

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII

NOTE—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, first remove the celluloid crystal by taking out the 4 buttons at the corner. Hold the tuning knob and shift the pointer to the 800 KC mark.

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

MODEL D22
MODEL D23

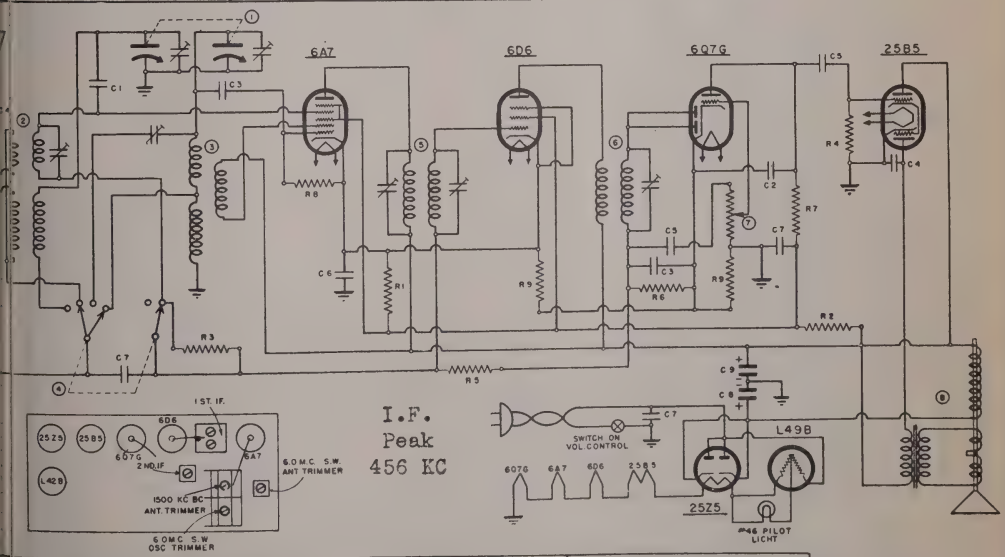


PART NO.	DESCRIPTION
1017	1 MEG OHM 1/3 W CARBON RES.
1018	500,000 " " " "
1024	250,000 " " " "
1025	50,000 " " " "
1022	15,000 " " " "
1023	10,000 " " " "
1013	300 " " " "
1011	100 " " " "

PART NO.		DESCRIPTION
C1	1612	.008 MFD. 1000V. TUB. COND.
C2	1651	.004 " 600V. " "
C3	1603	.01 " 400V. " "
C4	1614	.25 " 200V. " "
C5	1600	.1 " " " "
C6	1622	.05 " " " "
C7	1504	.00025 " MICA CONDENSER
C8	1501	.0001 " " "
C9	1845	DUAL 8 - 150 V. ELECTROLYTIC

PART NO.	DESCRIPTION	553
1	19-111	2 GANG CONDENSER
2	10-166	ANT. COIL
3	10-167	OSC. "
4	10-194	1ST I.F. TRANSFORMER
5	10-163	2ND " "
6	20-105	2ND I.F. TRIMMER
7	24-106	VOLUME CONTROL
8	80-134	POWER TRANSFORMER
9	3307	FILTER CHOKE
10	33-205	R.F. "A" CHOKE
11	3407	VIBRATOR
12	33-204	R.F. "B" CHOKE
13		SPEAKER

Model D-22



PART NO	DESCRIPTION
6014	5,000 OHM 1/2 WATT CARBON RES
60-131	3,000 " " " " "
6020	2 MEG " 1/3 " " "
6017	1 M " " " " "
6018	500,000 " " " " "
6024	250,000 " " " " "
6026	200,000 " " " " "
6025	50,000 " " " " "
60098	50 " " " " ±10%

PART NO		DESCRIPTION
C1	15-105	.00056 MFD. MICA CONDENSER ±3%
C2	1504	.00025 " " " "
C3	1501	.0001 " " " "
C4	[illegible]	.004 " 600V TUBULAR CONDENSER
C5	1603	.01 " 400V " "
C6	1614	.25 " 200V " "
C7	1622	.05 " " " "
C8	18-211	30 " " ELECTROLYTIC CONDENSER
C9	18-211	8 " " " "

PART NO	DESCRIPTION	610
1	19-114	2 GANG VARIABLE CONDENSER
2	10-174	ANT COIL
3	10-176	OSC COIL
4	69-109	WAVE BAND SWITCH
5	10-177	1ST I.F. TRANSFORMER
6	10-163	2 ND. I.F. TRANSFORMER
7	24-106	VOL. CONTROL WITH SWITCH
8	79-221	DYNAMIC SPEAKER

Model D-23

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Model D-22
ALIGNMENT PROCEDURE

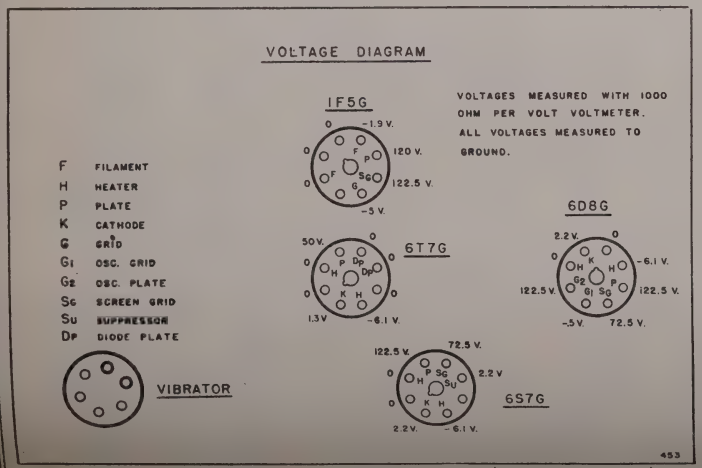
The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or microvolter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 10,000 ohms, to the two plate and screen pins of the 1F5G tube.

Connect the signal generator to the grid cap of the 6D8G tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 456 K.C. signal. Adjust the first and second I.F. trimmers until the maximum output is obtained. This aligns the I.F.

Turn the dial to the extreme high frequency end. Feed a 1740 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1740 K.C. oscillator trimmer until maximum output is shown. Set the generator to 1400 K.C. and tune in this signal on the receiver. Then adjust the 1400 K.C. antenna trimmer to maximum output. This completes the alignment.



Model D-23
ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

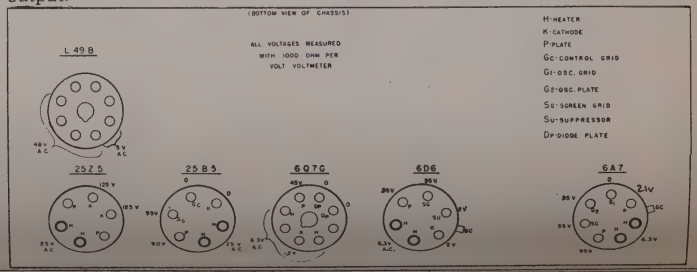
Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the receiver chassis through another .1 M.F. condenser. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Turn the wave switch to the short wave position and set the dial to 6.0 M.C. Feed a 6.0 M.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Tune the 6.0 M.C. Oscillator trimmer to give resonance. Two points may be found where this signal can be heard. The correct setting is the one where the trimmer is screwed the loosest. This may also be checked by turning the dial to about 5.0 M.C. where the signal should again be heard.

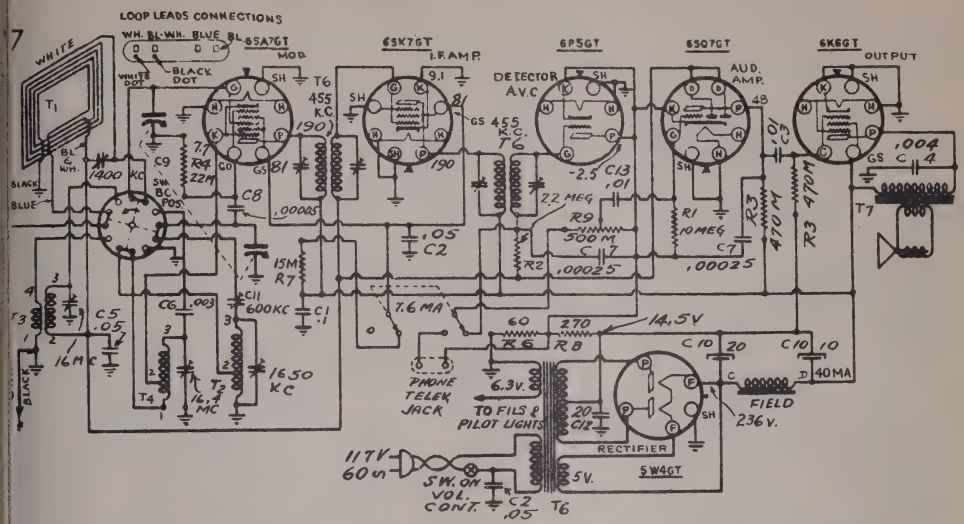
Then turn the wave switch to broadcast position and turn the dial to the extreme high frequency end. Feed in a 1720 K.C. signal and adjust the broadcast oscillator trimmer, which is located under the receiver at the wave switch, to resonance. Then set the signal generator to 1500 K.C. and tune in this signal on the receiver. Adjust the 1500 K.C. antenna trimmer for maximum output.

Again turn the wave switch to short wave position and tune in a 6.0 M.C. signal from the generator. Adjust the 6.0 M.C. antenna trimmer to maximum output.



LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

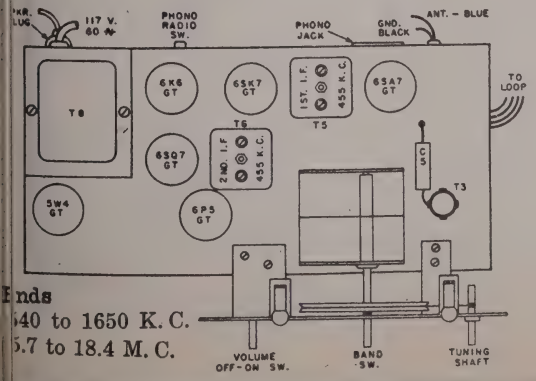
MODELS D26,S43



Code	Part No.	Description
C1	16-116	.1 mfd 400 V Tubular Condenser
C2		.05 " " " " "
C3	16-119	.01 " " " " "
C4		.004 " " " "
C5		.05 " 200 V " "
C6		.003 " Mica Condenser
C7	1504	.00025 Mfd. Mica Condenser
C8	1503	.00005 " " "
C9	19-156	2 Gang Variable Condenser
C10	10-254	20X10 Mfd.350 W.V. Electrolytic
C11		Padding Condenser
C12		20 Mfd. 25 V. Electrolytic
C13		.01 " 200 V. Tubular Condenser
R1	60-133	10 Meg. 1/4 W. Resistor
R2	60-179	2.2 " " " "
R3		470M Ohm " " "
R4		22M " " " "
R6	60-132	60 " 1/2 " "
R7	60-234	15M " 1 W. "
R8	60-245	270 " "
R9	24-144	500 M " Volume Control (With SW.)

Tube sockets are viewed from underside of chassis, voltage readings at indicated socket prongs are to chassis.
Voltages must be measured with no signal.
Voltages are measured with 1000 ohm per volt voltmeter.
Where no voltage reading is shown at socket prong, it indicates zero voltage or a very low reading.
Figures at cathodes are cathode current in milliamperes
Alignment is to be made at the frequency shown at each trimmer condenser.
Capacity values are in microfarads.

Code	Part No.	Description
T1		Loop Antenna
T2	10-326	B.C. Oscillator Coil
T3	10-323	S.W. Antenna Coil
T4	10-320	" Oscillator Coil
T5		1st I.F. Transformer
T6	10-312	2nd I.F. Transformer
T7	------	Output Transformer (on Spkr.)
T8		Power
1	79-278	6½ Inch. Dynamic Speaker
2	69-141	Band Switch
3	69-140	Phono Switch
4	20-127	Trimmer Block
5	20-129	Trimmer (on loop)



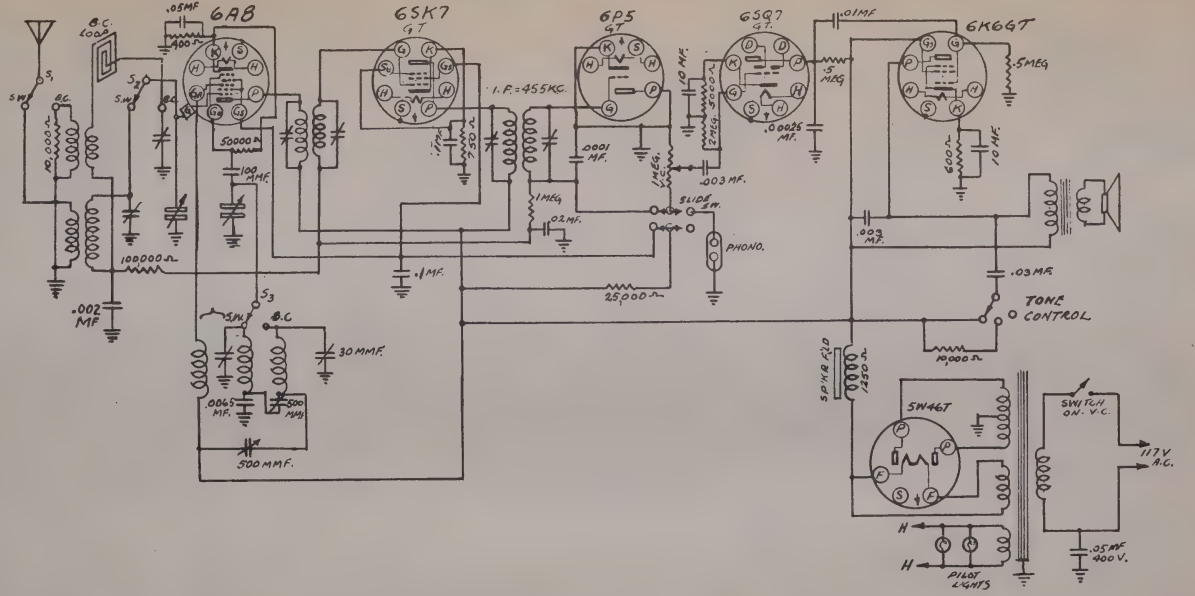
nds
40 to 1650 K. C.
5.7 to 18.4 M. C.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOLUME VIII

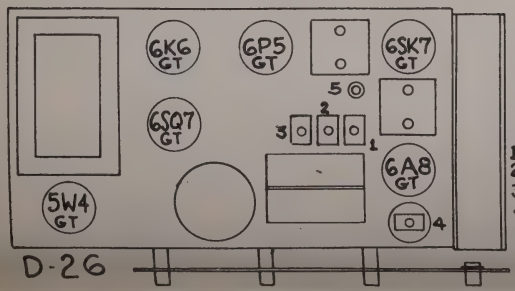
IF PEAK
455 KC

Models D-26 - S-43

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.



MODEL D-26



1-BCAST-ANT-1500KC.
2-BCAST-OSC-1720KC.
3-SHT-WVE-OSC-18MC.
4-SHT WVE ANT-15MC.
5-BCAST-PAD-600KC.

The Bands covered are as follows:
BROADCAST - 540 KC to 1720 KC,
SHORTWAVE 5.85 MC to 18 MC
The frequency is indicated directly on the Dial Scale.

I.F. 455 K.C.

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MODEL BB27

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC

Power Output - - - - - - - - 1.25 Watts Maximum
Selectivity - - 55 KC Broad at 1000 Times Signal
Intermediate Frequency - - - - - - - 456 KC
Speaker - - - - - - - - - - 5" Electro-Dynamic

CAUTION — THIS RADIO HAS NO POWER TRANSFORMER. GROUNDING OF ANY KIND ON ANY EXTERNAL GROUND MAY CAUSE DAMAGE TO THIS RADIO. DO NOT USE A GROUNDED OBJECT, SUCH AS A RADIATOR, FOR AN EXTERNAL ANTENNA.

D Range - - - - - - - - - -

MODEL BB27

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

Power Consumption - 28 Watts (At 117 volts AC Supply)

Power Output - - - - - - - .8 Watt Undistorted
1.25 Watts Maximum

Selectivity - - 55 KC Broad at 1000 Times Signal

Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - - - - - - - 5" Electro-Dynamic

Tuning Frequency Range

B Range..... to 1600 KC

D Range.....4600 to 12,200 KC

Sensitivity (For .05 watt output)

B Range.....35 Microvolts Average

D Range.....30 Microvolts Average

ALIGNMENT PROCEDURE

Remove Jumper on Loop Antenna for All Adjustments. The following equipment is required for aligning:

Volume Control—Maximum All Adjustments.

Connect Ground Post of Signal Generator to B—(12SK7—Prong No. 3) in Chassis.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antenna—.1 mf.

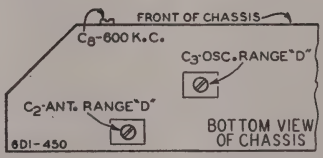
SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustrations)
I. F.					
456 KC	Signal Grid of 1st Det. Connect at Stator of Large Gang Section.	.1 mf.	B Range	Turn Rotor to full open	1st I.F. (C11) & (C12) 2nd I.F. (C13) & (C14)
RANGE B					
1600 KC	Signal Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to full open	Oscillator Range B (C4)
1500 KC	Red Antenna Screw at Back of Loop	.1 mf.	B Range	Turn Rotor to max. output	Antenna Range B (C6)—See Illustration Page 1
600 KC	Same as Above	.1 mf.	B Range	Turn Rotor to max. output	600 KC (C8) Rock Rotor—See Note A
RANGE D					
12,200 KC	Same as Above	.1 mf.	D Range	Turn Rotor to full open	Oscillator Range D (C3)
11,000 KC	Same as Above	.1 mf.	D Range	Turn Rotor to max. output	Ant. Range D (C2) Rock Rotor—See Note A

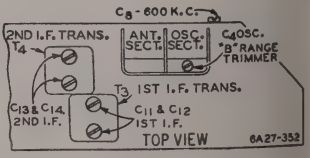
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

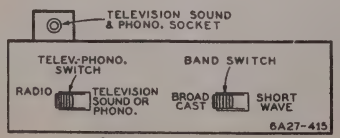
After each range is completed, repeat the procedure as a final check.

NOTE A—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

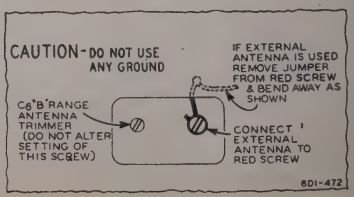
CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.







BACK PANEL OF CHASSIS


CAUTION-DO NOT USE ANY GROUND
IF EXTERNAL ANTENNA IS USED REMOVE JUMPER FROM RED SCREW & BEND AWAY AS SHOWN
C6 "B" RANGE ANTENNA TRIMMER (DO NOT ALTER SETTING OF THIS SCREW)
CONNECT EXTERNAL ANTENNA TO RED SCREW
6DI-472

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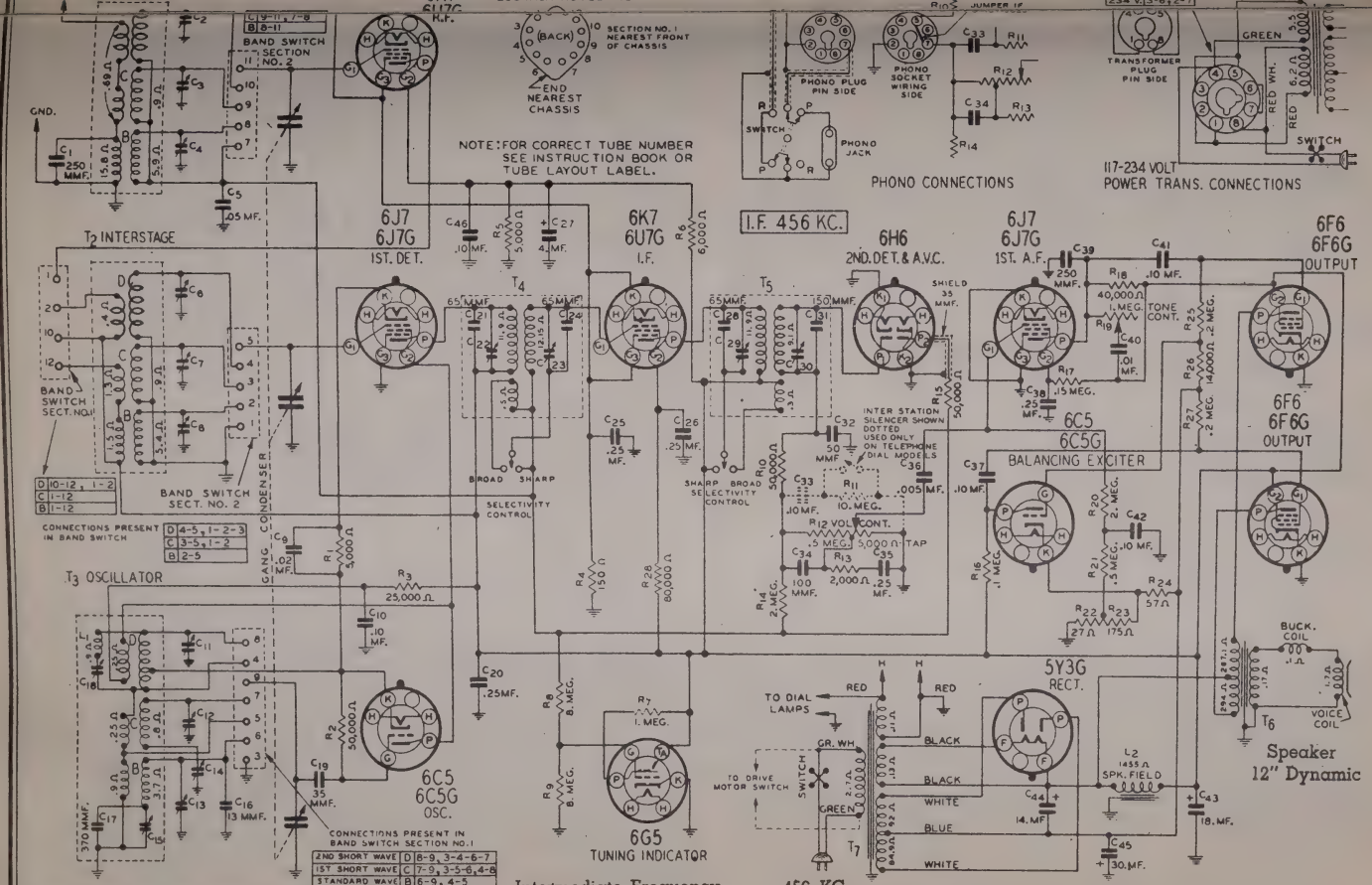

Intermediate Frequency 456 KC.

Tuning Frequency Range

B Range	528 to 1830 KC.
C Range	1810 to 6350 KC.
D Range	6300 to 22000 KC.

Sensitivity

B Range	1.0 Microvolts Average
C Range	1.0 Microvolts Average
D Range	2.0 Microvolts Average

Power Consumption - 100 Watts	(At 117 volts 60 cycles)
Power Output	9.8 Watts Undistorted 12 Watts Maximum
Selectivity (Sharp)	27 KC Broad at 1000 times Signal

MODEL B33

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

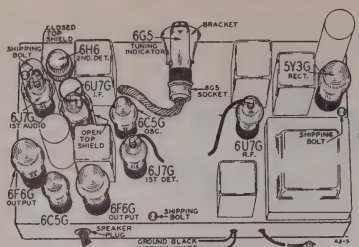

Fig. 4—Location of Tubes—Glass Tube Chassis

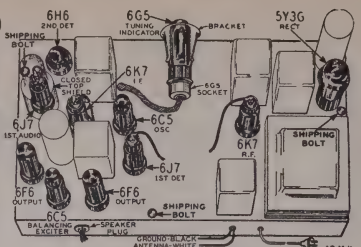

Fig. 5—Location of Tubes—Metal Tube Chassis

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter.

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)						
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7 6U7G	R.F.	0	6.1(1)	250	105	2.5		6.1(1)	2.5
6J7 6J7G	1st Det.	0	6.1(1)	250	125	0		6.1(1)	5.8
6C5 6C5G	Osc.	0	6.1(1)	125(2)				6.1(1)	0
6K7 6U7G	I.F.	0	6.1(1)	250	100	2.5		6.1(1)	2.5
6H6	2nd Det.—A.V.C.	0	6.1(1)					6.1(1)	0
6J7 6J7G	1st A.F.	0	6.1(1)	110	120	0(3)		6.1(1)	0(3)
6C5 6C5G	Balancing Exciter	0	6.1(1)	100				6.1(1)	18.5
6F6 6F6G	Output	0	6.1(1)	330	250			6.1(1)	0(4)
5Y3G	Rectifier	0	4.8(5)		730(6)		730(6)		4.8(5)
6G5	Tuning Indicator	Plate to Ground 20		Target to Ground 250		Cathode to Ground 0		Across Heater 6.1 A.C.	

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) Bias (2.5 volts) as read across resistor R22.
(4) Bias (24 volts) as read across resistors R22, R23, & R24.
(5) A.C. voltage as read across filament terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY * ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I. F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C29) & (C30)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C22) & (C23)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C13)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	Ant. Range B (C4) Int. Range B (C8)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C15)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE C							
6350 KC	Range C	400 Ohm	6350 KC	Antenna Lead	Oscillator Range C (C12)	Turn Rotor to Full Open	Adjust to Maximum Output
6000 KC	Range C	400 Ohm	6000 KC	Antenna Lead	Antenna Range C (C3) Int. Range C (C7)	Turn Rotor to Max. Output	Adjust to Maximum Output
2000 KC	Range C	400 Ohm	2000 KC	Antenna Lead	2000 KC (C14)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
22,000 KC	Range D	400 Ohm	22,000 KC	Antenna Lead	Oscillator Range D (C11)	Turn Rotor to Full Open	Adjust to Maximum Output
20,000 KC	Range D	400 Ohm	20,000 KC	Antenna Lead	Ant. Range D (C2) Int. Range D (C6)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
7000 KC	Range D	400 Ohm	7000 KC	Antenna Lead	7000 KC (C18)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

In sets using the moving beam of light indicator, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until the beam is at the 1500 KC mark on the dial. Retighten the screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

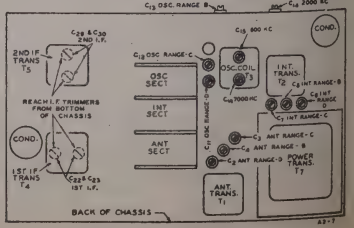

Fig. 3—Location of Trimmers

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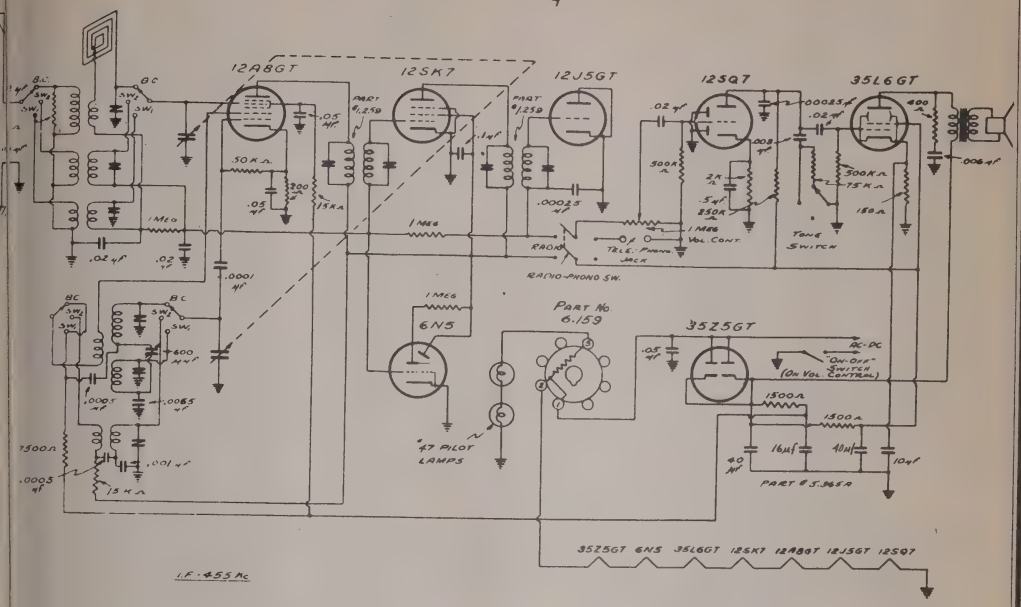
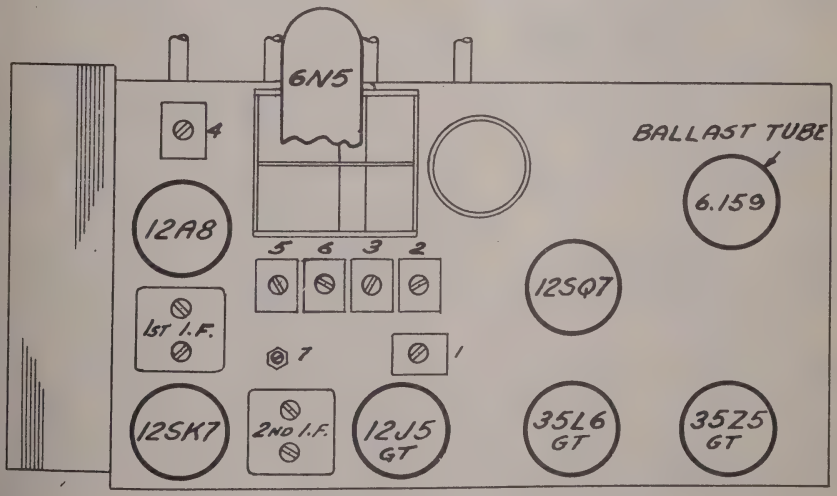
RADIO WIRE TELEVISION, INC.

MODEL D-33 G





TRIMMER ALIGNMENT FREQUENCIES

#1 - POLICE ANT. - 6.5 Mc.
#2 - POLICE OSC. - 7.35 Mc.
#3 - SHORT WAVE OSC. - 24 Mc.
#4 - SHORT WAVE ANT. - 20 Mc.
#5 - BROADCAST ANT. - 1500 Kc.
#6 - BROADCAST OSC. - 1720 Kc.
#7 - B'DC'ST PADDER - 600 Kc.

I.F. - 455 Kc.

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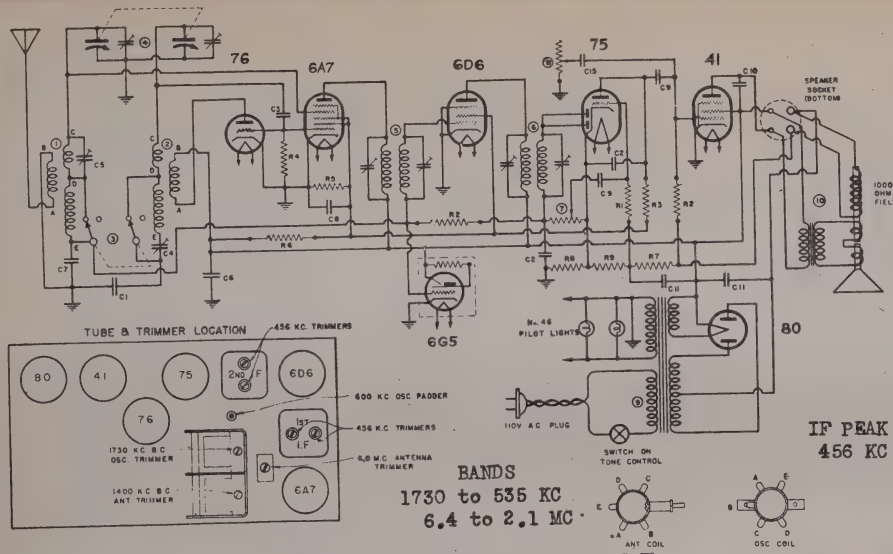


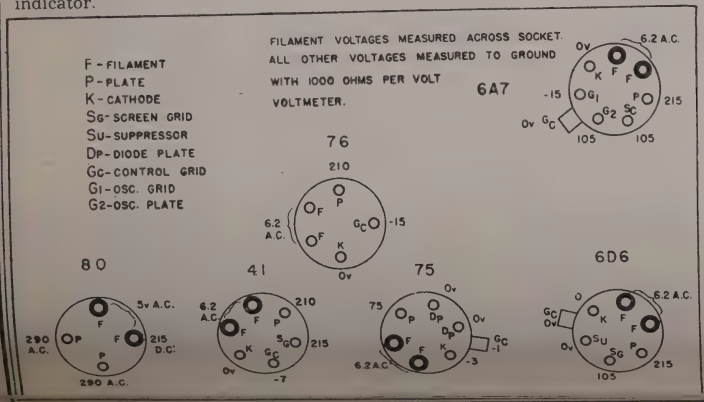
	PART NO	DESCRIPTION
C1	15-101	.00048 MFD MICA 5%
C2	1504	.00025
C3	1501	.0001
C4	20-100	B.C. OSC PADDING COND.
C5	2304	S.W. ANTENNA TRIMMER
C6	1602	.1 MFD. 600V
C7	1600	.1 200V
C8	1607	.05 400V
C9	1603	.01 400V
C10	1651	.004 600V

	PART NO	DESCRIPTION
R1	6020	2 MEGOHM 1/3 W
R2	6018	.5
R3	6026	100,000 OHMS
R4	6028	40,000
R5	6117	25,000 1/2 W
R6	6210	10,000 1 W
R7	60-100	200 OHMS 1W WIRE WOUND
R8	60-101	50 " 1/2 W
R9	60-104	20 " "
C11	18-200	DUAL 8 MFD 450V ELCTC

	PART NO.	DESCRIPTION
1	10-143	B.C. & S.W. ANTENNA COIL
2	10-144	OSCILLATOR
3	6922	WAVE SWITCH
4	19-107	2 GANG VARIABLE COND
5	1123	FIRST I.F. TRANSFORMER
6	1124	SECOND I.F.
7	24-101	VOLUME CONTROL
8	26-101	TONE CONTROL & SWITCH
9	80-106	POWER TRANSFORMER
10		SPEAKER

CIRCUIT DIAGRAM	
DRAWN BY Lou Zu	DATE 3-18-37

The tubes used are a 76 as oscillator, a 6A7 as modulator, a 6D6 as I. F. amplifier, a 75 as A. V. C. and audio rectifier and audio voltage amplifier, a 41 as power audio amplifier, an 80 as a power rectifier and a 6G5 as tuning indicator.



ALIGNMENT PROCEDURE

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Leaving the wave switch on broadcast position turn the dial to the extreme high frequency end. Feed a 1730 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1730 K.C. broadcast oscillator trimmer until maximum output is shown. Set the generator to 1400 K.C. and tune in this signal on the receiver. Then adjust the 1400 K.C. broadcast antenna trimmer to maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output **while tuning the receiver back and forth across the signal** from the generator. This completes the alignment of the broadcast band.

The short wave band is aligned while feeding a 6.0 M.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Turn the wave switch to short wave position and tune in the 6.0 M.C. signal. Adjust the 6.0

MODEL D37

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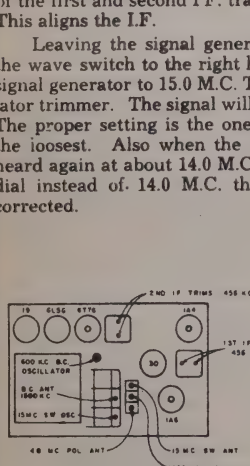
ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 10,000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 1A6 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground post of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I F. transformers until the maximum output is obtained. This aligns the I.F.

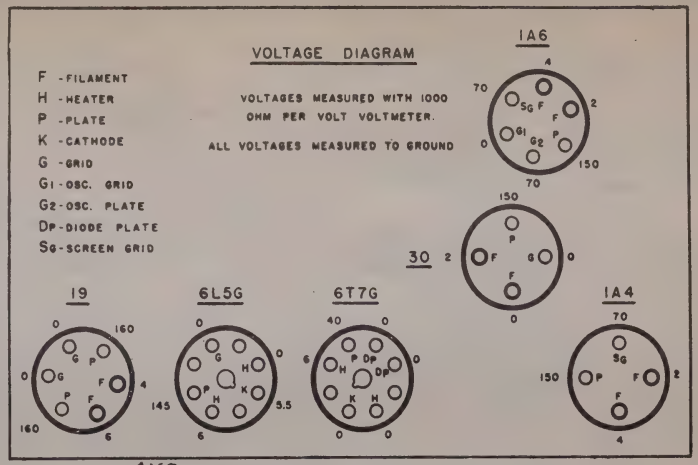
Leaving the signal generator connected to the grid cap of the 1A6. turn the wave switch to the right hand (short wave) position. Set the dial and the signal generator to 15.0 M.C. Tune in the signal by adjusting the 15.0 M.C. oscillator trimmer. The signal will be heard at two different settings of the trimmer. The proper setting is the one where the signal is heard when the trimmer is the loosest. Also when the dial of the receiver is turned the signal will be heard again at about 14.0 M.C. If the signal is heard at about 16.0 M.C. on the dial instead of 14.0 M.C. the wrong setting has been used and should be corrected.

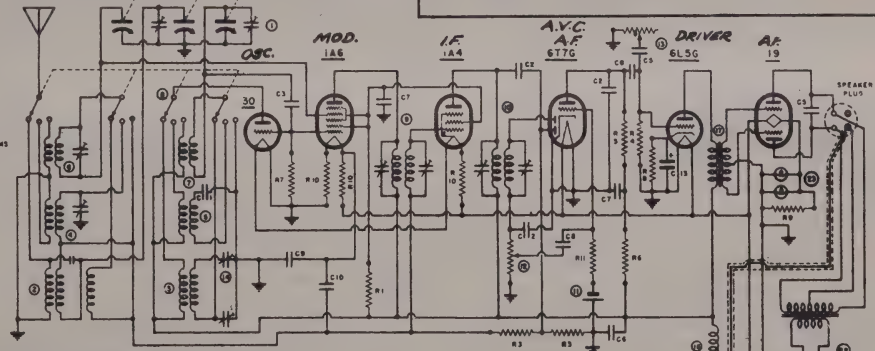


IF PEAK 456 KC

Set the wave switch on broadcast position and turn the dial to the extreme high frequency end. Feed a 1680 K.C. signal to the receiver antenna post through a .00025 M.F. mica condenser. Adjust the 1680 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. broadcast antenna trimmer for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output **while tuning the receiver back and forth across the signal** from the generator. This completes the alignment of the broadcast band.

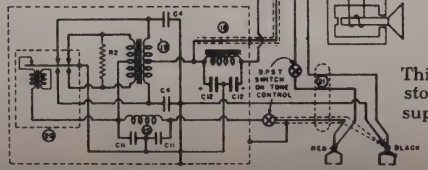
The police band is aligned by feeding a 4.0 M.C. signal to the receiver antenna lead through the .00025 condenser. Turn the wave switch to the center position and tune the receiver to this signal. Adjust the 4.0 M.C. police antenna





PART NO		DESCRIPTION			
R1	6106	15,000	OHM	1/2W	CARBON RES.
R2	6101	100	"	"	"
R3	6017	1 MEG	"	1/3W	"
R4	6018	500,000	"	"	"
R5	6024	250,000	"	"	"
R6	6026	100,000	"	"	"
R7	6025	50,000	"	"	"
R8	6006	1500	"	"	"
R9	6007	200	"	"	"
R10	80-108	33 1/3	"	1/2W	WIRE WOUND RES
R11	6020	2 MEG	"	1/3W	CARBON RES

PART NO		DESCRIPTION			
C1	15-106	.0011	MFD	MICA	CONC ±5%
C2	1504	.00025	"	"	"
C3	1503	.00005	"	"	"
C4	1604	.01	MFD	600V.	TUBULAR COND
C5	1611	.008	"	"	"
C6	1616	.75	"	400V.	"
C7	1601	.1	"	"	"
C8	1603	.01	"	"	"
C9	1614	.25	"	200V	"
C10	1600	.1	"	"	"
C11	1633	.3	"	150V	"
C12	1645	8	"	150V	ELECTROLYTIC
C13	16-100	10	"	25V	TUB ELECT.



This receiver is a 6 tube, 6 volt storage battery operated superheterodyne.

The short wave band is aligned in the same way using a 15 M.C. signal and adjusting the 15 M.C. short wave antenna trimmer after having turned

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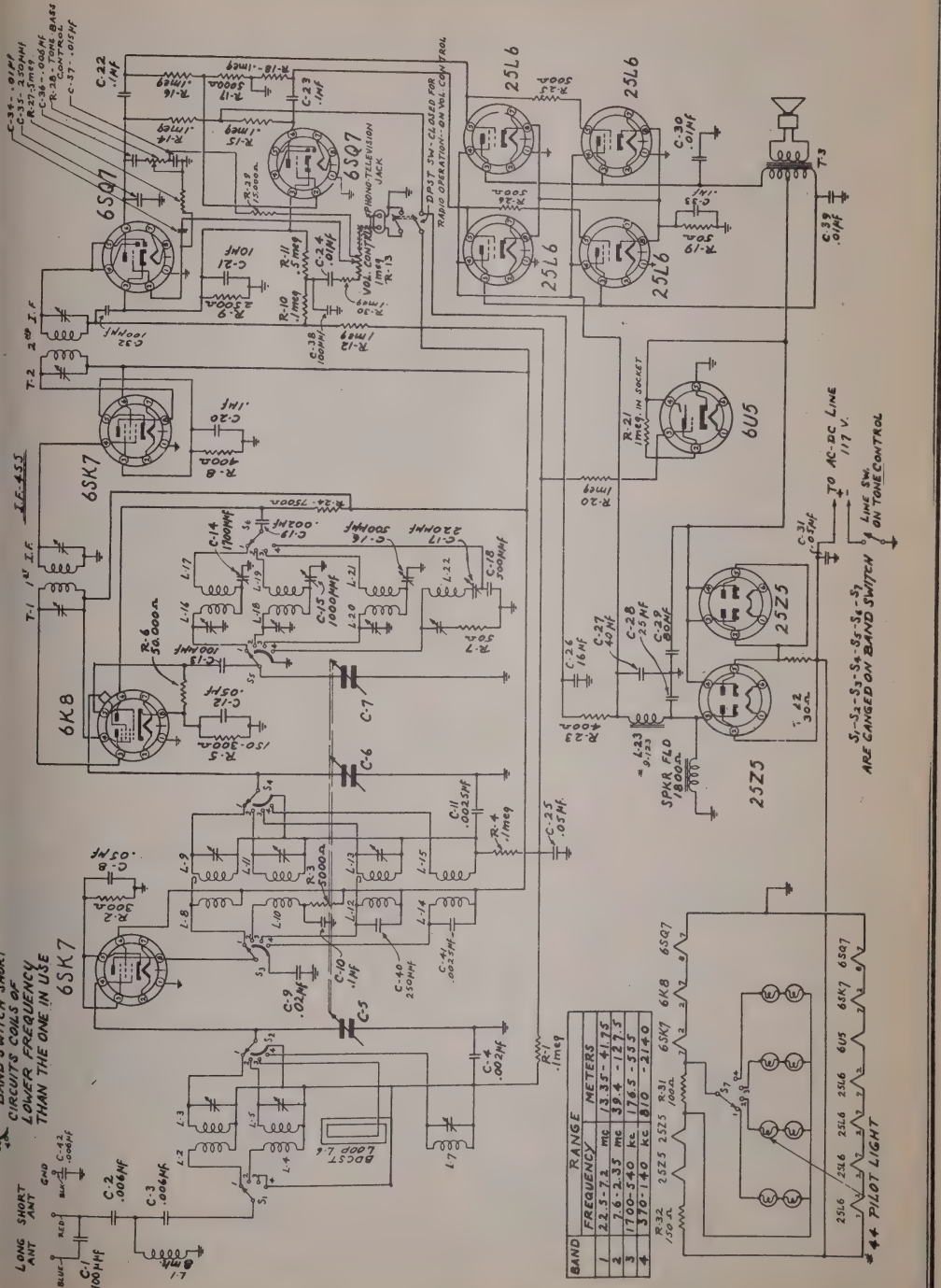
RADIO WIRE TELEVISION, INC.

MODELS CC48, 4124



MODELS CC48,4124

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC

It is important to remember that in receivers of this kind which are equipped with automatic volume control it is necessary to use the minimum possible signal from the signal generator; otherwise the A.V.C. action will tend to nullify the variations in output as the trimmers are adjusted.

I.F. Adjustment: The signal generator is set at 455 kc and is connected through a .5 mmfd condenser to the grid of the first detector (6K8). With the band switch set on "Broadcast", the pointer set at 550 kc and the receiver volume control at its maximum position, the I.F. trimmers are adjusted for maximum output. These trimmers may be found on tops of the I.F. transformer shield cans.

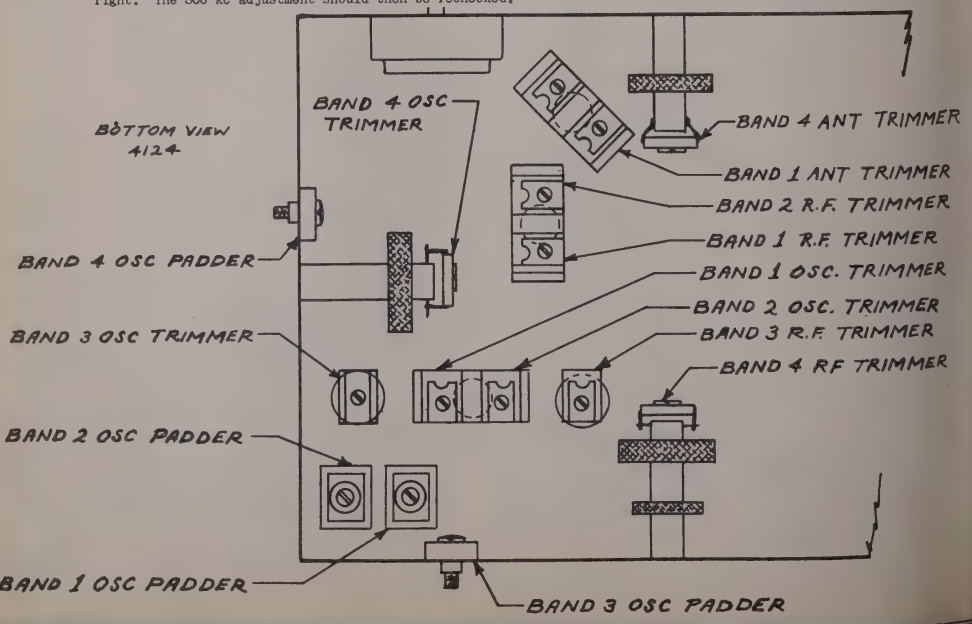
Band #1 Adjustment: Turn the dial control knob so that the condenser plates are entirely out of mesh. Set the band switch to band #1. The signal generator should be connected to the short-antenna binding post through the dummy antenna consisting of a 250 mmfd mica condenser and a 400 ohm non-inductive resistor. The oscillator trimmer condenser should be opened to minimum capacity and the signal generator then set to 224 megacycles. The oscillator trimmer is then increased in capacity until maximum response is obtained. Two responses are possible and it is important that the high frequency response (oscillator trimmer low capacity) be used. The signal generator is then set to 19 MC and the variable condenser turned until a response is obtained. The pointer should coincide with the 19 MC mark on the dial. The antenna preselector and first detector trimmers are then adjusted in the order named, for maximum output. The variable condenser should be rocked slightly during this last adjustment. The signal generator is now set at 7.6 mc and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum reading of the output meter while the generator runing condenser is rocked slightly to right and left. The high frequency adjustment should then be rechecked.

Band #2: The band selector switch is set in position for operation on short wave band #2. The variable condenser is opened so that the plates are completely unmeshed and the oscillator trimmer is opened to minimum capacity. The signal generator is set to 7.6 mc and the oscillator trimmer condenser is increased in capacity until a response is heard. Two responses are possible and it is important that the higher frequency response (oscillator trimmer low capacity) be used. Set the signal generator at 7 mc and turn the tuning control until a response is indicated on the output meter. The pointer should now coincide with the 7 mc marker on the dial. The antenna preselector and first detector trimmers are then adjusted in the order named for maximum output. After high frequency adjustments have been made set the signal generator at 2.5 mc and turn the variable gang condenser until a response is observed. Adjust the padding condenser for this band for maximum gain while rocking the tuning condenser slightly to the right and the left. The higher frequency adjustment should then be rechecked.

Broadcast Band: The dummy antenna for this band should consist of a 250 mmfd condenser only. The signal generator is set at 1620 kc, the band switch set at broadcast position. The variable condenser should be opened so that the plates are entirely out of mesh. The oscillator trimmer is then adjusted for maximum response on that frequency (1620kc). Set the signal generator at 1500 kc and tune the receiver until a response is indicated. The dial pointer should coincide with the 1500 kc mark on the dial.
The signal generator is then set at 600 kc and the receiver tuned until a response is indicated. The padder condenser is then adjusted for maximum gain while the tuning gang condenser is rocked slightly to the left and right. The 1500 kc adjustment should then be rechecked.

Long Wave Band: The band selector switch is set in position for operation on the long wave band. The receiver and generator are both tuned to 300 kc and the oscillator trimmer is adjusted for maximum response. The antenna and first detector trimmers are adjusted in the order named for maximum output.

The signal generator is then set at 150 kc and the signal is tuned in. The long wave padder condenser is adjusted for maximum response while the gang tuning condenser is rocked slightly to the left and right. The 300 kc adjustment should then be rechecked.



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MODEL C-37

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

11 TUBE A.C. RECEIVER
3 BAND
USED ON C-37
DRAWN BY
CHECKED
6V6
6V6
76
76
6AF6-G
80
6H6
TO SPK.
TO FIELD
60 CYCLE AC.
SWITCH
CONTROL
SW. - 22.5 M.C. - 57.0 METERS - OR - 13.3 METERS - 51.8 METERS
S. - 6.25 MC. - 2.2 MC. - OR - 48 METERS - 136.5 METERS
B.C. - 1720 KC. - 543 KC - OR - 174 METERS - 552 METERS
MFC CONDENSERS
AUTO
MAN.
ANT. COUPLING
OSC. COUPLING
R.F. GAIN
A.F. GAIN
TONE CONTROL
VOLUME CONTROL
SENSITIVITY
SELECTIVITY
BAND SWITCH
ANT. TRIMMER
OSC. TRIMMER
ANT. PADDER
OSC. PADDER
ANT. TRIMMER
OSC. TRIMMER
ANT. TRIMMER
OSC. TRIMMER
ANT. TRIMMER
OSC. TRIMM

MODELS D43, D44
MODEL D66
MODELS D72, D73

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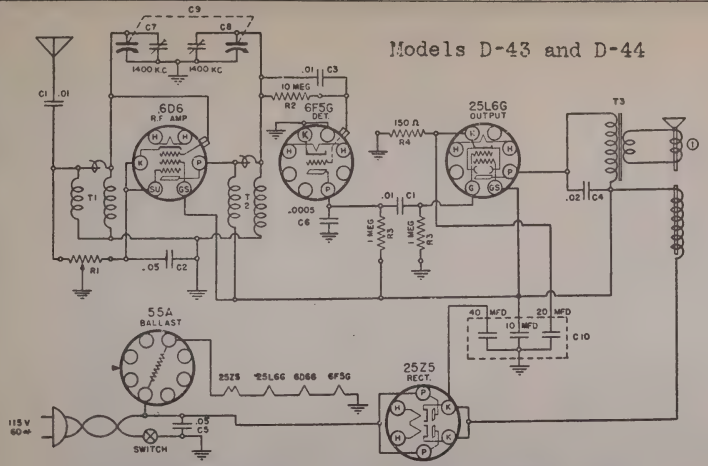
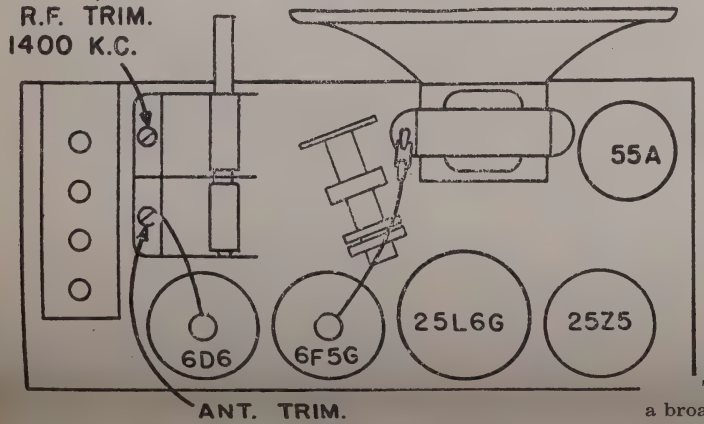
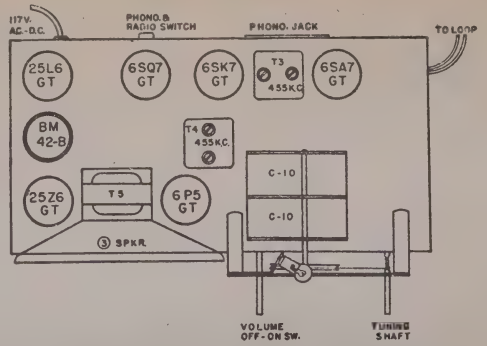
Models D-43 and D-44



CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION 542
C1	1604	.01 MFD. 600 V. TUBULAR CONDENSER	R1	24-127	VOLUME CONTROL & SWITCH
C2	1622	.05 MFD. 200 V. " "	R2	60-193	10 MEGOHM 1/3 W. RESISTOR
C3	16-119	.01 MFD. 400 V. " "	R3	60-195	1 " "
C4	16-108	.02 MFD. 600 V. " "	R4	60-184	150 OHMS " "
C5	1607	.05 MFD. 400 V. " "			
C6	15-112	.0005 MFD. MICA CONDENSER	T1	10-249	ANTENNA COIL
C7, C8, C9	19-135	ANTENNA VARIABLE COND. OSCILLATOR VARIABLE COND.	T2	10-250	R.F. COIL
			T3		OUTPUT TRANSFORMER
C10	18-234	FILTER CONDENSER 40 X 10 MF-400WV 20 MF-25 WV	1	79-251	SPEAKER

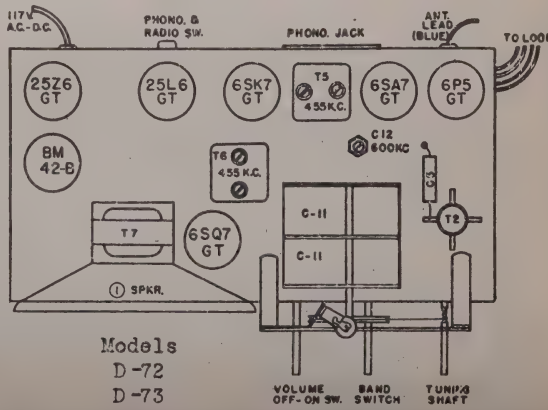


Model D-66



LOCATION OF PARTS ON TOP OF CHASSIS BASE.

For Conventional Alignment see Special Section Volume VIII.



Models
D-72
D-73

This model has been designed to cover two separate frequency bands, a broadcast band from 540 K. C. to 1650 K. C. and a short wave band from 5.7 to 18.4 M.C.

ALIGNMENT PROCEDURE

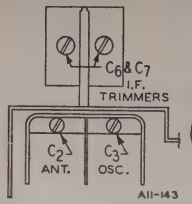
Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Illustration)
456 KC	Grid of 1st Det.	.1 mf.	Turn rotor to full open	I.F. (C6) & (C7)
1730 KC	Antenna Lead	200 mmf.	Turn rotor to full open	Oscillator (C3)
1500 KC	Antenna Lead	200 mmf.	Turn rotor to max. output	Antenna (C2)

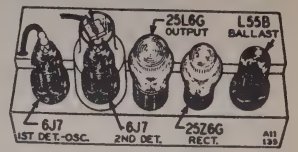
The following equipment is required for aligning:
Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas — .1 mf. and 200 mmf.

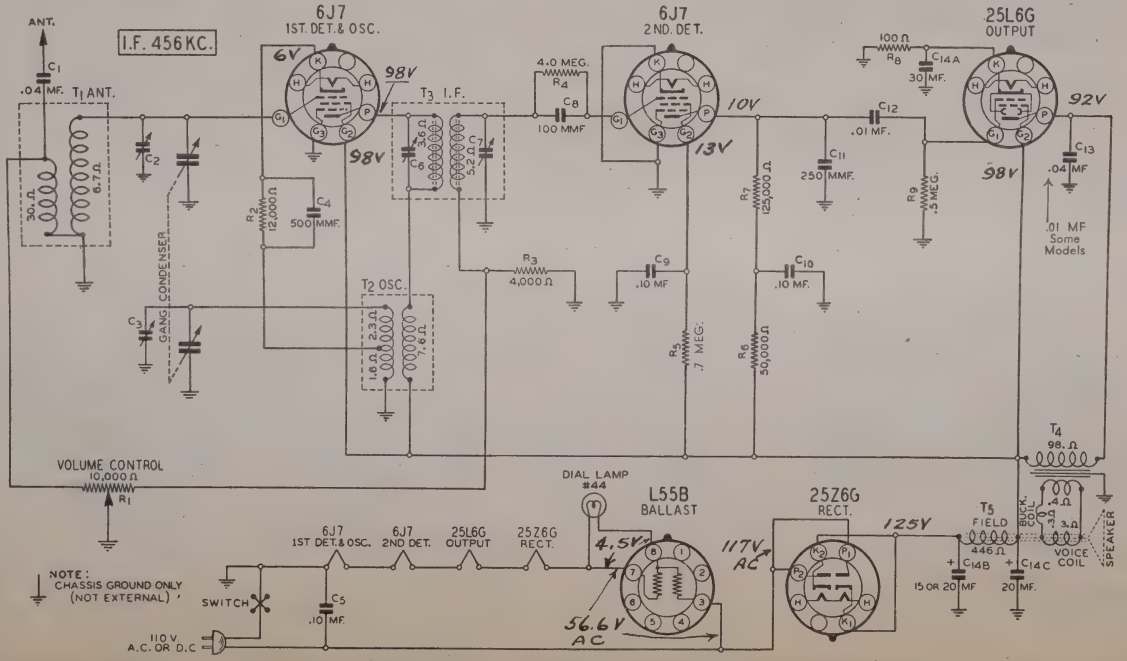
NOTE—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, loosen the pointer screw, set the pointer at the 800 KC mark and retighten the pointer screw.

work on the AC-DC chassis, keep it on a wood or other insulated surface to avoid contacts with ground.



DC OPERATION—Filament and ballast tube voltages will be the same as AC (for 117 volt line). The plate, screen and bias voltages will be slightly lower than those shown above. When operated on DC, the rectifier tube acts as a low resistance series resistor with a drop of approximately 6 volts between plate and cathode.





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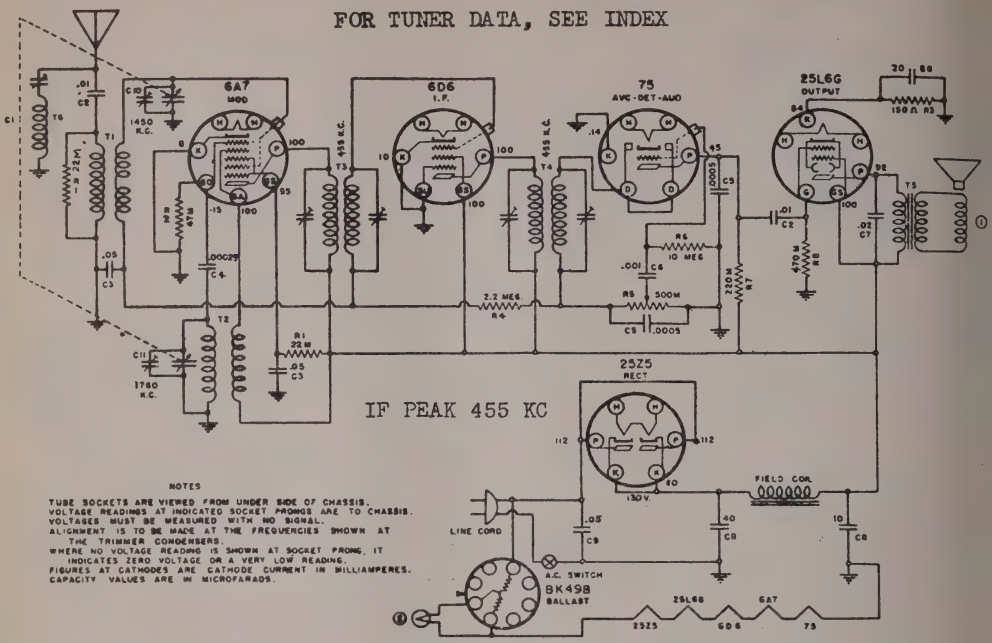
MODELS D58,D59

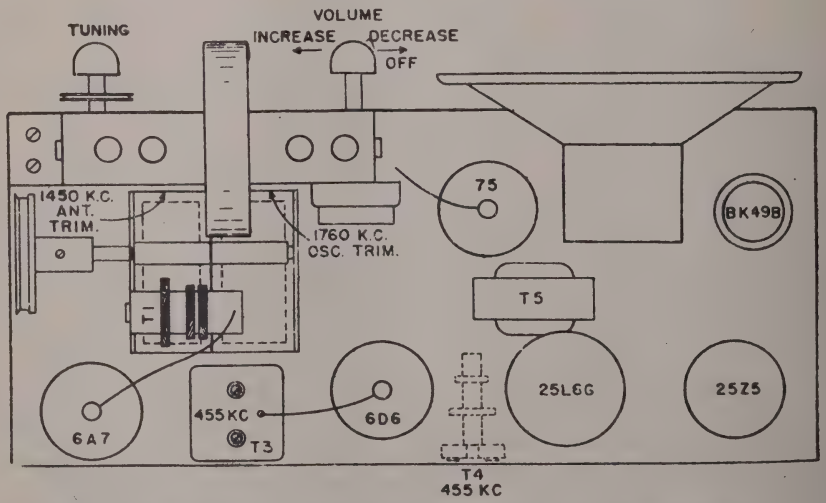
LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

FOR TUNER DATA, SEE INDEX



NOTES

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITY VALUES ARE IN MICROFARADS.



FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII

POWER SUPPLY

The receiver is designed for operation from 105-130 volt Alternating Current (A.C.) supply or a 105-130 volt Direct C (D.C.) supply. Never connect the receiver to any supply having a higher voltage than that specified on the sticker. If y not sure of the power supply voltage at your home, your Power Company will furnish the information.

When using a D.C. supply allow sufficient time for tubes to warm up (approximately 1½ minutes), and if at that ti receiver does not operate, remove the line cord plug from the socket and reverse. Replace plug in the reverse position and tubes to warm up, at which time the receiver will operate.

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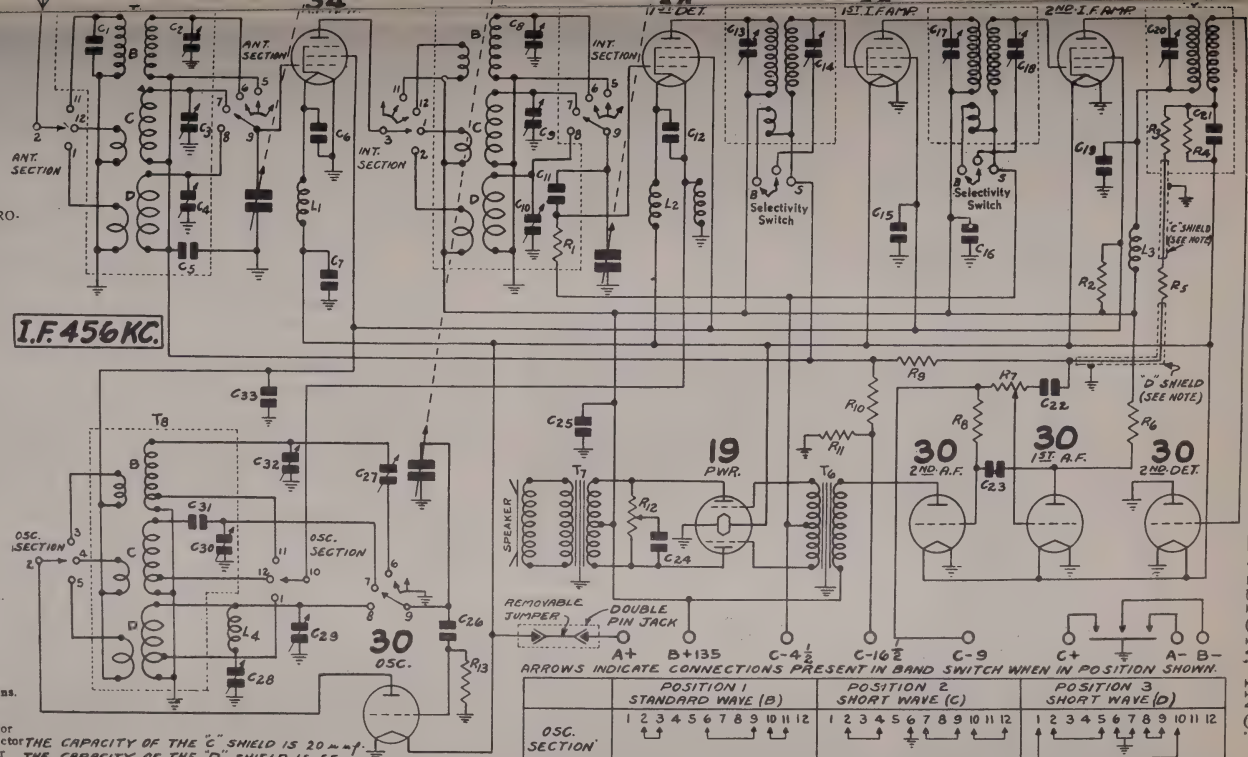

C 1 250 mmf.
C 2 2-25 mmf.
C 3 2-25 mmf.
C 4 2-25 mmf.
C 5 .05 mf. 180 V.
C 6 .05 mf. 180 V.
C 7 .25 mf. 180 V.
C 8 2-25 mmf.
C 9 2-25 mmf.
C10 2-25 mmf.
C11 35 mmf.
C12 .05 mf. 180 V.
C13 150-250 mmf. } ONE
C14 150-250 mmf. } UNIT
C15 4.0 mf. 150 V. } ELECTRO-
C16 8.0 mf. 150 V. } LYTIC
C17 150-250 mmf. } ONE
C18 150-250 mmf. } UNIT
C19 .05 mf. 180 V.
C20 .70-150 mmf.
C21 70 mmf.
C22 .01 mf. 360 V.
C23 .006 mf. 600 V.
C24 .05 mf. 240 V.
C25 .25 mf. 180 V.
C26 35 mmf.
C27 300-600 mmf. } ONE
C28 40-100 mmf. } UNIT
C29 2-25 mmf.
C30 2-25 mmf.
C31 1400 mmf.
C32 2-25 mmf.
C33 .25 mf. 180 V.

R 1 1.0 Megohm .2 W.
R 2 9,000 Ohm .5 W.
R 3 100,000 Ohm .2 W.
R 4 300,000 Ohm .2 W.
R 5 100,000 Ohm .2 W.
R 6 100,000 Ohm .2 W.
R 7 2.0 Megohm Vol. Cont.
R 8 1.0 Megohm .2 W.
R 9 2.0 Megohm .2 W.
R10 5.0 Megohm .2 W.
R11 15,000 Ohm .2 W.
R12 150,000 Ohm Tone Cont.
R13 100,000 Ohm .2 W.

T 1 Ant. R.F. Trans.
T 2 Int. R.F. Trans.
T 3 1st. I.F. Trans.
T 4 2nd. I.F. Trans.
T 5 3rd. I.F. Trans.
T 6 Push-Pull Input Trans.
T 7 Audio Output Trans.
T 8 Osc. Inductors
L 1 Single Filament Reactor
L 2 Double Filament Reactor
L 3 2nd. I.F. Plate Reactor
L 4 Osc. Tracking Coil

THE CAPACITY OF THE "C" SHIELD IS 20 mmf.
THE CAPACITY OF THE "D" SHIELD IS 55 mmf.
GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES. "B" AND "S" ON Selectivity SWITCH SECTIONS DENOTES "BROAD" AND "SHARP" RESPECTIVELY.

ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE (B)	POSITION 2 SHORT WAVE (C)	POSITION 3 SHORT WAVE (D)
OSC. SECTION	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12
INT. SECTION	11 12 1 2 3 5 6 7 8 9	11 12 1 2 3 5 6 7 8 9	11 12 1 2 3 5 6 7 8 9
ANT. SECTION	11 12 1 2 5 6 7 8 9	11 12 1 2 5 6 7 8 9	11 12 1 2 5 6 7 8 9

CONTACT LOCATIONS 4 AND 10 IN INT. SECTION, AND 3, 4 AND 10 IN ANT. SECTION ARE BLANK.

Input Voltages

"A" Battery - - - - - 2 Volts (0.74 Amperes)
"B" Batteries - - - - - - - - 135 Volts
"C" Batteries - - - - - 4½, 9 and 16½ Volts

Power Output - - - - - - 1.5 Watts Undistorted
Selectivity-20 KC Broad at 1000 times Signal (Sharp)
Intermediate Frequency - - - - - - - 456 KC.
Speaker - - - - 8" Permanent Magnet Dynamic

Tuning Frequency Range

B Range - - - - - - - - - 535 to 1730 KC.
C Range - - - - - - - - - 1680 to 4800 KC.
D Range - - - - - - - - - 5650 to 16000 KC.

Sensitivity

B Range Average - - - 1.0 Microvolts Absolute
C Range Average - - - 4.0 Microvolts Absolute
D Range Average - - - 7.0 Microvolts Absolute

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Alignment and Calibration

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 4800, 4200, 16,000, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a 0.1 mf. condenser to the switch end of condenser C11—see Fig. 2. There is a lead which goes to the lug on top of the center stator section of the tuning condenser—see Fig. 11. The connection can be made at this lug.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 11.

Range B Alignment

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C32) until maximum output is obtained. The location of this trimmer is shown in Fig. 9.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C8) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 9 for location of this trimmer.

Be sure to use a non-metallic screwdriver for this adjustment.

Range C Alignment

4800 KC Adjustment

Set the signal generator for 4800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector in the Range C position (1st short wave band—green dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range C trimmer (C30) until maximum output is obtained. See Fig. 9 for location of this trimmer.

4200 KC Adjustment

Set the signal generator for 4200 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C9) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

Range D Alignment

16,000 KC Adjustment

Set the signal generator for 16,000 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range D trimmer (C29) until maximum output is obtained. See Fig. 9 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C10) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 16,000 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 9 for location of this trimmer.

Use a non-metallic screwdriver for this adjustment.

Testing Batteries

If the receiver does not operate satisfactorily test the batteries under load. A high resistance meter is required for the "B" and "C" voltages. If any of the batteries are considerably below their rated voltage, new ones should be used. When the "B" batteries are replaced the "C" batteries should also be replaced. The reason for this is that the "C" drain is such that the "C" batteries are run down in about the same time as the "B" batteries.

"A" Battery and Regulator

This receiver is designed to operate with a 2 volt storage cell, but may be operated with a 3 volt dry "A" battery if used with a voltage regulator. The receiver may also be used with an air cell "A" battery provided a series resistor is used to reduce the voltage to the proper level of 2 volts for the tube filaments. Although the voltage regulator mentioned above can be used, the series resistor is cheaper and is satisfactory as the voltage of one of these batteries drops very little during the useful life of the battery.

D. C. Resistance of Windings

Refer to Figs. 10 & 2

Following are the D. C. resistances of the various coil windings in the chassis. The values given below will vary slightly in different sets.

Part No.	Item	Code	D.C. Resistance in Ohms
P-9A417	Antenna R. F. Transformer	T1	
	Range B Primary Winding		21.5
	Range C Primary Winding		0.5
	Range D Primary Winding		0.3
	Range B Secondary Winding		6.1
	Range C Secondary Winding		1.9
	Range D Secondary Winding		Small
P-9A449	Interstage R. F. Transformer	T2	
	Range B Primary Winding		3.7
	Range C Primary Winding		2.6
	Range D Primary Winding		0.5
	Range B Secondary Winding		5.8
	Range C Secondary Winding		1.8
	Range D Secondary Winding		Small
P-9A406	Oscillator Inductors	T8	
	Range B Plate Coil		1.1
	Range C Plate Coil		1.0
	Range D Plate Coil		0.3
	Range B Grid Coil		
	Red White Tap to White		2.7
	Red White Tap to Ground		0.5
	Range C Grid Coil		
	Green White Tap to Green		0.7
	Green White Tap to Ground		0.3
P-9A406	Oscillator Inductors cont'd	T8	
	Range D Grid Coil		
	Black White Tap to Black		Small
	Black White Tap to Ground		Small
P-9A407	1st I. F. Transformer	T3	
	Primary Winding		8.9
	Secondary Winding		8.9
	Coupling Winding		6.5
P-9A408	2nd I. F. Transformer	T4	
	Primary Winding		8.9
	Secondary Winding		8.9
	Coupling Winding		6.5
P-9A409	3rd I. F. Transformer	T5	
	Primary Winding		9.9
	Secondary Winding		27.3
P-50X11	Audio Input Transformer	T6	
	Primary Winding		1005.0
	Secondary Winding		
	Center Tap to Inside		580.0
	Center Tap to Outside		630.0
P-12A224	Permanent Magnet Dynamic Speaker		
	Speaker Voice Coil		1.6
	Audio Output Transformer	T7	
	Primary Winding		
	Center Tap to Inside		199.2
	Center Tap to Outside		234.3
	Secondary Winding		Small
P-9A281	Single Filament Reactor	L1	Small
P-9A410	Double Filament Reactor—Either Section	L2	Small
P-9A400	2nd I. F. Plate Isolating Reactor	L3	35.9
P-9A391	High Frequency Oscillator Tracking Coil	L4	1.0

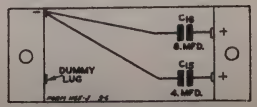

Fig. 12—Condenser Block—Internal Wiring

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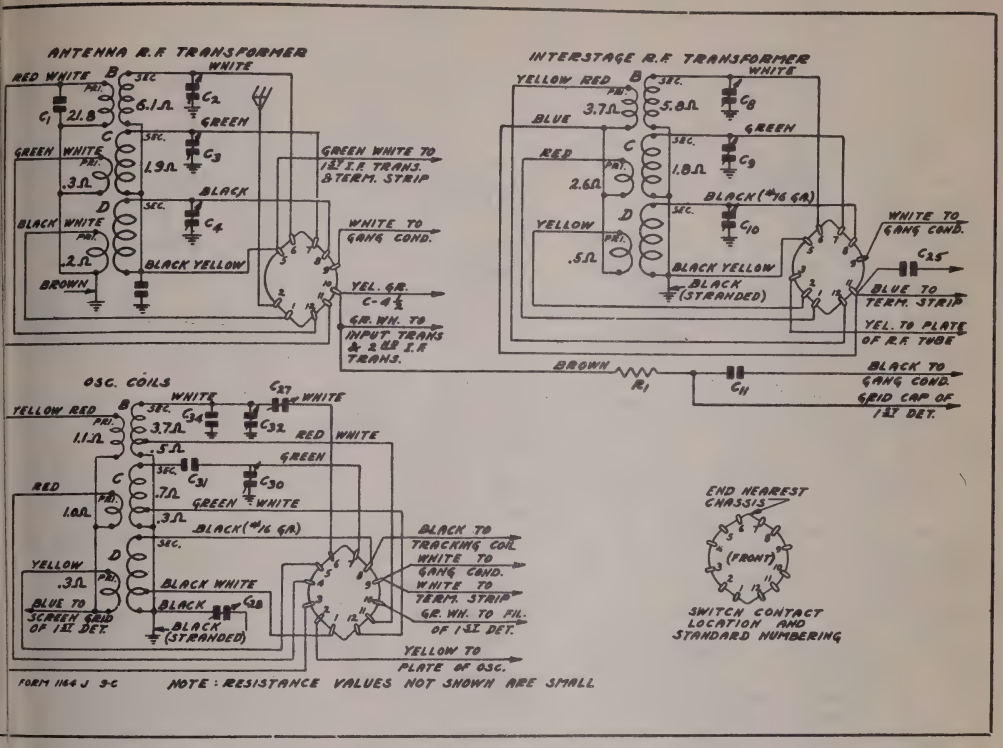
MODEL B63



g. 10—Color Coding of Coil Wires and D. C. Resistance of Windings. *(Also See Complete D. C. Resistance List Below)*

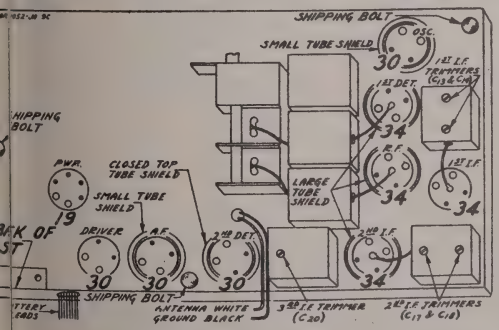


Fig. 11—Location of Tubes

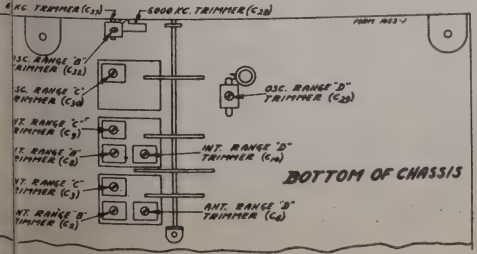

OSC. RANGE "D" TRIMMER (C32)
OSC. RANGE "C" TRIMMER (C30)
OSC. RANGE "D" TRIMMER (C28)
INT. RANGE "D" TRIMMER (C6)
ANT. RANGE "D" TRIMMER (C4)
BOTTOM OF CHASSIS

Fig. 9—Location of Trimmers

VOLTAGES AT SOCKETS
Antenna Shorted to Ground

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Control Grid to Ground	Normal Plate M. A.
34	R. F.	2.0	135	80	4.7(1)	2.4
34	1st. Det.	2.0	135	80	4.5(2)	2.2
30	Oscillator	2.0	80			3.4
34	1st I. F.	2.0	135	80	4.7(1)	2.4
34	2nd I. F.	2.0	135	80	4.5	2.2
30	2nd Det.	2.0				
30	1st Audio	2.0	90		9.0(3)	0.17
30	2nd Audio	2.0	132		9.0(4)	2.5
19	Power	2.0	135		4.5	1.5 (per plate)

(1) Computed figure—cannot be read with ordinary voltmeter.

(2) As read at 4½ volt tap on "C" battery.

(3) Volume Control at minimum.

(4) As read at 9 volt tap on "C" battery.

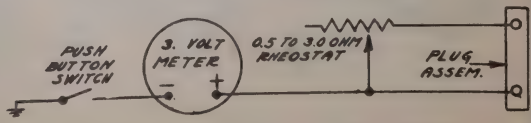


Fig. 6—Schematic Diagram of Voltage Regulator

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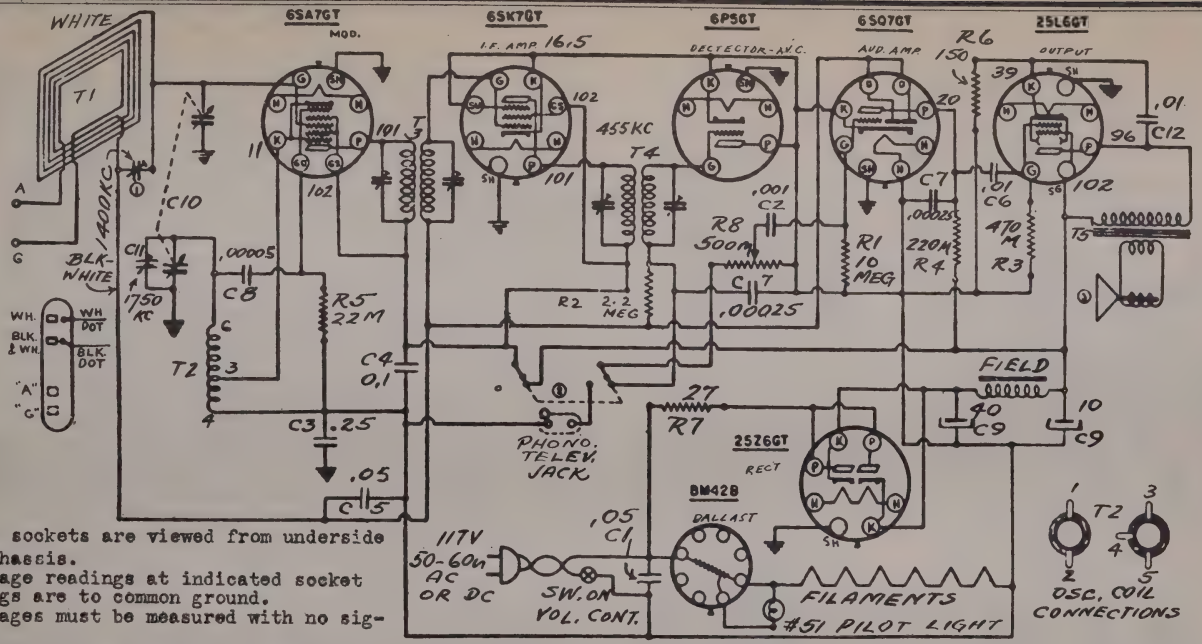

Tube sockets are viewed from underside of chassis.
Voltage readings at indicated socket prongs are to common ground.
Voltages must be measured with no signal.
Where no voltage reading is shown at socket prong, it indicates zero voltage or a very low reading.
Figures at cathodes are cathode current in milliamperes.
Alignment is to be made at the frequency shown at each trimmer condenser.
Capacity values are in microfarads.
Voltages are measured with 1000 ohm per volt voltmeter.

Code	Part No.	Description
R1	60-193	10 Meg. 1/4 W. Resistor
R2	60-179	2.2 " " "
R3	60-178	470M Ohm " "
R4	60-180	220M " " "
R5	60-185	22M " " "
R6	60-184	150 " " "
R7	60-220	27 " " "
R8		500M Vol.Control & Sw.

Code	Part No.	Description
C1	1607	.05 mf. 400V. Tubular Cond.
C2	16-124	.001" " " "
C3	16-120	.25 " 200V. " "
C4		.1 " " " "
C5	1622	.05 " " " "
C6	16-121	.01 " " " "
C7	1504	.00025 mf. Mica Condenser
C8	1503	.00005 " " "
C9		40 X 10" 150 W.V. Electrolytic
C10		2 gang variable condenser
C12	16-119	.01 mf. 400V. Tubular Cond.

Code	Part No.	Description
T1	82-10	Loop Antenna
T2	10-311	Oscillator Coil
T3	10-317	1st I.F. Transformer
T4	10-312	2nd " "
T5	------	Output Transformer (on speaker)
1	20-129	Trimmer (on loop)
2	69-140	Phono switch
3	79-283	8 Inch Dynamic Speaker

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Fig. 6—Location of 1st I.F. Trimmer in Tuning Unit

Tube and Vibrator Location

Power Consumption - 6.8 Amperes at 6.3 Volts
Power Output - - - - - 3 Watts Undistorted
Sensitivity - - 1.5 Microvolts at .5 Watt Output
(L-D Switch in Distance Position)

Selectivity - 39 KC Broad at 1000 Times Signal
Tuning Frequency Range - - - 540 to 1580 KC
Intermediate Frequency - - - - - - - 456 KC
Speaker - - - - - - - 6" Electro-Dynamic

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Procedure for Setting the Station Buttons

There are 5 buttons on the automatic tuning dial by means of which 5 stations may be set.

Any button may be used for any station you can receive.

Make a list of your favorite stations, those which you tune in regularly.

It is better to list the station with the lowest kilocycle number first, the station with the next higher kilocycle number next, and so on.

Depress the manual tuning button AND KEEP IT DEPRESSED DURING THE ENTIRE SETTING OPERATION AS DESCRIBED BELOW. See Fig. 1 for location of buttons. Turn the manual tuning knob so that the indicator moves toward the 1500 KC end of the dial until the stop is reached.

UNLOCK THE TUNING MECHANISM by inserting a screwdriver, as shown in Fig. 1, in the locking screw opening at the bottom of the tuning unit. Loosen the locking screw by turning it counter-clockwise as far as it will go.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED.

KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, depress the first (left hand) station button. Both will remain depressed.

Select the first station from the list you have made and tune in this station by means of the manual tuning knob.

TURN THE MANUAL TUNING KNOB CAREFULLY, BACK AND FORTH UNTIL THE ABOVE MENTIONED STATION IS ACCURATELY TUNED IN TO THE LOUDEST POINT. This station is now set on button No. 1.

CAUTION—Do not touch this button again while the mechanism is unlocked as the setting may be altered.

Next KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, depress the second station button FIRMLY AND GENTLY. Then proceed to set the second station on your list in the same manner as described above.

Then continue to set any additional stations on your list on the remaining buttons.

After all desired stations have been set, release any station button which is depressed as follows: KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, push in the OFF button a slight amount—only enough to release any station button which is depressed. Should the OFF button be pushed all the way in to the depressed position, no harm will be done except that the dial will not be illuminated.

Turn the manual tuning knob so that the indicator moves toward the 1500 KC end of the dial, until the stop is reached.

NOW LOCK THE TUNING MECHANISM by inserting a screwdriver, as shown in Fig. 1, in the locking screw opening and turning the locking screw in a clockwise direction until it is tight.

Insert a celluloid reinforcement tab half-way in the slot at the front of station button No. 1—See Fig. 3.

Fig. 3—Inserting Station Tab

Remove the correct station call letter tab for button No. 1 from the sheet supplied by bending the sheet back and forth at the score marks. Place the call letter tab in front of the celluloid reinforcement tab and insert it in slot. Push both tabs all the way in the button slot. Follow the same procedure for inserting the station call letter tabs in any other buttons.

After the stations are set and the mechanism is locked, tune in each of them by depressing the proper button. If any of them does not appear to be properly tuned in after the button has been depressed, reset the station for that button following the procedure outlined above. Changing the setting of one button will not affect the setting of the others.

Alignment Procedure

Remove grille and speaker from speaker unit.

Remove the chassis from tuning unit case in accordance with the article under "General Installation Items" in this manual.

Set the signal generator for 456 KC and connect the output of the signal generator through a .05 mf. condenser to the control grid of the 6SA7 1st detector tube (preng No. 8). Connect the ground lead of the signal generator to the tuning unit chassis. Set the volume control at maximum and the Local-Distance switch to the distance position. Attenuate the signal from the signal generator to prevent the levelling off action of the AVC.

Then adjust the 4 I.F. trimmers until maximum output is obtained. Three of the trimmers are in the speaker unit—See Fig. 2. One trimmer is at the top of the tuning unit —See Fig. 6.

Insert the antenna cable plug in the antenna socket on the tuning unit. The total capacity of the antenna cable and dummy antenna should be 60 mmf. If the cable, for example, has a capacity of 25 mmf., use a 35 mmf. condenser for a dummy antenna. Connect the other end of the antenna cable through the dummy antenna capacity to the output of the signal generator.

Set the signal generator for 1560 KC. Turn the tuning knob until the iron cores are as far out of the tuning coils as they will go. Then adjust the oscillator trimmer C6 (Fig. 7) until maximum output is obtained.

Set the signal generator for 1000 KC. Turn the tuning knob until maximum output is obtained. Adjust interstage trimmer C7 and antenna trimmer C2 for maximum output—See Fig. 1.

Reassemble the radio and install it in the automobile. Insert the car antenna cable. Tune in a weak signal near 1000 KC and readjust the antenna trimmer C2 for maximum output.

Calibration—If it is necessary to calibrate the radio, remove the chassis from the tuning unit case—See article on that subject in this manual. Accurately tune in a signal of known frequency near 1000 KC. Loosen the set screw of the large gear that drives the dial drum. Turn the dial drum until the indicator line is at the frequency of the station tuned in. Tighten the set screw and reassemble.

Adjusting Antenna Trimmer

After the antenna is connected, tune in a weak signal at approximately 1000 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna trimmer (C2) up or down until maximum output is obtained. See Fig. 1 for location of this trimmer.

Antenna

A shielded antenna cable with bayonet connector plug is required.

The plug on the antenna cable is inserted in the socket at the bottom of the tuning unit case as shown in Fig. 1. The wire at the other end of the cable is connected to the antenna.

LOW CAPACITY ANTENNA

This radio is designed for a low capacity car antenna. The total capacity of antenna and shielded cable should be 35 to 60 mmf.

Types of Low Capacity Antennas —Door hinge; fishpole; over-the-roof types which are mounted quite a distance from the metal roof of the car.

The antenna should be mounted on the same side of the car as the tuning unit.

HIGH CAPACITY ANTENNA

If this radio is to be installed with a high capacity car antenna (200 mmf. total capacity of antenna and shielded cable) an adapter must be used. The adapter is inserted in the socket at the bottom of the tuning unit case. Then the antenna plug is inserted in the adapter.

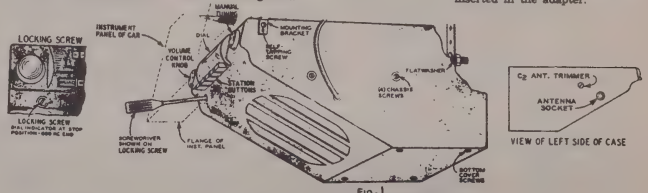

Fig. 1
MODEL BB69

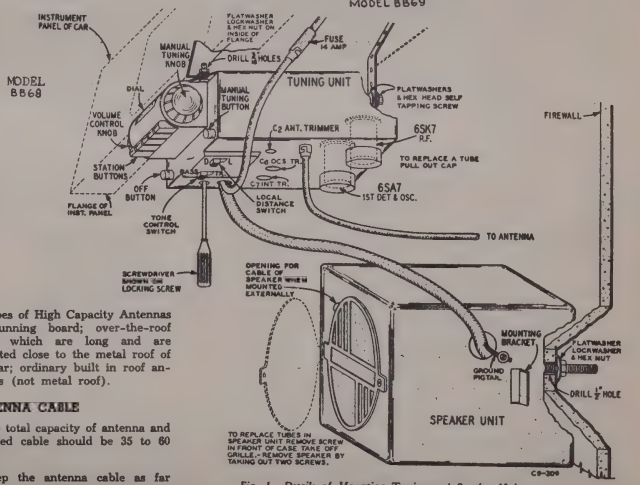

Fig. 1—Details of Mounting Tuning and Speaker Units

Types of High Capacity Antennas — Running board; over-the-roof types which are long and are mounted close to the metal roof of the car; ordinary built in roof antennas (not metal roof).

ANTENNA CABLE

The total capacity of antenna and shielded cable should be 35 to 60 mmf.

Keep the antenna cable as far away from car wiring as possible and ground the pigtail of the antenna cable shield at the antenna end, otherwise ignition noise may be picked up. The length of the pigtail from the grounding point to the end of the antenna cable should be kept as short as possible, preferably not over one inch.

For the door hinge and over-the-roof type antennas, the antenna lead must be shielded the entire distance from the radio to the point where the lead goes through the car body to the outside. In the case of a running board antenna, the antenna lead shielding must extend all the way to the antenna.

When the antenna cable is connected to an antenna lead coming down the pillar post, the shielded cable should be pushed several inches up into the pillar post.

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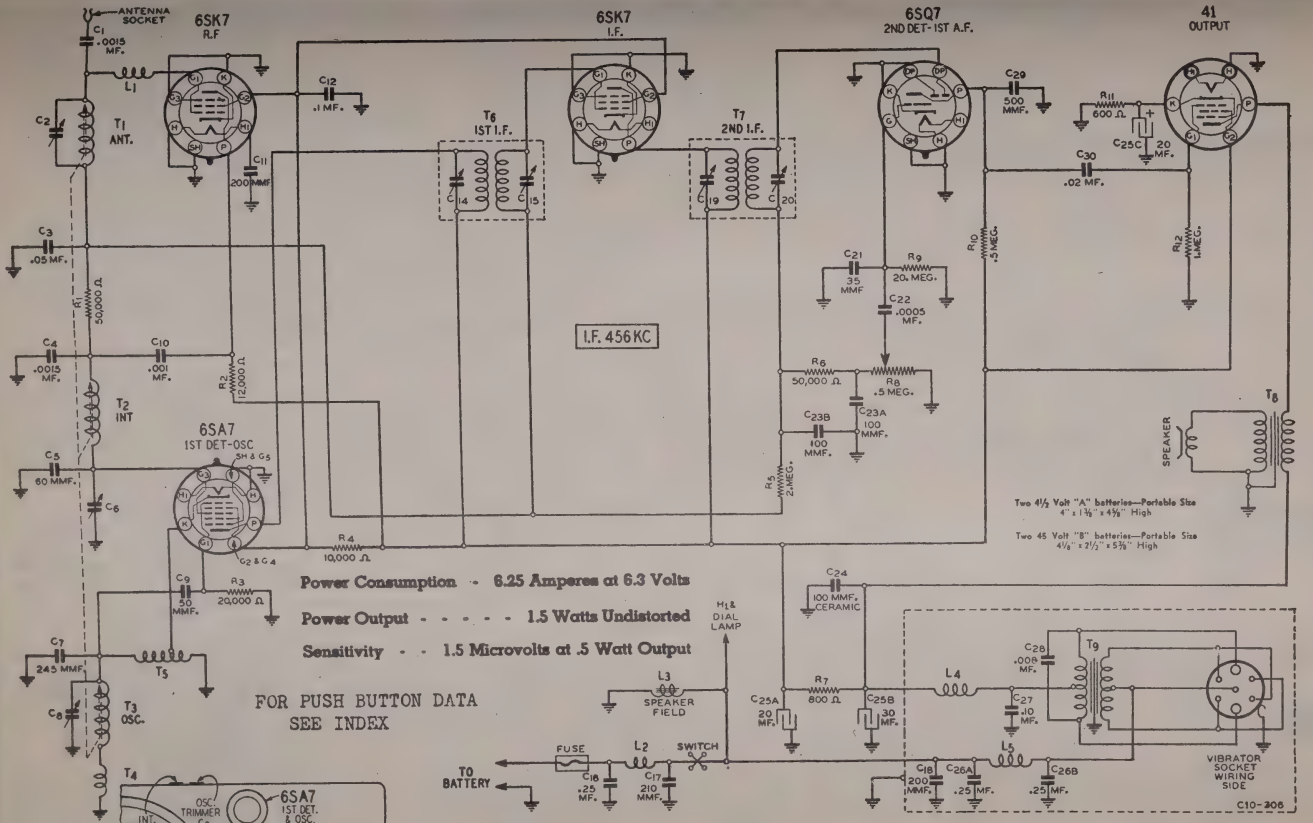

Power Consumption - 6.25 Amperes at 6.3 Volts

Power Output - - - - - 1.5 Watts Undistorted

Sensitivity - - 1.5 Microvolts at .5 Watt Output

FOR PUSH BUTTON DATA
SEE INDEX

IF ALIGNMENT
Adjust at 456 kc through .05-mf condenser

BC ALIGNMENT
Adjust oscillator trimmer C8 at 1560 kc
Adjust C6 and C2 trimmers at 1000 kc

FOR CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION OF VOL. VIII.

Selectivity - 42 KC Broad at 1000 Times Signal
Tuning Frequency Range - - - 540 to 1560 KC
Intermediate Frequency - - - - - - 456 KC
Speaker - - - - - - - 6" Electro-Dynamic

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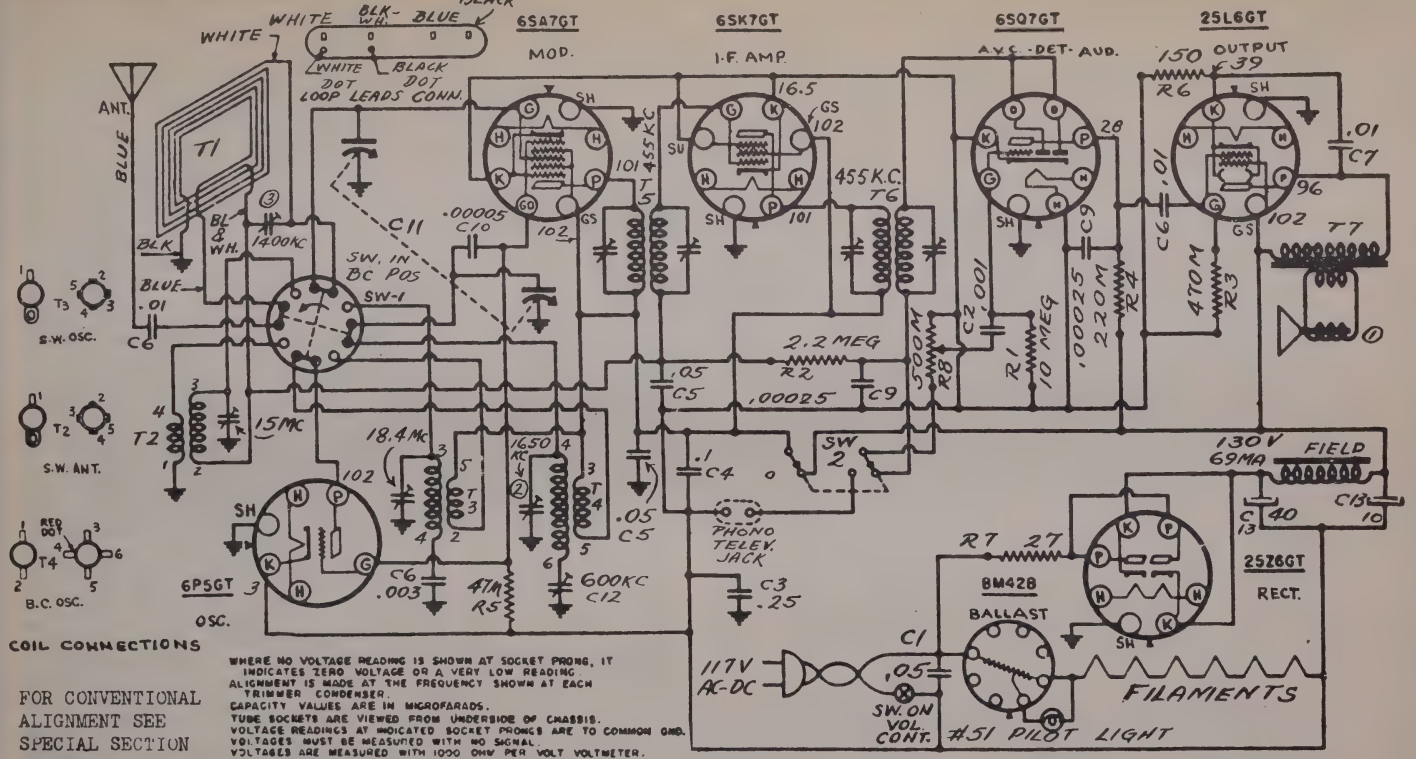
LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.



FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII

WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER.
CAPACITY VALUES ARE IN MICROFARADS.
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO COMMON GND.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

IF PEAK 455 KC

CODE	PART NO	DESCRIPTION
R1	60-193	10 MEGOHM 1/4 W. RESISTOR
R2	60-179	2.2 " " "
R3	60-178	470M OHM " "
R4	60-180	220M " " "
R5	60-177	47M " " "
R6	60-184	150 " " "
R7	60-220	27 " " "
R8	24-146	500M " VOLUME CONTROL
SW1	69-145	BAND SWITCH
SW2	69-140	PHONO "

CODE	PART NO	DESCRIPTION 0-71
T1	82-11	LOOP ANTENNA (B.C)
T2	10-328	S.W. ANTENNA COIL
T3	10-328	S.W. OSCILLATOR COIL
T4	10-318	B.C. " "
T5	10-317	1 ST. I.F. TRANSFORMER
T6	10-312	2 ND. " "
T7	------	OUTPUT TRANS. (ON SPKR)
1	79-283	5" DYNAMIC SPEAKER
2	20-127	TRIMMER BLOCK
3	20-129	TRIMMER (ON LOOP)

CODE	PART NO	DESCRIPTION
C1	1607	.05 MFD. 400 V. TUBULAR CONDENSER
C2	16-124	.001 " " " "
C3	16-120	.25 " 200 V. " "
C4	16-115	.1 " " " "
C5	1622	.05 " " " "
C6	16 121	.01 " " " "
C7	16-119	.01 " 400 V " "
C8	15-118	.003 MFD. MICA CONDENSER
C9	1504	.00025 " " "
C10	1503	.00005 " " "
C11	19-160	2 GANG VARIABLE CONDENSER
C12	20-130	PADDING CONDENSER
C13	18-255	40 x 10 MFD 150 W.V. ELECTROLYTIC

MODEL BB73

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

Power Consumption (At 117 volts AC Supply) 28 Watts
"B" Battery ..... 90 Volts—11.5 Ma.
AC Operation - - - - - 200 Mw. Undistorted
400 Mw. Maximum
1A7GT 1ST DET. & OSC.
1N5GT 1ST I.F.
1N5GT 2ND I.F.
1H5GT 2ND DET. A.V.C. 1ST A.F.
3Q5GT OUTPUT
3525GT RECT.
I.F. 456 KC.
LOOP ANTENNA
EXTERNAL ANTENNA AND GROUND
GANG CONDENSER
VOLUME CONTROL 1 MEG. .5 MEG.
ON-OFF SWITCH
BATTERY POSITION
A.C.-D.C. OR BATTERY SWITCH
A.C.OR D.C. POSITION
DIAL LAMP
117 V. A.C.OR D.C.
SPEAKER
VOLTAGE AS READ WITH 117 VOLT A.C. LINE.
USED ON SOME MODELS
AUTOMATIC SWITCH
CAUTION—If the dial lamp burns out, it should be replaced at once. Use ONLY a No. 51 dial lamp.
FOR OTHER DATA SEE INDEX
Tuning Frequency Range - - 540 to 1600 KC
Sensitivity (For .05 Watt Output)
External Antenna - - - 10 Microvolts Average
8+ 90 V.
A+ 9 V.
B-
A-
Selectivity - 50 KC Broad at 1000 Times Signal
Intermediate Frequency - - - - - 456 KC
Speaker - - - - - - - - - 6" P.M. Dynamic
IMPORTANT - METAL BASE TUBES MUST BE USED IN THOSE SOCKETS AT WHICH SHIELDS ARE SHOWN.
SHIELD
BATT.
AC-DC
887-490

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Removing Chassis from Cabinet

Take out the 2 screws, one at each rear corner of the chassis shelf. On some models, it will be necessary to remove the nut holding the automatic "A" battery switch to the front panel of the radio. Grasp the chassis shelf at each rear corner and edge it away from the cabinet front until the chassis shelf and chassis slide easily out of the cabinet.

To remove the shelf from the chassis, take out the bolt and the 2 screws at the bottom of the shelf.

CAUTION—When Operated on AC or DC Power. As the chassis is connected to one side of the line, in any service work, keep the chassis on a wood or other insulated surface to avoid contacts with ground.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

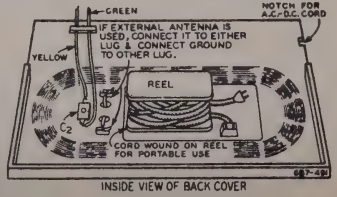
Dummy Antenna—.1 mf.

The chassis may be aligned on either AC-DC or Battery power. If AC-DC power is used, see precaution above about avoiding external grounds. Also do not connect the signal generator to any outside ground as the ground terminal of the generator will be connected to the chassis.

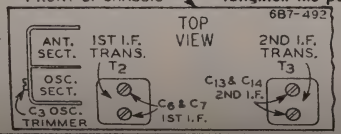
SIGNAL GENERATOR				
FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration below and Illustration of Back—Page 1)
456 KC	Signal Grid of 1st Det. (Top Cap)	.1 mf.	Turn Rotor to full open	1st I.F. (C6) & (C7) 2nd I.F. (C13) & (C14)
1600 KC	Signal Grid of 1st Det.	.1 mf.	Turn Rotor to full open	Oscillator (C3)
1500 KC	None—See Note A		Turn Rotor to max. output	Antenna (C2)

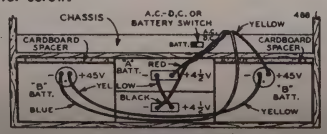
NOTE A—Chassis must be in cabinet. Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. The back of the cabinet must be in place. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

CALIBRATION (For models with pointer in front of dial scale)—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, hold the pulley at the back of the dial and loosen the pointer screw. Set the pointer at the 800 KC mark. Hold the pointer and retighten the pointer screw.


GREEN
NOTCH FOR A.C.-D.C. CORD
IF EXTERNAL ANTENNA IS USED, CONNECT IT TO EITHER LUG & CONNECT GROUND TO OTHER LUG.
YELLOW
REEL
C2
CORD WOUND ON REEL FOR PORTABLE USE
687-492
INSIDE VIEW OF BACK COVER

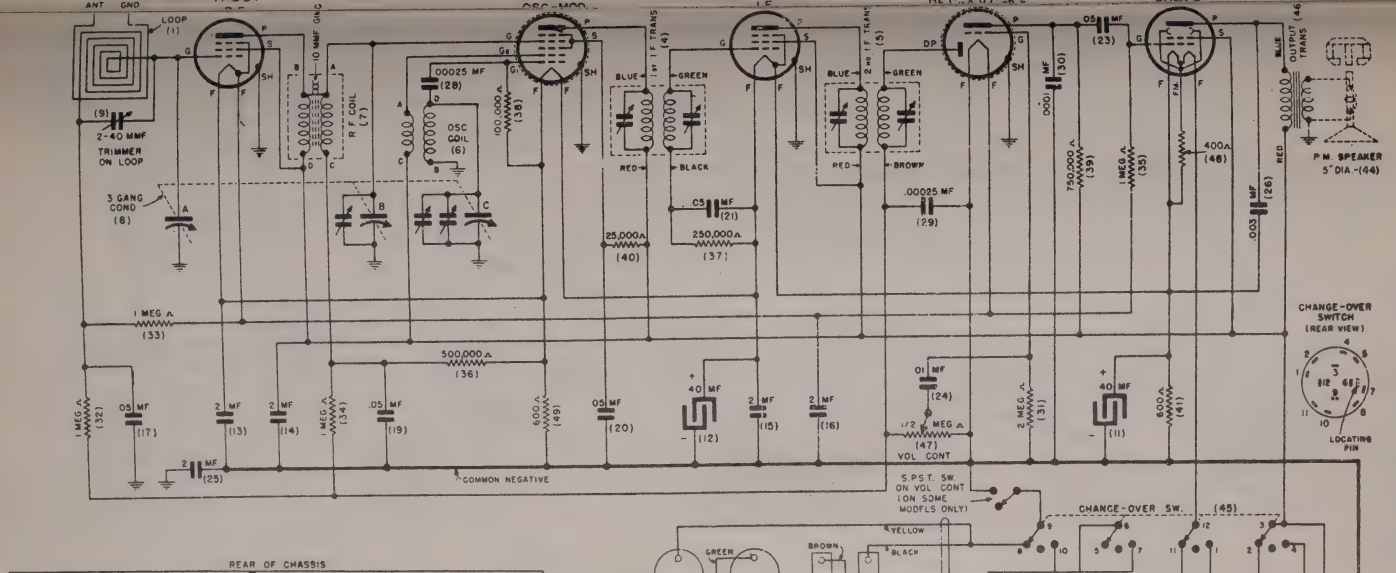
Using Radio Without Batteries—The radio may be used without batteries when it is operated on AC-DC. If this is done, tape the prongs of the battery plugs to prevent them from accidentally touching each other, and place the plugs and cables in the battery compartment.

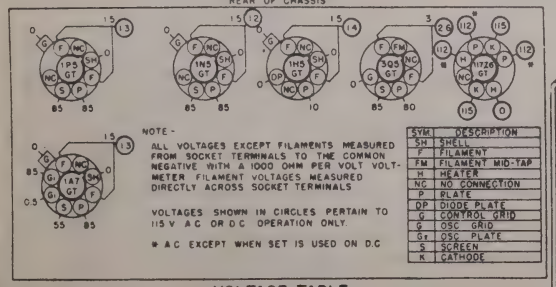




LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

MODEL BB73A





NOTE - ALL VOLTAGES EXCEPT FILAMENTS MEASURED FROM SOCKET TERMINALS TO THE COMMON NEGATIVE WITH A 1000 OHM PER VOLT VOLT-METER. FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.

VOLTAGES SHOWN IN CIRCLES PERTAIN TO 115 V. A.C. OR D.C. OPERATION ONLY.

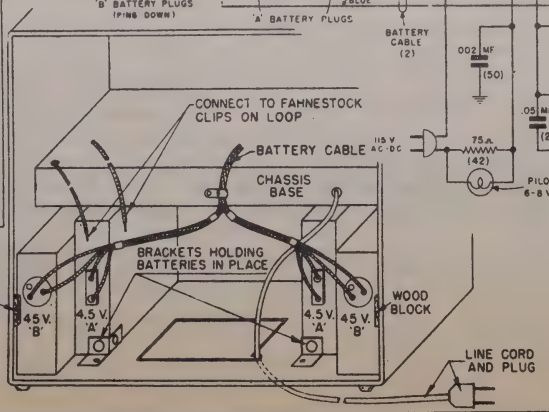
* A.C. EXCEPT WHEN SET IS USED ON D.C.

SYM.	DESCRIPTION
SH	SHELL
F	FILAMENT
FM	FILAMENT MID-TAP
H	HEATER
NC	NO CONNECTION
P	PLATE
DP	DIODE PLATE
G	CONTROL GRID
G	OSC. GRID
G+	OSC. PLATE
S	SCREEN
K	CATHODE

VOLTAGE TABLE

(BOTTOM VIEW OF CHASSIS)

PART NO 217-219



TO INSTALL BATTERIES REMOVE BACK FROM CABINET, AND PLACE BATTERIES AS SHOWN.
FOR AC/DC OPERATION BRING LINE CORD THROUGH OPENING IN BOTTOM OF CABINET.
ALWAYS KEEP BACK ON CABINET.

BATTERY EQUIPMENT:

2—4½ VOLT "A" BATTERIES such as Eveready type 746.
2—45 VOLT "B" BATTERIES such as Eveready type 482.

I.F. - 455 KC.

NOTE:- NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

John F. Rider

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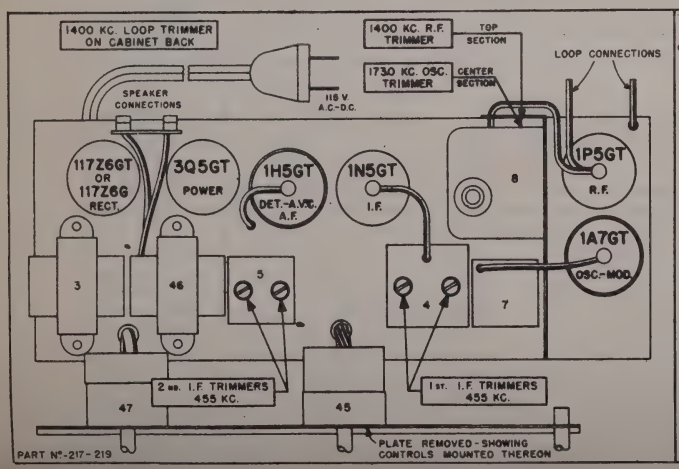
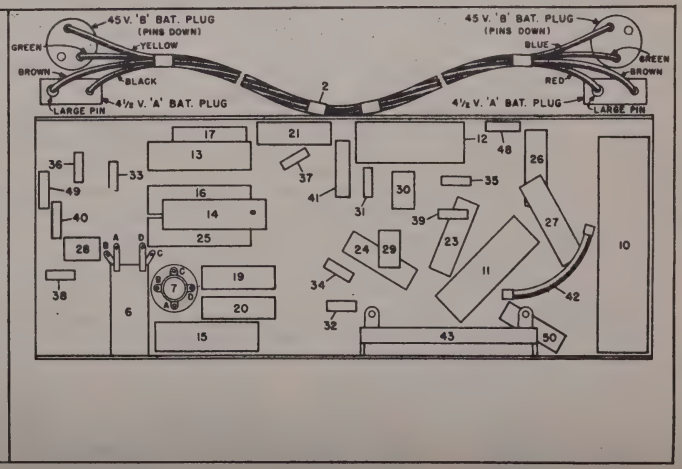
ALIGNMENT PROCEDURE

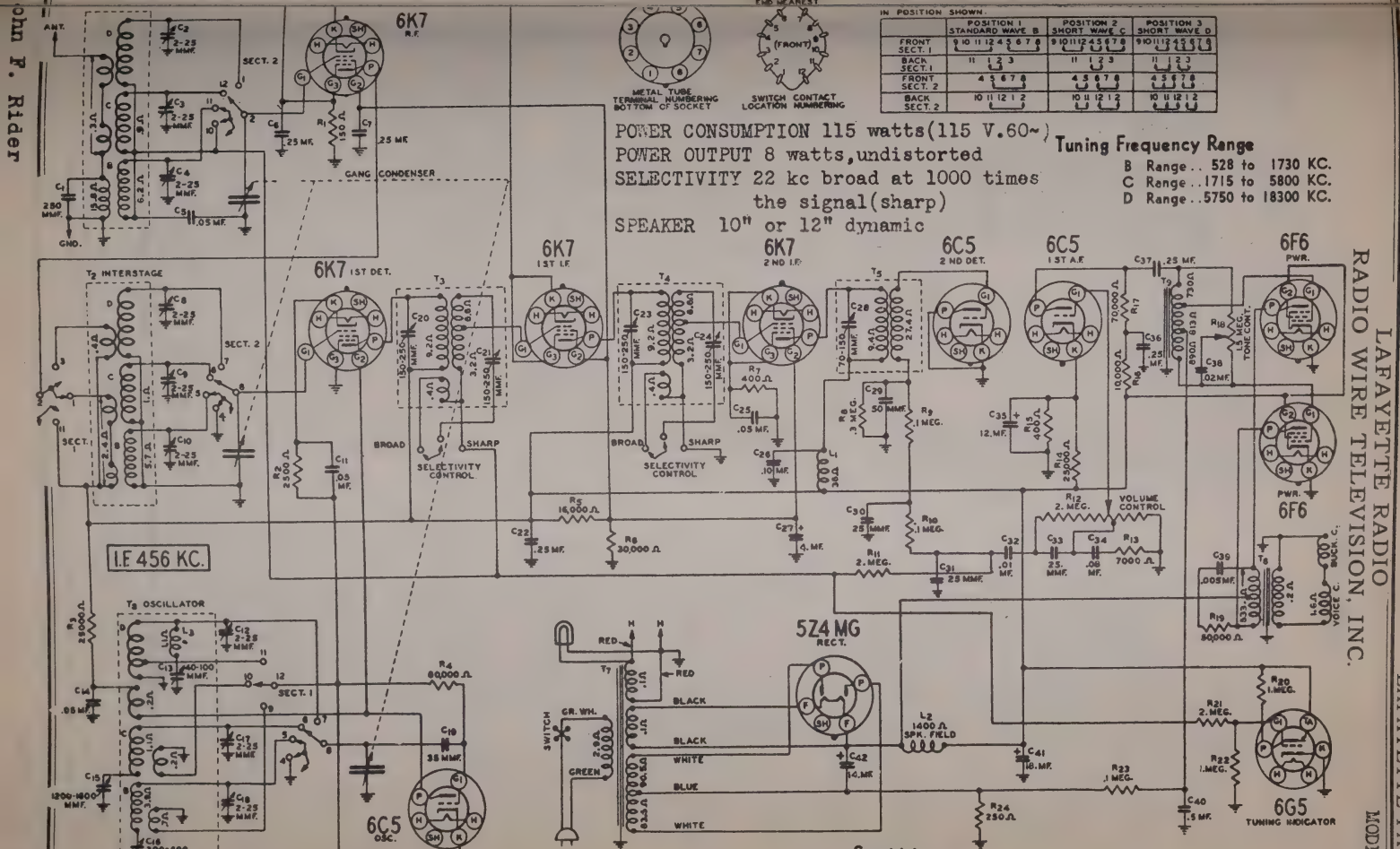
For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to loop. Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR: Adjust test oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR: Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
I. F. alignment use any band position.	Any point where no interfering signal is received.	Exactly 455 K.C.	0.2 Mfd. condenser	High side to grid cap of 1A7GT tube. Do not remove cap.	Adjust each of the second I.F. transformer trimmers for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output.
1730 to 540 K.C. Band	1 Exactly 1730 K.C.	Exactly 1730 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	Adjust 1730 K. C. oscillator trimmer for maximum output.
	2 Approx. 1400 K.C.	Approx. 1400 K.C.	None	Use Small Loop to couple test oscillator to receiver loop.	Adjust 1400 K.C. loop and R.F. trimmers for maximum output.







IN POSITION SHOWN.	POSITION 1 STANDARD WAVE B	POSITION 2 SHORT WAVE C	POSITION 3 SHORT WAVE D
FRONT SECT. 1	9 10 11 12 4 5 6 7 8	9 10 11 12 4 5 6 7 8	9 10 11 12 4 5 6 7 8
BACK SECT. 1	11 1 2 3	11 1 2 3	11 1 2 3
FRONT SECT. 2	4 5 6 7 8	4 5 6 7 8	4 5 6 7 8
BACK SECT. 2	10 11 12 1 2	10 11 12 1 2	10 11 12 1 2

POWER CONSUMPTION 115 watts(115 V.60~)
POWER OUTPUT 8 watts,undistorted
SELECTIVITY 22 kc broad at 1000 times the signal(sharp)
SPEAKER 10" or 12" dynamic

Tuning Frequency Range

B Range.. 528 to 1730 KC.
C Range..1715 to 5800 KC.
D Range..5750 to 18300 KC.

NOTE: RESISTANCES BELOW .1 OHM ARE NOT SHOWN.

Fig. 2—Schematic Circuit Diagram

Sensitivity

B Range.....1.0 Microvolts Absolute
C Range.....1.0 to 2 Microvolts Absolute
D Range.....1.0 to 3 Microvolts Absolute

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MODEL B87

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

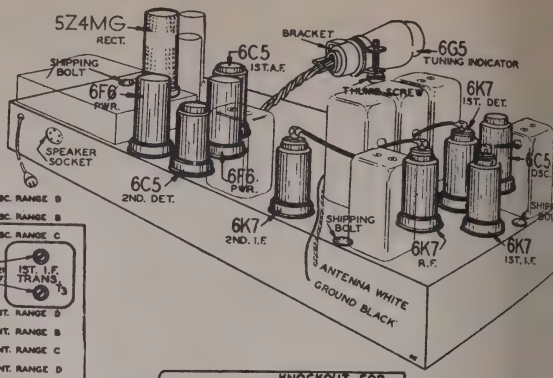


Fig. 6—Location of Tubes

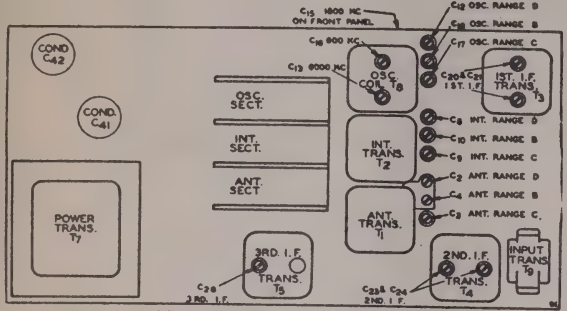


Fig. 3—Location of Trimmers

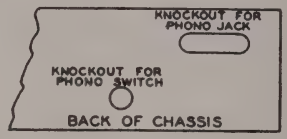
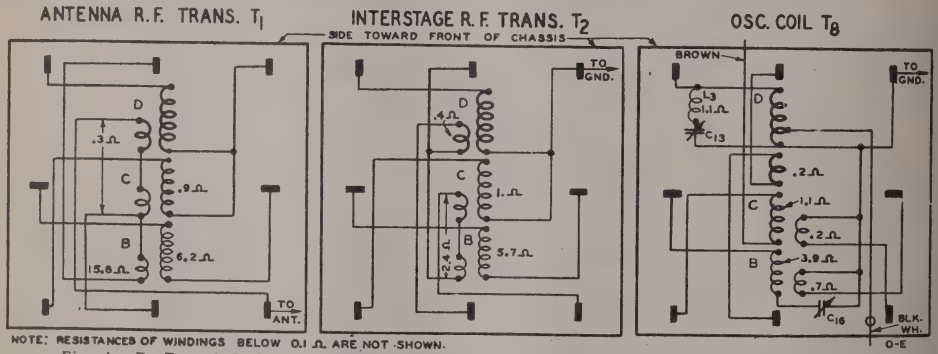


Fig. 8—Location of Phono Knockouts



NOTE: RESISTANCES OF WINDINGS BELOW 0.1 Ω. ARE NOT SHOWN.

Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

Line Voltage: 115
Volume Control: Maximum

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	R.F.	0	6.1(1)	250	100	2.5	...	6.1(1)	2.5
6K7	1st Det.	0	6.1(1)	250	120	0	...	6.1(1)	9
6C5	Osc.	0	6.1(1)	120	...	...	...	6.1(1)	0
6K7	1st I.F.	0	6.1(1)	250	100	2.5	...	6.1(1)	2.5
6K7	2nd I.F.	0	6.1(1)	250	100	3	...	6.1(1)	3
6C5	2nd Det.	0	6.1(1)	0	...	...	...	6.1(1)	0
6C5	1st A.F.	0	6.1(1)	110	...	...	...	6.1(1)	4.5
6F6	Power Amp.	0	6.1(1)	330	250	25(2)	...	6.1(1)	0
5Z4MG	Rect.	0	4.8(3)	...	640(4)	...	640(4)	...	4.8(3)

6G5	Tuning Indicator	Plate to Ground 20(5)	Target to Ground 250	Cathode to Ground 0	Across Heater 6.1 A.C.

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) As read across resistor R24.
(3) A.C. voltage as read across heater terminals 2 and 8.
(4) A.C. voltage as read across terminals 4 and 6.
(5) As read with 500,000 ohm meter.

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Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C18) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

In sets using pointers, loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Re-tighten the screw.

In sets using the moving beam of light, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until it is at the 1500 KC mark on the dial. Re-tighten the screw.

Adjust the interstage Range B trimmer (C10) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C9) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 1800 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C12) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage and antenna Range D trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and gears to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch—See Fig. 8.

The phono switch must be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. This is done by removing the white wire connected to the insulated lug of the terminal strip on which one end of condenser C32 is also connected. The terminal strip is located at the back of the volume control. This wire is then connected to the phono switch as shown in Fig. 7. A wire is then connected from the lug on the above mentioned terminal strip to the phono switch, as shown in Fig. 7. Both of the above wires are connected to the switch terminals nearest the chassis base and should be twisted together as far

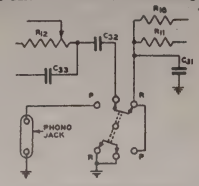


Fig. 7—Phonograph Connections

as possible and run as close to the back of the chassis base as possible.

The lead to condenser C32, after turning away from the back of the chassis base, should be run close to the 6C5 tube sockets.

Complete the other connections as illustrated in Fig. 7, using the lugs in the chassis base, located near the phono switch and jack, for grounding purposes.

The control grid lead of the 6P6 power tube nearest the back of the chassis should be removed and a longer lead substituted. This lead is run from the tone control to the back of the chassis, along the lower edge and is then brought to the grid terminal by being routed between the speaker socket and the tubular condenser next to it.

If a hum is heard when the phono pickup is touched, reverse the two pickup leads.

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

Voltage Chart

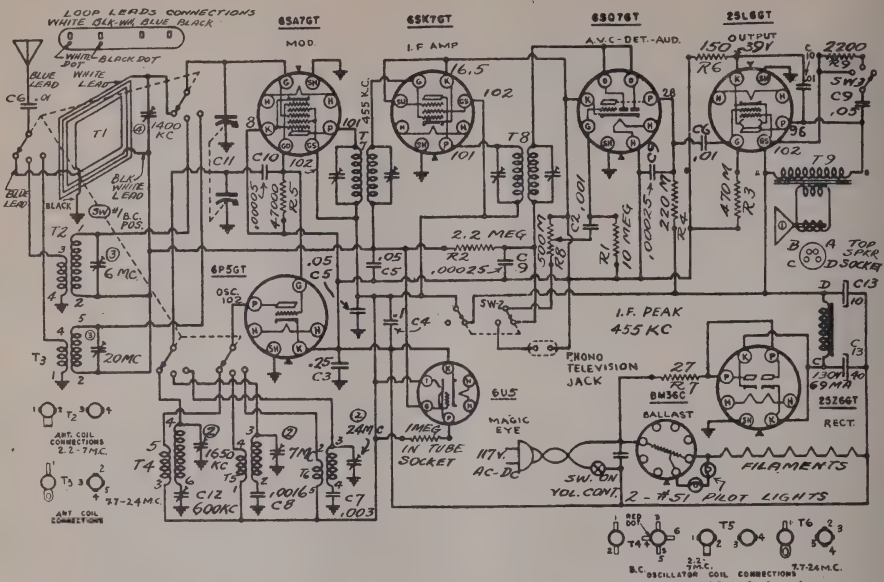
The voltage readings are taken with a voltmeter having a resistance of 1000 ohms per volt.

The standard metal tube socket terminal numbering system (bottom of socket) is shown in Fig. 5 On the schematic circuit diagram, Fig. 2, is a list giving the complete names of the tube elements and the corresponding symbols as used on the sockets on the schematic.

Fig. 5—Metal Tube Terminal numbering (bottom of socket)

MODEL D-33

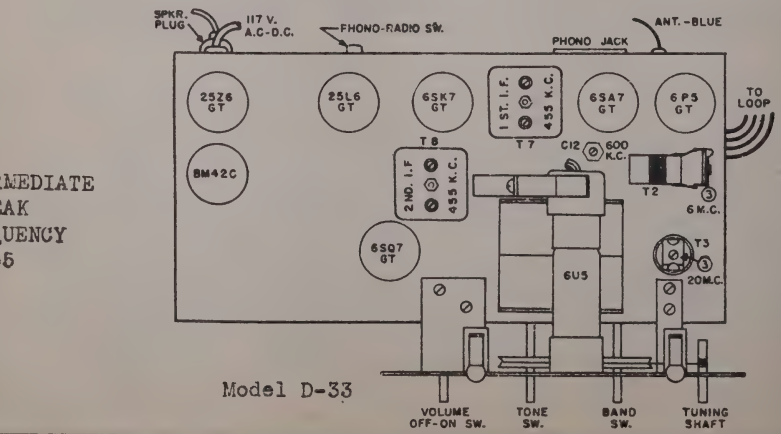
LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.



Code	Part No.	Description
C1	1607	.05 Mfd. 400 V Tubular Condenser
C2	16-124	.001 "
C3	16-120	.25 200 V
C4	16-115	1 "
C5	1622	.05
C6	16-121	.01
C7	15-118	.003 Mfd. Mica Condenser
C8	15-119	.0016 " "
C9	1504	.00025
C10	1503	.00005
C11	19-156	2 Gang Variable Condenser
C12		Padding Condenser
C13	18-255	40 x 10 Mfd 150 W. V.Electrolytic
C14	18-119	.01 Mfd 400 V.Tubular Condenser
R1	60-193	10 Meg. 1/4 W. Resistor
R2	60-179	2.2 "
R3	60-178	470M Ohm
R4	60-180	220M " "
R5	60-177	47M " "
R6	60-184	150 " "
R7	60-220	27 " " "
R8	24-144	500M Volume Control
R9	60-253	2200 1/4 W. Resistor
SW 1	69-142	Band Switch
SW 2	69-140	Phono Switch
Sw 3	69-143	Tone Switch

Tube sockets are viewed from underside of chassis.
Voltage readings at indicated socket prongs are to common ground.
Voltages must be measured with no signal.
Voltages are measured with 1000 ohm per volt voltmeter.
Figures at cathode are cathode current in milliamperes.
Where no voltage readings is shown at socket prongs, it indicates zero voltage or a very low reading.
Alignment is made at the frequency shown at each trimmer condenser.
Capacity values are in microfarads.

Code	Part No.	Description
T1	62-13	Loop Antenna
T2	10-324	Antenna Coil (2.2 - 7M.C.)
T3	10-322	Antenna Coil (7.7 - 24 M.C.)
T4	10-313	Oscillator Coil (B.C.)
T5	10-327	Oscillator Coil (2.2 - 7 M.C.)
T6	10-329	Oscillator Coil (7.7 - 24 M.C.)
T7	10-317	1st I.F. Transformer
T8	10-312	2nd " "
T9	------	Output Transformer (on Spkr.)
1	79-277	6½ Inch. Dynamic Speaker
2		Trimmer Block
3	2062	2 Plate Trimmer
4	20-129	Trimmer (on loop)



INTERMEDIATE PEAK FREQUENCY 455 KC

Model D-33

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LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

MODEL B92 Late

Power Consumption - - 8.25 Amperes at 6.3 Volts
7.0 Amperes with P.M. Speaker
I.F. 175 KC
NOTE: MODELS WITH P.M. DYN. SPEAKER—FIELD & WIRING SHOWN DOTTED ARE OMITTED. NO OTHER CHANGE IN CIRCUIT.
WHEN SINGLE ROOF SPEAKER IS USED, DISCONNECT FIELD LEAD OF CHASSIS SPEAKER.
SINGLE 5 1/4" OR 6" ROOF SPEAKER
DUAL 5 1/4" ROOF & 6" CHASSIS SPEAKER
DUAL 6" ROOF & 6" CHASSIS SPEAKER
ANTENNA R.F. TRANS. T1
INTERSTAGE R.F. TRANS. T2
OSC COIL T3
SIDE NEAREST END OF CHASSIS
SIDE NEAREST CENTER OF CHASSIS
TO GRID CAP
PAINT MARK
ROOF SPK. SOCKET WIRING SIDE
REMOVABLE JUMPER
CHASSIS SPK. SOCKET WIRING SIDE
CHASSIS SPK. PLUG PRONG SIDE
DISTANCE
LOCAL
ROOF SPEAKER CABLE
ROOF SPEAKER SOCKET TOP SIDE
JUMPER
VOICE COIL
FIELD
PRONG END OF VIBRATOR
VIBRATOR SOCKET WIRING SIDE
TO PILOT LIGHT
TO AMMETER
SWITCH

"B" AND LATER ISSUES

VOLTAGES AT SOCKETS ("B" AND LATER ISSUES)

Battery—6.3 Volts Under Load L-D Switch in Distance Position

Type of Tube	Function	Across Heater	Plate to Ground	Screen to Ground	Cathode to Ground
6K7	R.F.	5.8	250	132	3.6
6J7	1st Det. and Osc.	5.8	250	132	0
6K7	I.F.	5.8	250	132	3.6
6B7	2nd Det. & 1st A.F.	5.8	45(1)	45(1)	0
41	2nd A.F.	6.0	240	240	26
6A6	Power	6.0	262		0

(1) As read with 1000 ohm per volt meter—500 volt scale.

"B" AND LATER ISSUES

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SUPPLEMENTARY REPLACEMENT PARTS

The parts of the "D" issue are the same as those used in earlier issues with the following exceptions:

CHANGES IN LATER MODELS

Later models have changes incorporated in them which are explained below. The models which have these changes may be identified by the issue letter which is a large letter stamped on top of the chassis base. The tube arrangement label on the chassis case cover also shows this issue letter.

When ordering parts, it is important that the issue letter be noted and the correct part number, as shown in the parts list, be specified.

The "D" issue is different from the "B" and "C". The gang condenser used in the "D" issue radios does not have the cut plate oscillator section. A padding condenser (600 KC) was added in series with the oscillator section of this gang condenser and the oscillator coil. The padding condenser is a part of the 2nd I. F. trimmer unit and is mounted in the 2nd I. F. coil can.

The capacity (C17) shown within a dotted circle in the 2nd I.F. coil assembly on the schematic has been changed to an actual part as shown in the supplementary parts list.

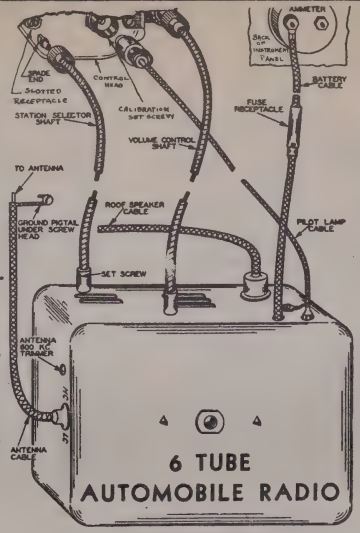
The antenna, R.F. Interstage, oscillator, and 2nd I.F. coil assemblies have been changed and have been given new part numbers as shown in the supplementary parts list.

THE FOLLOWING NEW PARTS ARE USED:

No.	Code	Description
9A859	T1	Antenna Transformer and Can Assembly.....
9A861	T2	R. F. Interstage Transformer and Can Assembly.....
9A862	T3	Oscillator Coil and Can Assembly.....
9A858	T5	2nd I. F. Transformer and Can Assembly.....
47X57	C17	100 mmf. Molded Condonser.....
17A79	(C16	30-100 mmf. 2nd I.F. Trimmer)...
	(	900-1300 mmf. Oscillator 600 KC Padder)
14A77		3 Section Gang Condenser Complete with Drive Gears.....

THE FOLLOWING PARTS OF THE SERIES 6J ARE NOT USED ON THE SERIES 6J "D" ISSUE RADIO:

9A740) 9A771)	or T1	Antenna Transformer and Can Assembly.....
9A741) 9A765)	or T2	R.F. Interstage Transformer and Can Assembly.....
9A742) 9A772)	or T3	Oscillator Coil and Can Assembly.....
9A744	T5	2nd I.F. Coil and Can Assembly.....
17A65	C16	30-100 mmf. 2nd I.F. Trimmer.....
14A65		3 Section Gang Condenser Complete with Drive Gears.....



General Installation View

Adjusting Antenna 600 KC Trimmer

Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig. 9 for location of this trimmer.

Antenna

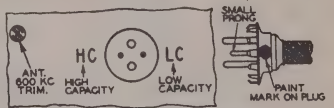


Fig. 9—Antenna Plug Insertion

IMPORTANT—The antenna plug can be inserted in two ways depending on whether the antenna is of high or low capacity.

If the total capacity of the antenna and shielded lead is approximately 200 mmf., which would be the case in a running board or ordinary roof antenna (not metal roof), insert the antenna plug with the mark on the HC side—See Fig. 9.

If the total capacity of the antenna and shielded lead is approximately 70 mmf., such as is the case if a "fish pole" antenna is used, insert the antenna plug with the mark on the LC side.

Alignment Procedure

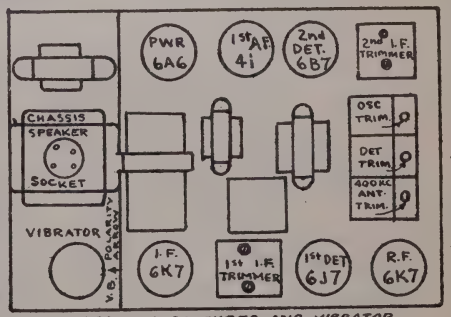
Set the signal generator for 175 KC and connect the output of the signal generator through a .05 mf. condenser to the stator of the 1st detector section of the tuning condenser. Set the volume control at the maximum position and attenuate the signal from the signal generator to prevent the levelling off action of the AVC. Then adjust the three IF trimmers until maximum output is obtained

Set the signal generator for 1581 KC. Turn the rotor of the tuning condenser to the full open position. Insert the antenna plug with the mark on the high capacity (HC) side. Connect the shielded antenna lead from the chassis through a 120 mmf. condenser to the antenna post of the signal generator. Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained.

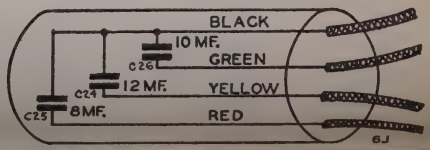
Set the signal generator for 1400 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained. Adjust the 1st detector and antenna 1400 KC trimmers for maximum output. Do not change the setting of the oscillator trimmer.

Then set the signal generator for 600 KC and adjust the 600 KC antenna trimmer to maximum

After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted on the LC side if a low capacity (70 mmf.) car an



LOCATION OF TUBES AND VIBRATOR.



RADIO WIRE TELEVISION, INC.

MODELS B100, B101, B102

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ALIGNMENT PROCEDURE

Volume Control—Maximum All adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
Remove chassis from cabinet—Reconnect loop antenna plugs.					
I. F. 456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C31) & (C32) 2nd I.F. (C35) & (C36)
RANGE B 1730 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C16)
1500 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A	Ant. Range B (C6) Int. Range B (C11)
600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C17) Rock Rotor—See Note B
RANGE C 7400 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C15)
7000 KC	Antenna Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Ant. Range C (C5) Int. Range C (C10) Rock Rotor—See Note B
RANGE D_1 12,300 KC	Antenna Lead	400 Ohm	D_1 Range	Turn Rotor to Full Open	Oscillator Range D_1 (C14)
11,900 KC	Antenna Lead	400 Ohm	D_1 Range	Turn Rotor to Max. Output	Ant. Range D_1 (C4) Int. Range D_1 (C9) Rock Rotor—See Note B
RANGE D_2 15,450 KC	Antenna Lead	400 Ohm	D_2 Range	Turn Rotor to Full Open	Oscillator Range D_2 (C13)
15,250 KC	Antenna Lead	400 Ohm	D_2 Range	Turn Rotor to Max. Output	Ant. Range D_2 (C3) Int. Range D_2 (C8) Rock Rotor—See Note B
RANGE D_3 21,800 KC	Antenna Lead	400 Ohm	D_3 Range	Turn Rotor to Full Open	Oscillator Range D_3 (C12)
21,500 KC	Antenna Lead	400 Ohm	D_3 Range	Turn Rotor to Max. Output	Ant. Range D_3 (C2) Int. Range D_3 (C7) Rock Rotor—See Note B
LOOP RANGE B 1500 KC	Antenna Lead See Note C	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C6)

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

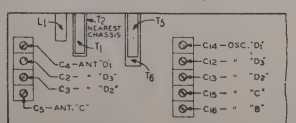
After each range is completed, repeat the procedure as a final check.

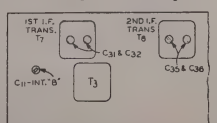
NOTE A—If the pointer is not at 1500 KC on the dial, remove pointer from drive cord. Set pointer at the 1500 KC mark on the dial scale. Attach pointer to drive cord.

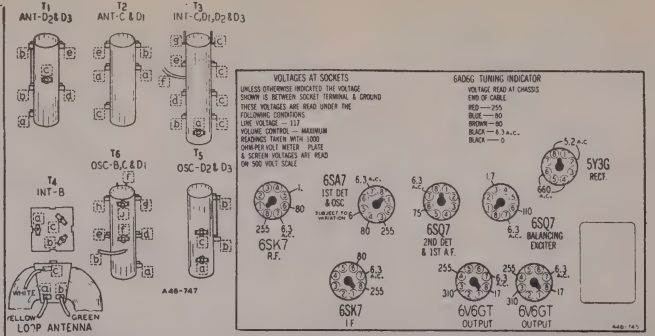
NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Re-assemble chassis in cabinet.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.







PROCEDURE FOR SETTING THE STATION BUTTONS

SELECTING THE STATIONS TO BE SET

There are 6 buttons on the automatic tuning dial by means of which 6 stations may be set for quick tuning.

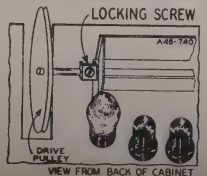
Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

It is better to list the station with the lowest kilocycle number first, the station with the next higher kilocycle number next, and so on.

Any button may be used for any station you can receive, although it will be more convenient to set the stations so that the kilocycle numbers increase from left to right.

SETTING A STATION BUTTON

Unlock the push button tuning mechanism from the back of the radio. On the drive pulley shaft and at the left side (from back of radio) of the push button tuning assembly is a locking screw—See illustration.



VIEW FROM BACK OF CABINET

Turn the manual tuning knob until the locking screw can be easily reached with a screwdriver.

Using a small handled screwdriver, unlock the mechanism by turning this screw several turns in a counter-clockwise direction.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED.

Select the first station from the list you have prepared, and carefully tune in this station by means of the manual tuning knob, using the tuning eye as a guide.

With one hand, hold the manual tuning knob to prevent it from turning and with the other hand, push one of the station buttons shown in the illustration *all the way in*. It is better to start with the left hand button.

Hold *this* button all the way in. With the other hand, see whether or not this station is still accurately tuned in by moving the tuning knob a slight amount back and forth while observing the tuning eye. *Be sure to hold the button all the way in.*

Slowly release the button after the station is tuned in.

CAUTION—Do not touch this button again while the mechanism is unlocked as the setting may be altered.

Carefully tune in the second station on your list. Then hold the tuning knob and push the second button slowly and firmly all the way in. Check for accurate tuning.

Proceed in the same manner to set any additional stations on your list on the remaining station buttons.

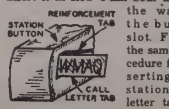
After all the stations are set, it will be necessary to lock the mechanism so that the settings will not change. Turn the manual tuning knob until the locking screw can be easily reached with a screwdriver. Then, with the SMALL HANDLED screwdriver, turn the locking screw in a clockwise direction until it is tight. Tighten the locking screw firmly but not excessively to avoid stripping the threads.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons.

Remove the correct station call letter tab for this button from the sheet supplied by bending the sheet back and forth at the score marks.

In Models With Transparent Buttons—Insert a celluloid reinforcement tab half way in the slot at the front of the first station button.

Place the call letter tab in front of the celluloid reinforcement tab and insert it in slot. Push both tabs all the way in the button slot. Follow the same procedure for inserting the station call letter tabs in any other buttons.



In Models With Brown Opaque Buttons—Press the tab all the way to the bottom of the space provided in the button. Cover the call letter tab with a celluloid tab, pressing this in until it snaps into place.

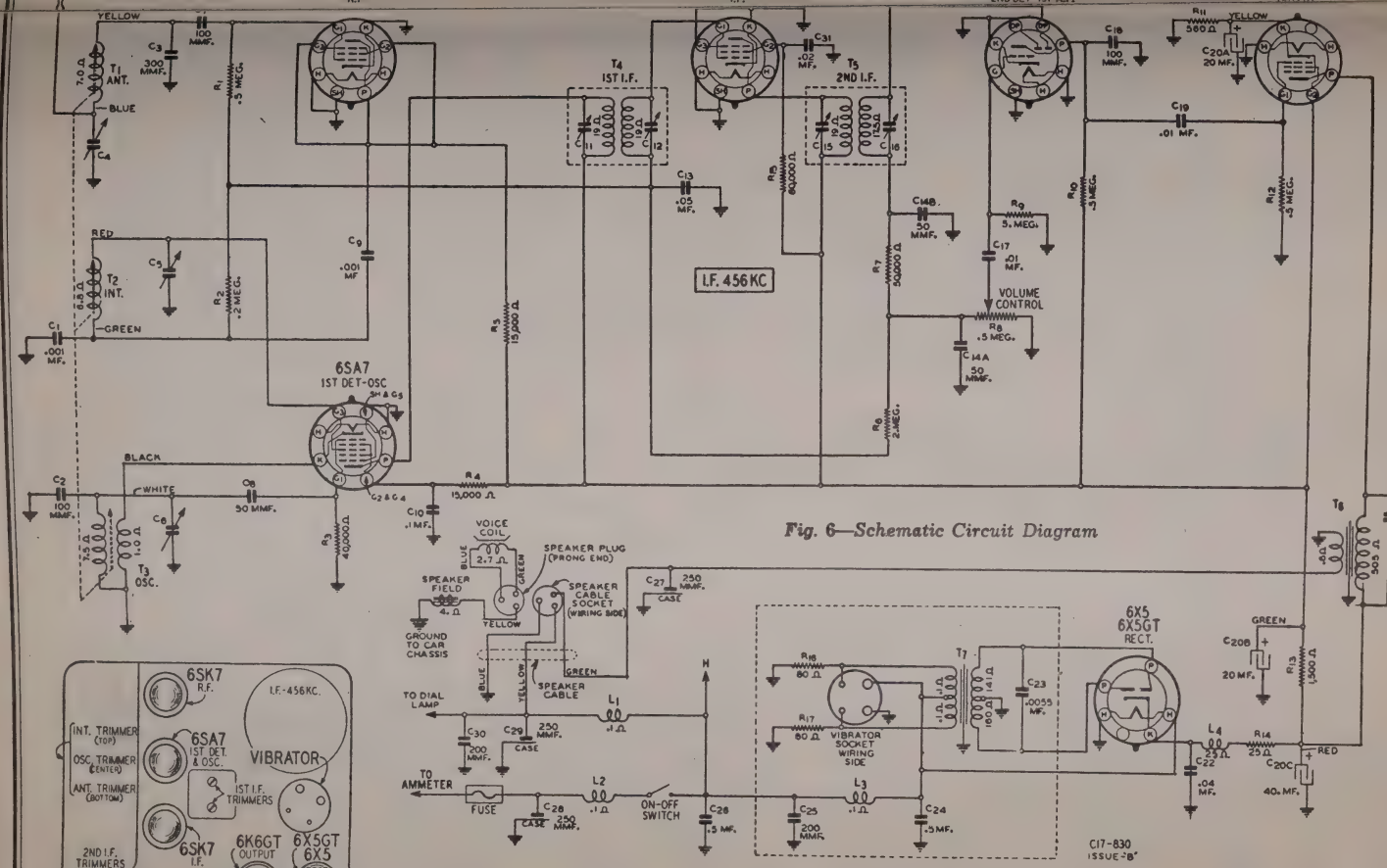


Fig. 6—Schematic Circuit Diagram

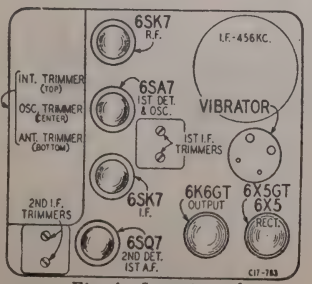


Fig. 4—Location of Tubes and Vibrator

SPECIFICATIONS

Selectivity - - 38 KC Broad at 1000 Times Signal	Power Consumption - - 8.2 Amperes at 6.6 Volts
Tuning Frequency Range - - - - 540 to 1600 KC	Power Output (6.6 Volts) - - - 3.0 Watts Undistorted, 5.5 Watts Maximum
Intermediate Frequency - - - - - - - - 456 KC	Sensitivity - - - - 1 Microvolt at .5 Watt Output
Speaker - - - - - - - - - 6" Electro-Dynamic	

MODEL BB11
MODEL BB110

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

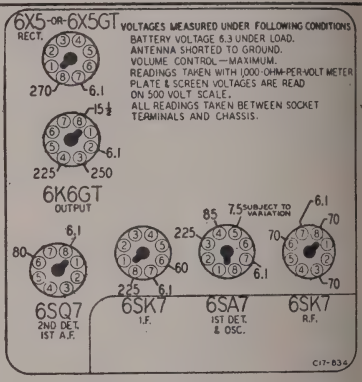
SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	IRON CORE SETTING	ADJUST TRIMMERS TO MAXIMUM (See Figs. 3 and 4)
I.F. 456 KC	Control Grid (prong No. 8) 6SA7 1st Det. Tube	.05 mf.	Extreme Position out of Coil	1st I.F. (C11) & (C12) 2nd I.F. (C15) & (C16)
OSCILLATOR 1600 KC	Antenna Cable See Note A	See Note A	Extreme Position out of Coil	Oscillator (C6)
1400 KC ADJUSTMENT 1400 KC	Antenna Cable	See Note A	Tune to Max. Output with Tuning Knob	Int. (C5) Ant. (C4)

Reassemble Radio—Install in Car—Connect Car Antenna to Radio.

Car Antenna Readjustment—Tune in weak signal near 1400 KC—Readjust Antenna Trimmer C4 for maximum output.

SERIES B CHANGES

To secure improved performance, the following changes are made in issue "B" chassis: The oscillator grid resistor is increased from 20,00 ohms to 40,000 ohms. The R.F. plate resistor is decreased from 20,000 ohms to 15,000 ohms. The R.F. screen is disconnected from the modulator screen and connected to the R.F. plate. In the Series 6C18 only, the modulator screen resistor is increased from 10,000 ohms to 12,000 ohms. To permit easier installation, the issue "B" chassis use a socket and plug arrangement for the speaker connection. Issue "A" chassis used pin tips and clips to connect cable to speaker.



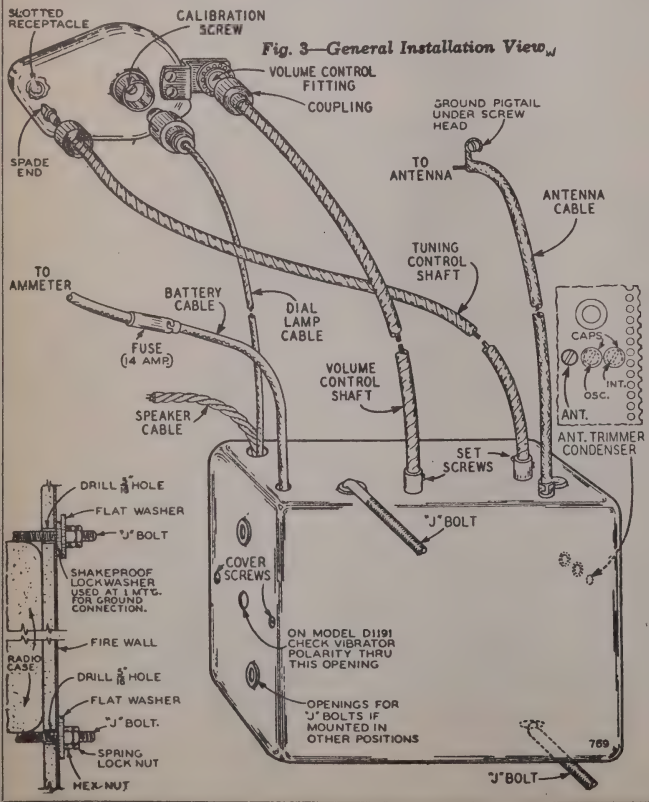


Fig. 3—General Installation View

CALIBRATION—To calibrate the radio, tune in a station of known frequency. At the back of the control unit is the calibration screw. Remove the dial lamp assembly. Insert a fine bladed screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—Insert the antenna cable plug in the antenna socket on the chassis. The total capacity of the antenna cable and dummy antenna should be 60 mmf. If the cable, for example, has a capacity of 30 mmf., use a 30 mmf. condenser for a dummy antenna. Connect the other end of the antenna cable through the dummy antenna capacity to the output of the signal generator.

Alignment Procedure:Vol.Cont.Max. all adj.Connect Radio Chassis to ground post of Sig.Gen. with short heavy lead. Allow chassis and Sig. Gen. to "Heat Up" for few minutes. Following equipment is required fo alignment: A sig. Gen. which will provide accurately calibrated sig. at the test frequencies. Output indicating meter-Non-metalic Screwdriver.Dummy antenna-.05mf.

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MODEL B112

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

MODEL B112

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

	SIGNAL GENERATOR					
	FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I.F.	456 KC	Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C12) & (C13) 3rd I.F. (C17) & (C18)
RANGE B	1600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C10)
	1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC See Note A	Ant. Range B (C2)
	600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C6) Rock Rotor—See Note B
RANGE D	18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C3)
	17,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note B
LOOP RANGE B	1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C2)

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

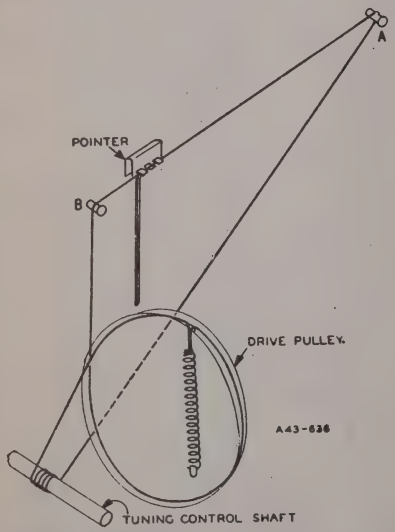
NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

SPECIFICATIONS

Power Consumption - 60 Watts (At 117 volts 60 cycles)
80 Watts (Phonograph Operating)
Power Output - - - - - - - - 2.5 Watts Undistorted
3.5 Watts Maximum
Selectivity - - - - 40 KC Broad at 1000 times Signal
Intermediate Frequency - - - - - - - - - - 456 KC
Speaker - - - - - - - - 10" or 12" Electro-Dynamic

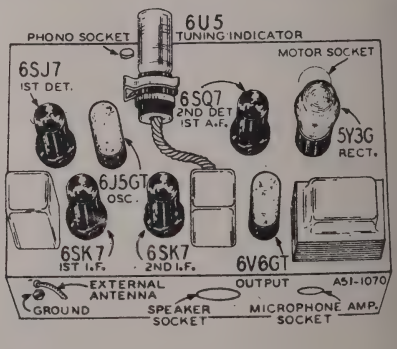
Tuning Frequency Range
B Range - - - - - - - - - 528 to 1600 KC
D Range - - - - - - - - - 5750 to 18300 KC

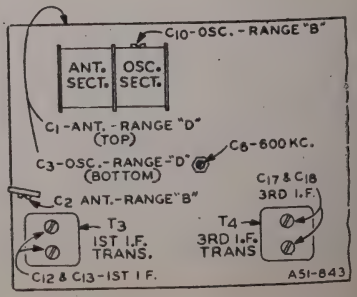
Sensitivity—External Antenna—(For .05 Watt output)
B Range - - - - - - - 20 Microvolts Average
D Range - - - - - - - 4.0 Microvolts Average



DRIVE CORD REPLACEMENT

Turn gang condenser to full open position — See illustration. Use a new drive cord 42 inches in length.





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LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

MODELS D131,D132, D133

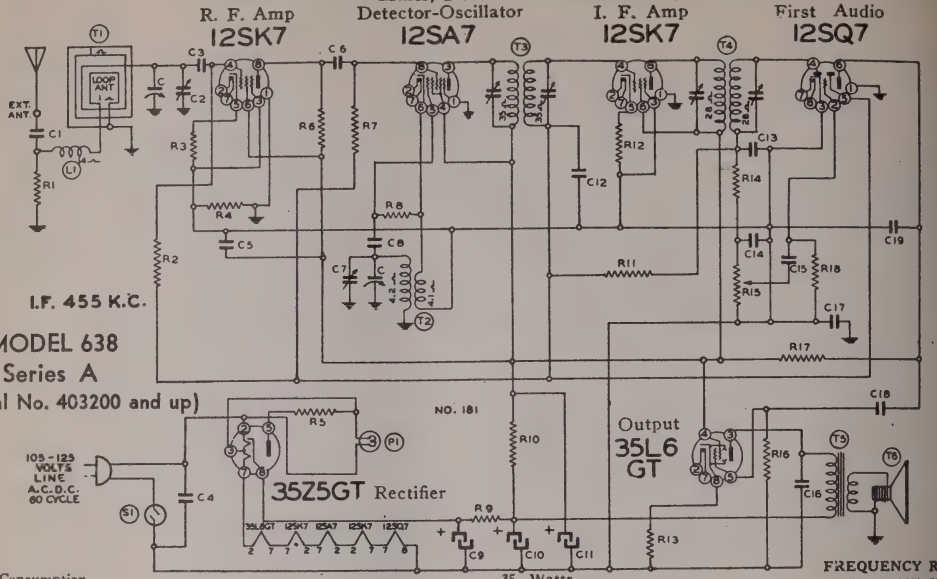
CODE	PART NO	DESCRIPTION
R 1	60-193	10 MEGOHM 1/4 W RESISTOR
R 2	60-178	" " "
R 3	60-178	470K OHM "
R 4	60-180	220K " "
R 5	60-185	22K " "
R 6	60-184	150 " "
R 7	60-438	1800 " 1/2 W
R 8	60-647	66 " 1 1/2 W
R 9	24-152	1 MEG. " VOL. CONT & SW.
S 1	69-153	S.P.S.T. SWITCH

CODE	PART NO	DESCRIPTION 1:41
T 1	10-367	ANTENNA COIL
T 2	10-366	OSCILLATOR COIL
T 3	10-369	I.F. TRANSFORMER
T 4	80-205	OUTPUT TRANSFORMER

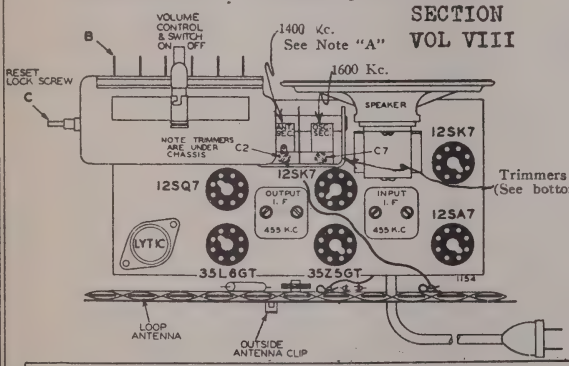
CODE	PART NO	DESCRIPTION
C 1	16-125	.004 MFD 400V TUBULAR COND
C 2	16-148	.006 " " "
C 3	16-149	.01 " " "
C 4	1607	.05 " " "
C 5	16-121	.01 " " 200V. "
C 6	1622	.05 " " "
C 7	1621	.00005 MFD. MICA COND.
C 8	1501	.0001 " " "
C 9	18-265	30 X 30 AT 150V. & 10 AT 25V. ELECT.
C 10	19-169	2 GANG VAR. COND. ALSO C11 & C12
⊙	79-305	5" P.M. SPEAKER
⊙	89-1	6.3V. PILOT LIGHT
⊙	59-26	R.F. CHOKE
⊙	59-4	PHONO MOTOR
⊙	69-154	SPOT SWITCH

MODEL FE141

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.



CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL VIII

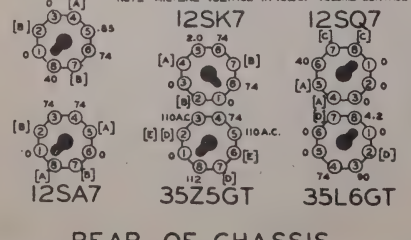


BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B—

[A] CANNOT BE MEASURED WITH VOLTMETER.
[B] 12 VOLTS A.C MEASURED ACROSS PINS 2 & 7.
[C] 12 VOLTS A.C MEASURED ACROSS PINS 7 & 8.
[D] 30 VOLTS A.C MEASURED ACROSS PINS 2 & 7.
[E] 117 VOLTS A.C MEASURED ACROSS PINS 2 & 8.

NOTE: A.C. LINE VOLTAGE 117 VOLTS. VOLUME CONTROL AT MINIMUM.



REAR OF CHASSIS

1156

Code No.	Part No.	Description
		RESISTORS
R1	13018	4M ohm—½ w.
R2	13019	1 megohm—½ w.
R3	130168	100 ohm—½ w.
R4	130100	150M ohm—½ w.
R5	130215	25 ohm—½ w.
R6	130218	5M ohm—½ w.
R7	13020	100M ohm—½ w.
R8	13012	50M ohm—½ w.
R9	130296	200 ohm—1 w.
R10	130287	1200 ohm—1 w.
R11	130170	3 megohm—½ w.
R12	13024	400 ohm—½ w.
R13	130166	150 ohm—½ w.
R14	13012	50M ohm—½ w.
R15	101218	1 megohm volume control
R16	1303	500M ohm—½ w.
R17	1309	200M ohm—½ w.
R18	130257	5 megohm—½ w.
		CONDENSERS
C	102116	2 gang variable condenser
C1	10025	.002 x 600 v.
C2		B. C. Antenna Trimmer on Gang Con.
C3	1292	.0005 Mica
C4	1001	.1 x 400 v.
C5	1006	.25 x 200 v.
C6	1295	.0001 mica
C7		B. C. Oscillator Trimmer on Gang Con.
C8	1295	.0001 mica
C9	11994	40 mfd. lytic x 150 w. v.
C10	11994	20 mfd. lytic x 150 w. v.
C11	11994	20 mfd. lytic x 150 w. v.
C12	1009	.05 x 200 v.
C13	129161	.0001 mica
C14	129161	.0001 mica
C15	10025	.002 x 600 v.
C16	10026	.02 x 400 v.
C17	100110	.2 x 400 v.
C18	100106	.004 x 600 v.
C19	1295	.0001 mica C9, C10, C11 are in same unit C13, C14 are in same unit
		PARTS
T1	111180	Loop Antenna complete
T2	110152	Oscillator Coil
T3	108140H	Input I. F. Coil—455 Kc.
T4	108145	Output I. F. Coil—455 Kc.
T5	105104	Output Transformer
T6	114197	5" P. M. Speaker
L1	12310	Loading Coil
S1		On-off switch on volume control
P1	107249	T47 Pilot light bulb

NOTE "A" Lay the output lead from the generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the generator.

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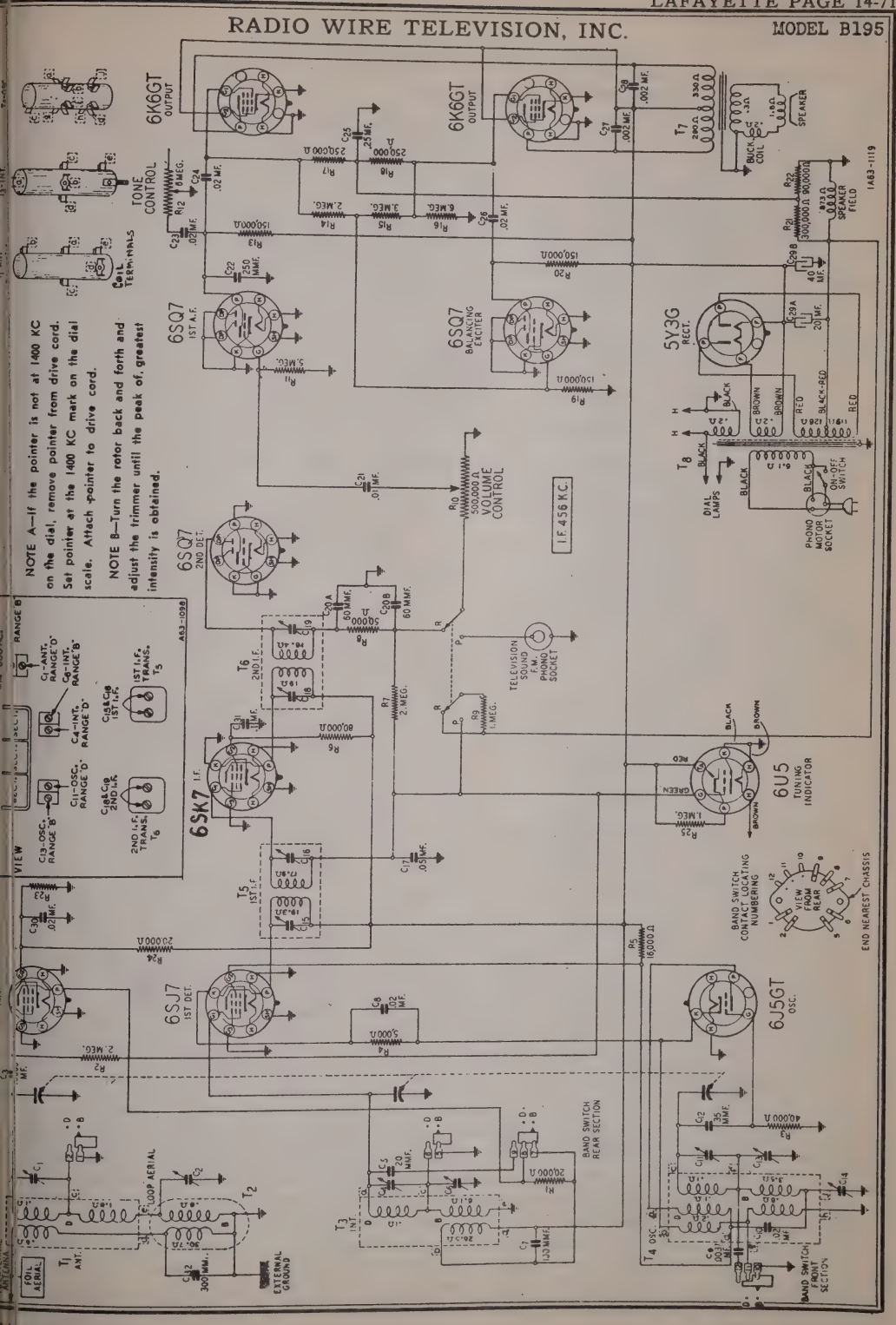
RADIO WIRE TELEVISION, INC.

MODEL B195


6K6GT OUTPUT
6K6GT OUTPUT
6SQ7 1ST A.F.
6SQ7 BALANCING EXCITER
6SQ7 2ND DET.
5Y3G RECT.
6SK7 I.F.
6SJ7 1ST DET.
6J5GT OSC.
6U5 TUNING INDICATOR
TONE CONTROL
SPEAKER
SPEAKER FIELD
VOLUME CONTROL
I.F. 456 KC.
DIAL LAMPS
ON-OFF SWITCH
PHONO MOTOR SOCKET
TELEVISION SOUND PHONO SOCKET
LOOP AERIAL
FOIL AERIAL
EXTERNAL GROUND
BAND SWITCH CONTACT LOCATING NUMBERING
VIEW FROM REAR
END NEAREST CHASSIS
BAND SWITCH REAR SECTION
BAND SWITCH FRONT SECTION
NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.
NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

MODEL B195

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC

ALIGNMENT PROCEDURE

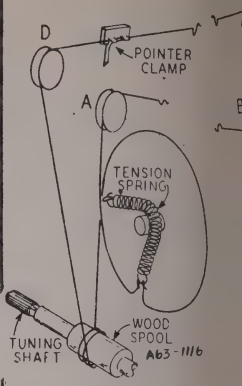
Volume Control—Maximum All Adjustments.

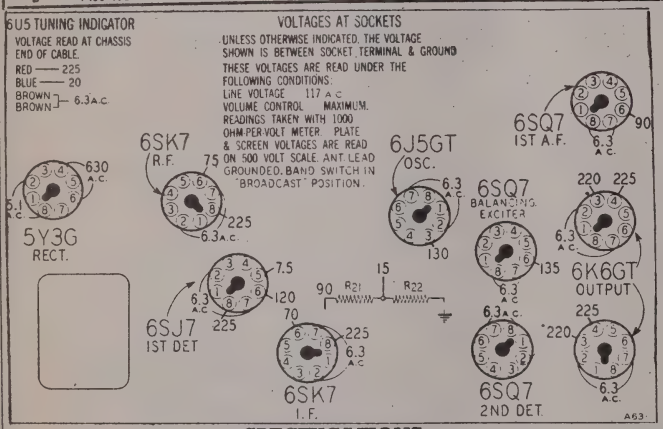
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An all Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screw driver.
Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I.F.	456 KC	Signal Grid of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C15) & (C16) 2nd I.F. (C18) & (C19)
RANGE D	18,300 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C11)
	17,000 KC	Antenna Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Int. Range D (C4) Rock Rotor—See Note B
RANGE B	1610 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C13)
	1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note A	Ant. Range B (C2) Int. Range B (C6)
	600 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C14) Rock Rotor—See Note B
LOOP RANGE B	1400 KC	Antenna Lead	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C2)




6U5 TUNING INDICATOR
VOLTAGE READ AT CHASSIS END OF CABLE.
RED — 225
BLUE — 20
BROWN — 6.3 A.C.
BROWN
VOLTAGES AT SOCKETS
UNLESS OTHERWISE INDICATED, THE VOLTAGE SHOWN IS BETWEEN SOCKET TERMINAL & GROUND
THESE VOLTAGES ARE READ UNDER THE FOLLOWING CONDITIONS:
LINE VOLTAGE 117 A.C.
VOLUME CONTROL MAXIMUM.
READINGS TAKEN WITH 1000 OHM-PER-VOLT METER. PLATE & SCREEN VOLTAGES ARE READ ON 500 VOLT SCALE. ANT. LEAD GROUNDED. BAND SWITCH IN "BROADCAST" POSITION.
6SK7 R.F.
6J5GT OSC.
6SQ7 IST A.F.
6SQ7 BALANCING EXCITER
6K6GT OUTPUT
5Y3G RECT.
6SJ7 IST DET
6SK7 I.F.
6SQ7 2ND DET.
R21
R22
A63-

Turn gang condenser to open position. Use new drive cord 55" in length.

Secure one end of tension spring to hook on drive pulley. Bend spring around drive pulley shaft—see illustration. Pass cord through slot in pulley rim. Wind cord ¼ turn clockwise (from drive pulley end of chassis) around drive pulley. Pass cord around idler pulleys A, B, C and D as in illustration. Then wind cord 2½ turns clockwise (from front of chassis) around tuning shaft spool. These turns should progress away from chassis. Pass cord over top of drive pulley for ¾ turn clockwise (from drive pulley end of chassis) and through slot in pulley rim. Fasten cord to tension spring—see illustration.

FOR GENERAL RECORD CHANGER DATA SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS"

SPECIFICATIONS

Speaker - - - - - - - - 8", 10" or 12" Electro-Dynamic

Tuning Frequency Range
B Range - - - - - - - - - 535 to 1610 KC
D Range - - - - - - - - - 5.35 to 18.3 MC

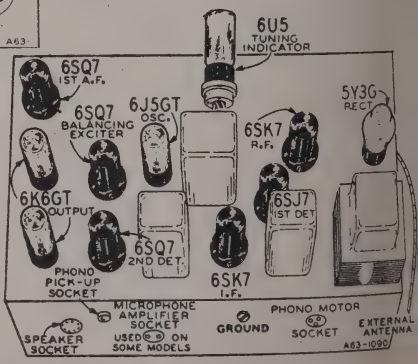
Sensitivity—External Antenna—(For 0.5 Watt output)
B Range - - - - - - - 2.0 Microvolts Average
D Range - - - - - - - 4.0 Microvolts Average

Power Consumption - 85 Watts (At 117 volts 60 cycles) 105 Watts (Phonograph Operating on Phono-Radio Combinations)

Power Output - - - - - - - - - 4 Watts Undistorted 5.5 Watts Maximum

Selectivity - - - 35 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - - - - - - 456 KC



PROCEDURE FOR SETTING THE STATION BUTTONS

Grasp left-handed nutton at sides(depress adjacent button) and pull it out as far as it will go. A click will be heard. If it is impossible to depress button which is adjacent to button you are setting, rotate tuning knob a few turns. Now lock mechanism by pushing button all the way in until felt to lock into place. Proceed in same manner to set stations on any of remaining buttons. Any button may be used for any station you can receive, although it will be more convenient to set station so that the Kc. numbers will increase from left to right. Changing setting of one button will not affect setting of any others.

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LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

MODELS C216, 3120

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MODELS C216,3120

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

Frequency Range	
Broadcast Band	530-1630 Kilocycles
Second S. W.	2.1-6.3 Megacycles
First S. W.	5.8-22.5 Megacycles

ALIGNMENT INSTRUCTIONS

Re-alignment of this receiver should not be attempted unless all other possible causes have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave bands, and an output meter for indicating the effect of adjustments are required.

During the alignment procedure all adjustments should be made under the following conditions:

1) Line Voltage as indicated on instruction sheet.
2) Volume & Tone control at maximum volume positions.
3) Minimum Input from signal generator.

If this procedure is not adhered to, all adjustments will appear very broad. This is due to the action of the automatic colume control.

I.F. Adjustment - The signal generator is set at 455 KC and is connected to the grid of the converter tube (6A8) through a .5 MFD condenser. Be sure to connect a resistor of approximately 25,000 OHMS between the converter grid and ground so that the grid circuit is at ground potential for D.C.

The Input I.F. Transformer trimmers - are both adjusted for maximum output as indicated by the output meter connected across either the voice coil or the primary coil of the loud speaker.

The Output I.F. Transformer trimmers - are adjusted for maximum output as indicated on the output meter. The Input I.F. should now be re-checked for maximum output.

Short Wave Band #1 Adjustment - Set the band switch to the third position which is short wave band #1. Connect the signal generator thru a standard dummy antenna to the antenna and ground leads of the receiver. Set the generator at 19MC turn the condenser until a response is indicated. The pointer should coincide with the 19MC mark on the dial. Adjust the antenna trimmer for the short wave band for maximum output while rocking the condenser gang from left to right.

Short Wave Band #2 - Set the band switch to the second position. Turn the dial control knob to the extreme high frequency end so that the condenser plates are entirely out of mesh. The signal generator is left connected as for band #1. The generator is set at 6.25MC and the Band #2 osc. trimmer is opened until a response is indicated, at the lower capacity setting of the trimmer. Set the generator at 6MC and turn the variable condenser until a response is indicated. The pointer should now coincide with the 6.MC mark on the dial. The antenna trimmer is then adjusted for maximum output while the condenser gang is rocked from right to left. Set the generator at 2.4MC and turn the variable condenser knob until a response is indicated. The padder for this band is now adjusted for maximum output while rocking the condenser gang from left to right. The high frequency adjustments should then be re-checked.

Broadcast Band
It is desirable to align this band on the loop. The signal generator is coupled to the receiver by means of a 2 or 3 turn loop. Set the Band Switch in the Broadcast position and condenser plates completely out of mesh. Set the signal generator at 1600 KC and adjust the broadcast oscillator trimmer until a response is indicated on the output meter. The generator is now set at 1400 KC. Turn the variable condenser until a response is indicated. The dial pointer should now co-incide with the 1400KC mark on the dial. Set the generator at 600KC and turn the variable condenser control until a response is indicated. Adjust the broadcast oscillator padder condenser for maximum response while "rocking" the gang condenser. The high frequency adjustments should now be re-checked.

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MODEL D247

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

CODE	PART NO.	DESCRIPTION
R 1	60-193	10 MEGOHM 1/4 WATT RESISTOR
R 2	60-179	2.2 " " "
R 3	60-178	470K OHM " "
R 4	60-180	220K " " "
R 5	60-185	22K " " "
R 6	60-184	150 " " "
W 7	60-651	27 " " "

CODE	PART NO.	DESCRIPTION
C 1	1504	.00025 MFD MICA CONDENSER
C 2	1501	.0001 " " "
C 3	1503	.00005 " " "
C 4	1607	.05 MFD - 400 V. TUBULAR CONDENSER
C 5	16-118	.01 " " " "
C 6	16-125	.004 " " " "
C 7	1622	.03 " 200 V " "
C 8	18-266	30 - 30 MFD. 150 W.V. ELECTROLYTIC
C 9	19-177	2 GANG VARIABLE CONDENSER (ALSO C10 & C11)

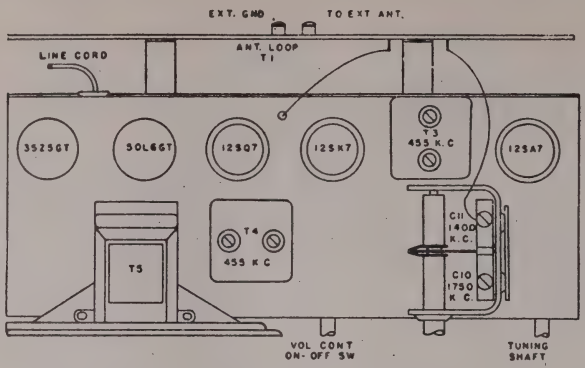
T2 OSC COIL 6 SECTIONS

CODE	PART NO.	DESCRIPTION
T 1	82-30	LOOP ANTENNA
T 2	10-394	OSCILLATOR COIL
T 3	10-369	1ST I F TRANSFORMER
T 4	10-370	2ND I F TRANSFORMER
T 5		OUTPUT TRANSFORMER (ON SPKR)
1	79-319	5" DYN SPEAKER
2		500K OHM VOLUME CONTROL (WITH SW)
3	24-153	

2-53

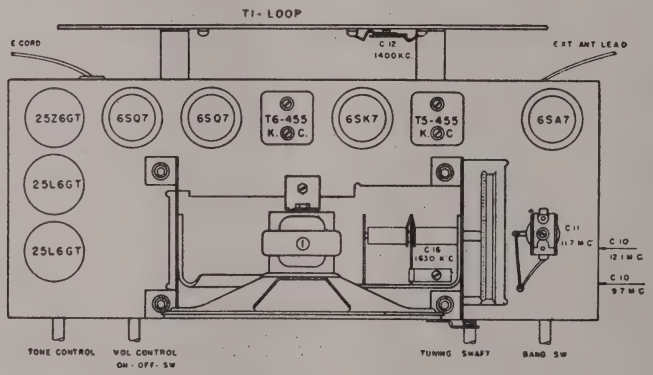
MODEL D247
MODEL D251
MODELS D294,D314,D315

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.



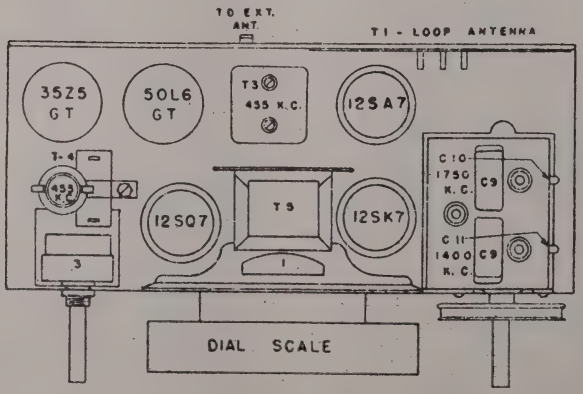
LOCATION OF PARTS ON TOP OF CHASSIS

Model D-247



LOCATION OF PARTS ON TOP OF CHASSIS

Model D-251



LOCATION OF PARTS ON TOP OF CHASSIS

Models D294, D314,-15

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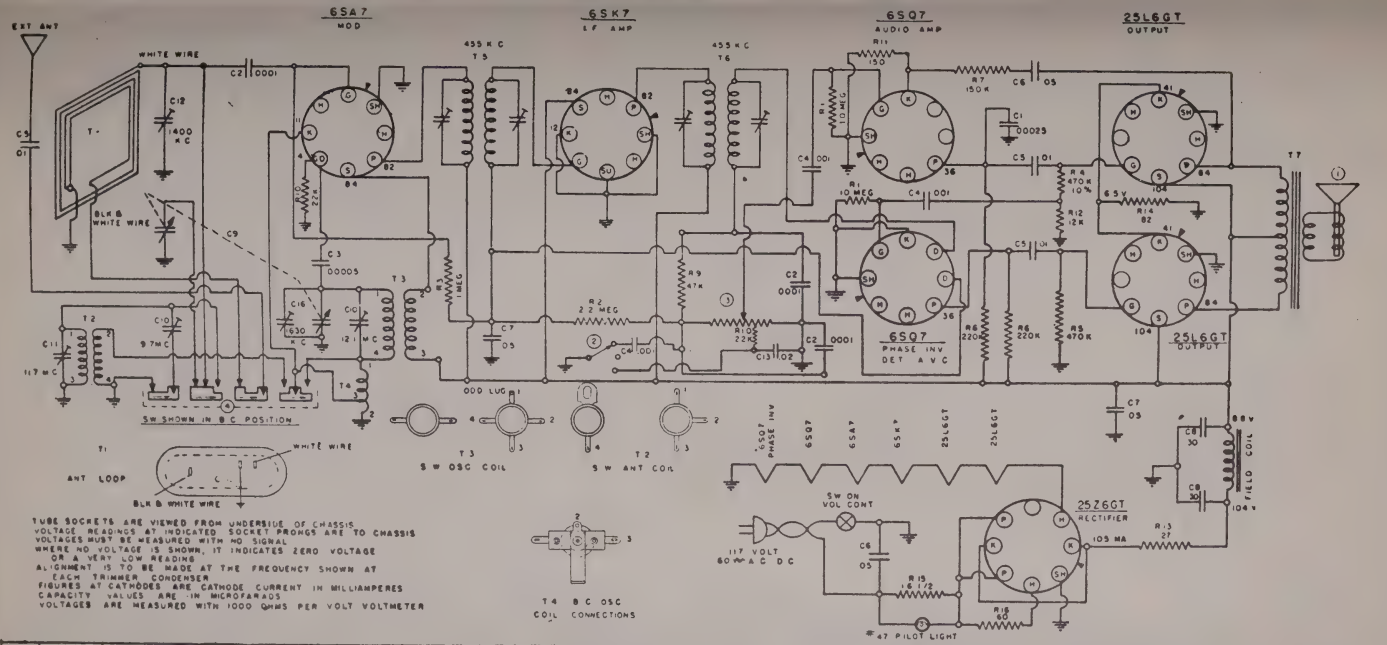

6SA7 MOD
6SK7 I.F. AMP
6SQ7 AUDIO AMP
25L6GT OUTPUT
EXT ANT
WHITE WIRE
BLK & WHITE WIRE
455 K C
T5
T6
6SQ7 PHASE INV DET A V C
25L6GT OUTPUT
SW SHOWN IN B C POSITION
ANT LOOP
T3 S W OSC COIL
T2 S W ANT COIL
T4 B C OSC COIL CONNECTIONS
SW ON VOL CONT
117 VOLT 60 ~ A C D C
25Z6GT RECTIFIER
105 MA
#47 PILOT LIGHT
6.3 V COIL
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL
WHERE NO VOLTAGE IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES
CAPACITY VALUES ARE IN MICROFARADS
VOLTAGES ARE MEASURED WITH 1000 OHMS PER VOLT VOLTMETER

CODE	PART NO	DESCRIPTION
R 1	60-193	10 MEGOHM 1/4 WATT RESISTOR
R 2	60-179	2.2 " "
R 3	60-195	1 " "
R 4	60-407	470 K OHM "
R 5	60-178	" " "
R 6	60-180	220 K " "
R 7	60-402	150 K " "
R 8		
R 9	60-177	47 K " "
R 10	60-185	22 K " "
R 11	60-184	150 " "
R 12	60-390	12 K " "
R 13	60-651	27 " "
R 14	60-426	82 " 1/2 WATT
R 15	60-854	6 1/2 " 3 "
R 16	60-653	60 " 6 "

CODE	PART NO	DESCRIPTION
C 1	1504	00025 MFD MICA CONDENSER
C 2	1501	0001 " "
C 3	1503	00005 " "
C 4	16-106	001 MFD 600 V TUBULAR CONDENSER
C 5	16-119	01 " 400 V "
C 6	1607	05 " " "
C 7	1622	05 " 200 V " "
C 8	18-266	30 x 30 MFD 150 W V. ELECTROLYTIC
C 9	93-16	2 GANG VARIABLE CONDENSER (ALSO CHS. TRIMMER BANK (2 SECTIONS)
C 10	20-131	TRIMMER
C 11	20-133	TRIMMER
C 12	20-129	TRIMMER ON LOOP)
C 13	16-123	02 MFD 200 V TUBULAR CONDENSER
C 14		
C 15		

CODE	PART NO	DESCRIPTION
T 1	83-33	LOOP ANTENNA
T 2	10-398	ANTENNA COIL S W
T 3	10-399	OSCILLATOR COIL S W
T 4	10-397	" " B C
T 5	10-401	1ST I.F TRANSFORMER
T 6	10-402	2ND I.F. "
T 7		OUTPUT TRANSFORMER 1 OH SPKR
1	79-323	4" x 6" DYNAMIC SPEAKER
2	69-160	TONE CONTROL
3	24-160	VOLUME CONTROL
4	69-159	BAND SWITCH

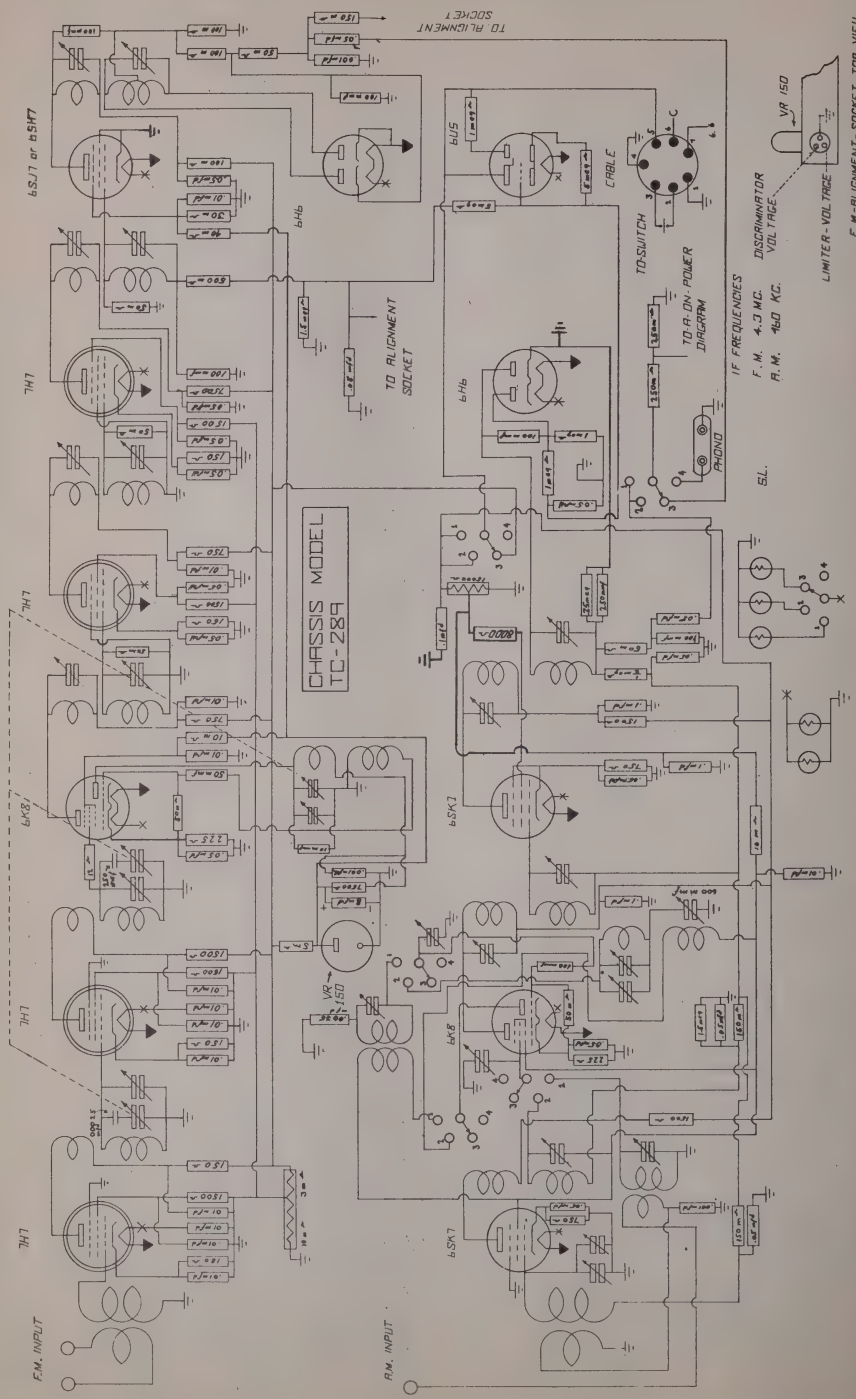
2-70

Conventional
P.B. Tuning

This receiver has been designed to cover two separate frequency bands, a boadcast band from 540 K.C. to 1630 K.C. and a spread-band short-wave band from 8.9 M.C. to 12.1 M.C. The dial scale has been calibrated directly in kilocycles (less the final 0) on the broadcast band, while the short-wave band is calibrated directly in megacycles.

MODELS TC266, TC287, TC288, TC299

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.



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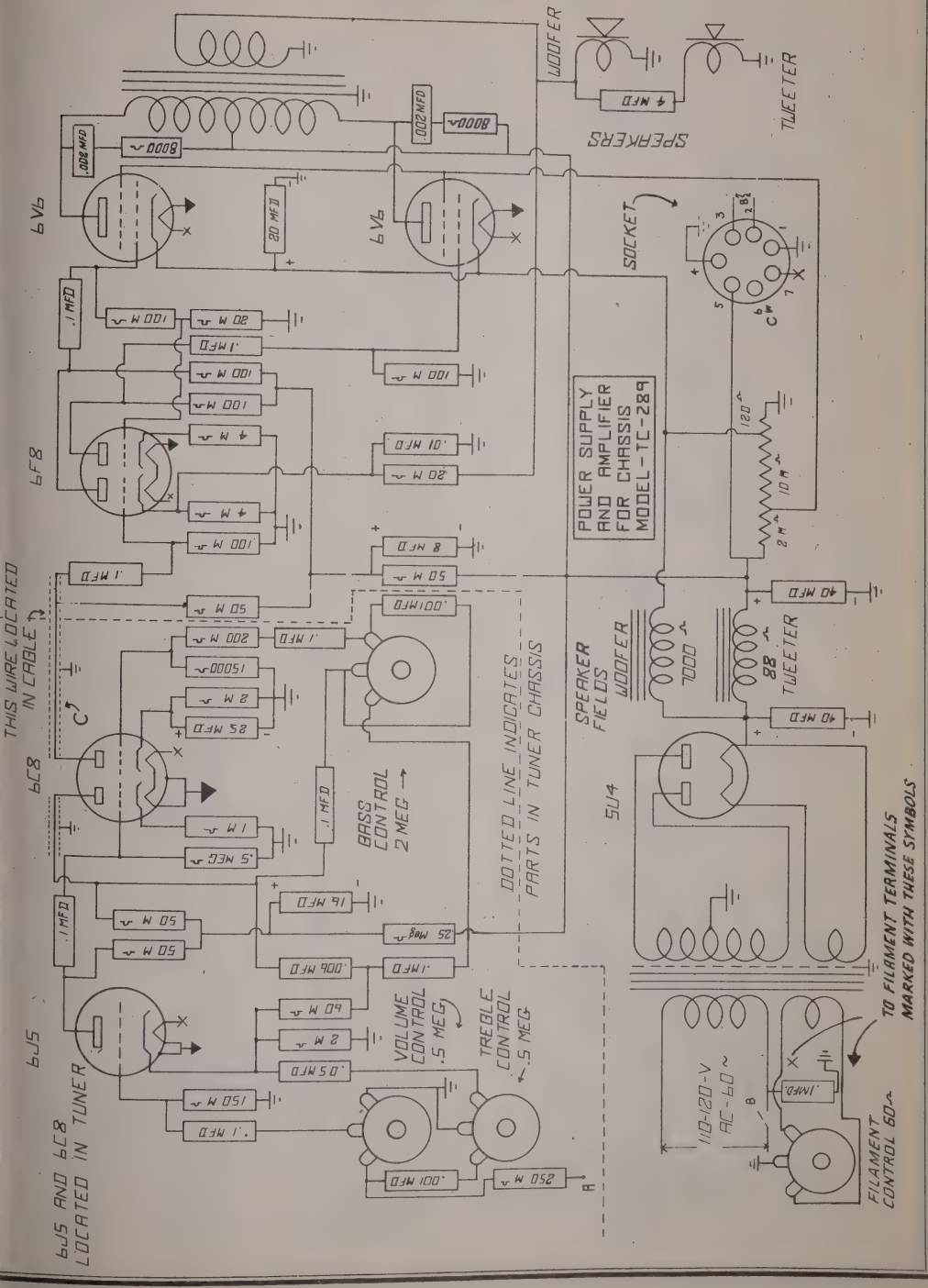
MODELS TC266, TC287
TC288, TC299



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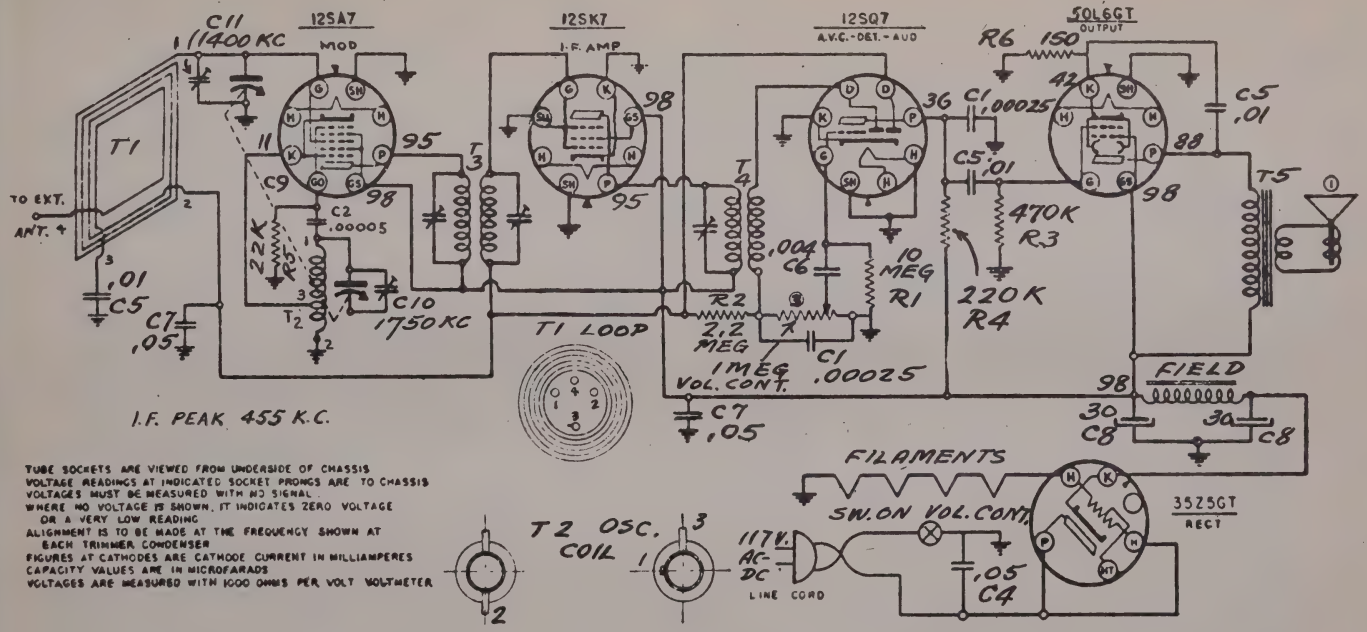

TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL
WHERE NO VOLTAGE IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES
CAPACITY VALUES ARE IN MICROFARADS
VOLTAGES ARE MEASURED WITH 1000 OHMS PER VOLT VOLTMETER

CODE	PART NO.	DESCRIPTION
R 1	60-193	10 MEGOHM 1/4 WATT RESISTOR
R 2	60-179	2.2 " " "
R 3	60-178	470K OHMS " "
R 4	60-180	220K " " "
R 5	60-185	22K " " "
R 6	60-184	150 " " "
R 7		
R 8	60-	
R 9	60-	
R 10		

CODE	PART NO.	DESCRIPTION
C 1	1506	.00025 MFD. MICA CONDENSER
C 2	1503	.00005 " "
C 3		
C 4	1607	.05 MFD 400 V TUBULAR CONDENSER
C 5	16-119	.01 " " " "
C 6	16-123	.004 " " " "
C 7	1622	.05 " 200 V. " "
C 8	18-266	30 x 30 MFD. 150 W.V. ELECTROLYTIC
C 9	19-173	2 GANG VARIABLE CONDENSER (ALSO C10

CODE	PART NO.	DESCRIPTION 2-50
T 1	82-81	LOOP ANTENNA
T 2	10-581	OSCILLATOR COIL
T 3	10-382	1ST I.F. TRANSFORMER
T 4	10-386	2ND I.F. TRANSFORMER
T 5		OUTPUT TRANS (ON SPEAKER)
1	79-321	4" DYN SPEAKER
3	24-157	1 MEGOHM VOLUME CONTROL (WITH SW)

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LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

MODEL C-38

11 TUBE A.C. RECEIVER
3 BAND
USED ON
3119 C-38
DRAWN BY
CHECKED BY
6V6
6U8
6Q6
6H6
80
TO FIELD
ANT. COMPENSATORS
OSC. COMPENSATORS
PUSH BUTTON TUNING UNIT
SW. 22.5 MC. - 5.8 MC. 13.3 METERS - 51.8 METERS
P. 8.35 MC. - 2.1 MC. 36 METERS - 136.5 METERS
B.C. 1.720 MC. - .549 MC. 174 METERS - 532 METERS
C-1 100 MMF. MICA
C-2 .004 MF. PAPER
C-3 .006 MF. PAPER
C-4 .001 MF. MICA 3%
C-5 .0001 MF. 600 V. TUBULAR
C-6 .05 MF. 200 V.
C-7 500 MMF. MICA
C-8 .005 MF. 200 V.
C-9 .1 MF. 400 V. TUBULAR
C-10 .0001 MF. MICA
C-11 .25 MF. 400 V. TUBULAR
C-12 .25 MF. 400 V. TUBULAR
C-13 100 MMF. MICA
C-14 .05 MF. 400 V.
C-15 100 MMF. MICA
C-16 .05 MF. 400 V.
C-17 .05 MF. 200 V.
C-18 100 MMF. MICA
C-19 .005 MF. 400 V. TUBULAR
C-20 .1 MF. 400 V. TUBULAR
C-21 .1 MF. 400 V. TUBULAR
C-22 8 MF. 450 V. ELECTROLYTIC
C-23 .1 MF. 400 V. TUBULAR
C-24 .1 MF. 400 V. TUBULAR
C-25 .25 MF. 200 V.
C-26 .005 MF. 400 V.
C-27 .05 MF. 400 V.
C-28 .25 MF. 400 V.
C-29 16 MF. 450 V. WET ELECTROLYTIC
C-30 .01 MF. 400 V. TUBULAR
C-31 .01 MF. 400 V. TUBULAR
C-32 30 MMF. TRIMMER
C-33 } 8 MF. 15 MMF.
C-34 } TRIMMER
C-35 } 365 MMF. MAX.
C-36 } VARIABLE
C-37 } 500 MMF. PADDER
C-38 } 1300 MMF. PADDER
C-39 } DUAL 12 MMF TRIMMER COND.
C-40 }
C-41 }
C-42 }
C-43 }
C-44 }
R-1 1 MEG.
R-2 50 Ω.
R-3 500,000 Ω.
R-4 100 Ω.
R-5 3500 Ω.
R-6 3500 Ω.
R-7 10,000 1 WATT
R-8 1 MEG.
R-9 400,000 1 WATT
R-10 .5 MEG.
R-11 15000 Ω.
R-12 1 MEG VOL. CONT. TAP AT 150,000 Ω.
R-13 1 MEG.
R-14 1 MEG.
R-15 1 MEG TONE CONTROL
R-16 400 Ω.
R-17 400 Ω.
R-18 1 MEG.
R-19 350,000 Ω.
R-20 3500 Ω.
R-21 50,000 Ω.
R-22 50,000 Ω.
R-23 100,000 Ω.
R-24 100,000 Ω.
R-25 50,000 Ω.
R-26 1000 Ω.
R-27 1000 Ω.
R-28 50,000 Ω.
R-29 100,000 Ω.
R-30 100,000 Ω.
R-31 50,000 Ω.
R-32 50,000 Ω.
R-33 100 Ω.
R-34 100 Ω.
R-35 100 Ω. 3 WATT
L-1 } ANTENNA COILS # 1.139
L-2 } CHOKE
L-3 } 2 BAND ANT COIL
L-4 } #1.617
L-5 }
L-6 } 2 BAND OSC. COIL
L-7 } # 1.139
L-8 } POLICE BAND ANT COIL # 1.231
L-9 }
L-10 }
L-11 } POLICE BAND OSC COIL
L-12 }
L-13 1000 Ω. SPEAKER COIL
T-1 INPUT I.F. # 1.163
T-2 OUTPUT I.F. # 1.164
T-3 OUTPUT TRANSF. ON SPEAKER
T-4 POWER TRANSF. UTC # 9.102
POWER TRANSF. MULTIPLIER 40 N # 9.103

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MODEL C-38

LAFAYETTE RADIO
RADIO WIRE TELEVISION, INC.

SERVICE INSTRUCTION

Re alignment of this receiver should not be attempted unless all other possible causes have been tho roughly investigated. An accurately calibrated signal generator which will cover the necessary wave bands, and an output meter for indicating the effect of adjustments are required.

During the alignment proceedure all adjustments should be made under the following conditions.

1) Volume and Tone control at maximum volume positions.
2) Minimum Input from signal generator.
3) The change-over switch should be turned to the right or MANUAL position
If this proceedure is not adhered to, all adjustments will appear very broad. This is due to the action of the automatic volume control.

I.F. ADJUSTMENT The signal generator is set at 456 KC and is connected to the grid of the coverter tube (6K8) through a .5 MFD condenser. Be sure to connect a resistor of approximately 25,000 ohms be tween the coverter grid and ground so that the grid circuit is at ground potential for D.C.

The band switch should be set at broadcast and the dial set to 550 kc. The Input I.F. transformer trimmers are located at top of chassis on top of I.F. transformer which is between the 6K8 and 6D6 tubes.

Both screws are adjusted for maximum output as indicated by the output meter connected across either the voice coil or the primary coil of the loud speaker.

The output I.F. transformer trimmers are located at top of chassis on top of the I.F. transformer wh is behind the 6D6 I.F. tube, adjust the trimmers for maximum output as indicated on the output me The Input I.F. should now be re-checked for maximum output.

SHORT-WAVE BAND #1 ADJUSTMENT.
Set the band switch to the extreme right-hand position which is short wave band #1. Turn the dial control knob to the extreme high frequency end so that the condenser plates are entirely out of mesh. The signal generator is connected to the "short-antenna" lead through a dummy antenna consisting of a 250 MMFD condenser and a 400 ohm non-inductive resistor in series. With the generator set at 22.5 MC the short wave oscillator trimmer is opened until a response is heard. The trimmer condenser is then opened further (capacity reduced) until a second response is heard. This response (with trimmer at low capacity) is the correct response to use, the other being the image.

Set the generator at (19MC) turn the condenser until a response is indicated. The pointer should co incide with the 19MC mark on the dial. Adjust the antenna trimmer for the short-wave band (located on the antenna coil, which is under the chassis behind the dial drive shaft) for maximum output while rocking the condenser gang from left to right.

BROADCAST BAND
The dummy antenna for this band consists of only a 250 MMFD Condenser. Set the Band Switch in the Br cast position and condenser plates completely out of mesh.

Set the signal generator at 1720 KC and adjust the broadcast oscillator trimmer located to the right of the variable condenser. The oscillator is the front trimmer, until a response is indicated on the output meter. The generator is now set at 1500 KC. Turn the variable condenser until a response is indicated. The dial pointer should now coincide with the 1500 KC mark on the dial.

Set the generator at 600 KC and turn the variable condenser control until a response is indicated. Adjust the broadcast oscillator padder condenser (Located behind the variable condenser. The left han padder screw is the one for broadcast) for maximum response while "rocking" the gang condenser. The high frequency adjustments should now be rechecked.

SHORT WAVE BAND #2
Set the band switch to the middle-position. Turn the dial control knob to the extreme high frequency end so that the condenser plates are entirely out of mesh. The signal generator is left connected as for band #1. The generator is set at 6.25 MC and the band #2 oscillator trimmer is opened until a res ponse is indicated at the lower capacity setting of the trimmer.

Set the generator at 6MC and turn the variable condenser until a response is indicated. The pointer should now coincide with the 6.0 MC mark on the dial. The antenna trimmer is then adjusted for maxi mum output while the condenser gang is rocked from right to left.

Set the generator at 2.4 MC and turn the variable condenser knob until a response is indicated. The padder for this band, (which is the right-hand padder screw behind the variable condenser) is now ad justed for maximum output while rocking the condenser gang from left to right. The high frequency ad justments should then be rechecked.

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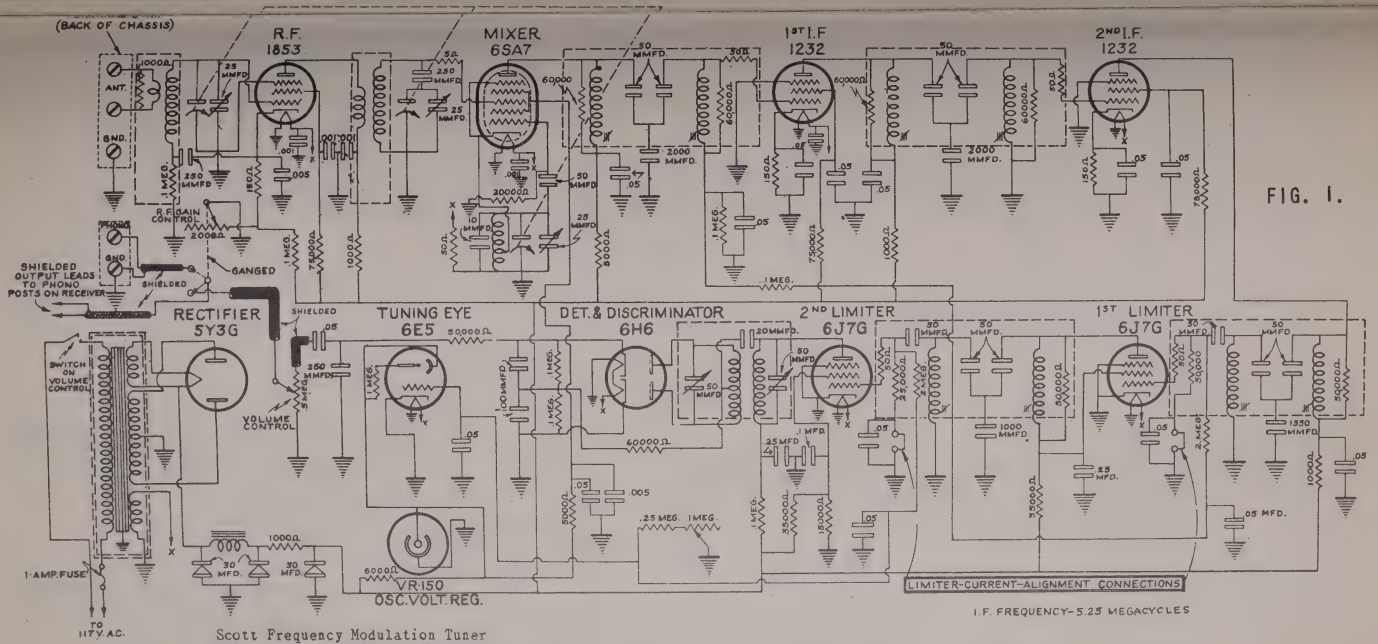

FIG. 1.

Scott Frequency Modulation Tuner
Scott Phantom Deluxe FM-AM Combination
Scott Philharmonic FM-AM Combination
Scott Masterpiece FM-AM Combination

It has been possible to combine the instructions for all of these receivers because of the fact that the same basic FM circuit is used in all models. Hence the alignment procedure and performance characteristics in the FM sections do not differ appreciably. Variations in circuit features of the different models are discussed in the section dealing with the description of electrical circuit features.

ELECTRICAL AND MECHANICAL DATA

VOLTAGES AND CURRENTS FOR F.M. TUNER

Tube Type	Function	E_f	E_k	E_{g1}	E_{gs}	E_p
	Function					
1853	1st R.F. Amplifier	5.9	1.2	105	0	230
6SA7	Mixer - Oscillator	5.9	0	102	-	225
1232	1st I.F. Amplifier	5.9	1.2	87	0	230
1232	2nd I.F. Amplifier	5.9	1.2	85	0	230
6J7G	1st Limiter	5.9	0	75	0	75
6J7G	2nd Limiter	5.9	0	60	0	45
6H6	Detector	5.9	0			

Power Consumption

F.M. Philharmonic	270 watts
F.M. Phantom	220 "
F.M. Masterpiece	150 "
F.M. Tuner	60 "

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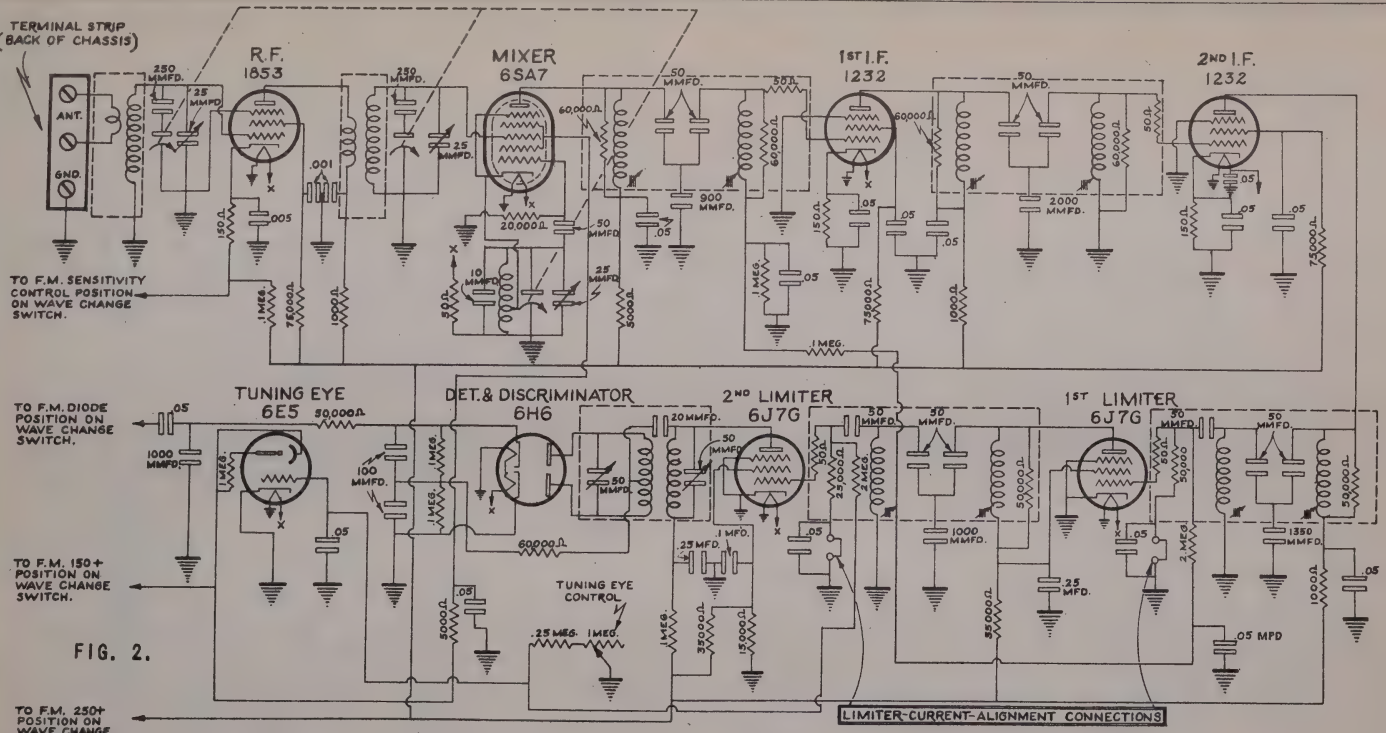

TERMINAL STRIP (BACK OF CHASSIS)
ANT.
GND.
R.F. 1853
MIXER 6SA7
1ST I.F. 1232
2ND I.F. 1232
TO F.M. SENSITIVITY CONTROL POSITION ON WAVE CHANGE SWITCH.
TUNING EYE 6E5
DET. & DISCRIMINATOR 6H6
2ND LIMITER 6J7G
1ST LIMITER 6J7G
TO F.M. DIODE POSITION ON WAVE CHANGE SWITCH.
TO F.M. 150+ POSITION ON WAVE CHANGE SWITCH.
TUNING EYE CONTROL
TO F.M. 250+ POSITION ON WAVE CHANGE SWITCH.
LIMITER-CURRENT-ALIGNMENT CONNECTIONS
I.F. FREQUENCY- 5.25 MEGACYCLES

FIG. 2.

F. M. Circuit of Phantom Deluxe

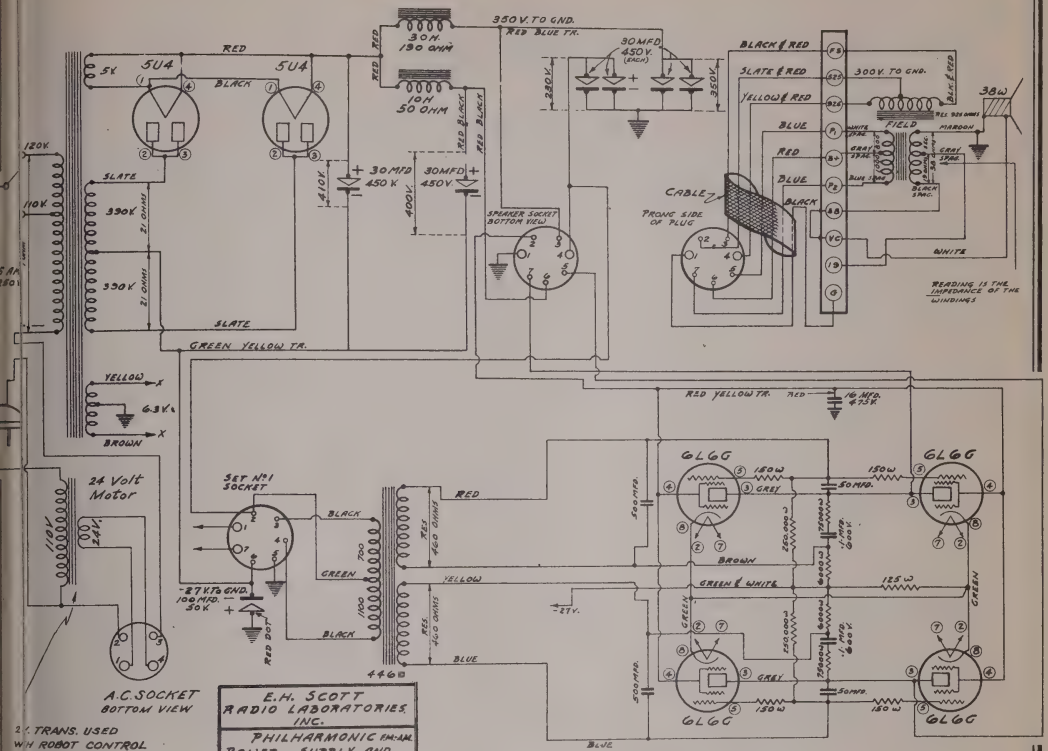
GENERAL

The Scott FM Tuner and Combinations are superheterodyne receivers covering a tuning range of 41 to 50 megacycles for wide band frequency modulation reception. A single high gain r. f. stage with an 1853 type high mutual conductance pentode is employed in all sets, except the Philharmonic where two stages of this type provide maximum signal-to-noise ratio and maximum image and spurious signal rejection. Dipole or doublet connections to the antenna primary may be made by removing the ground wire connected to one side of the winding.

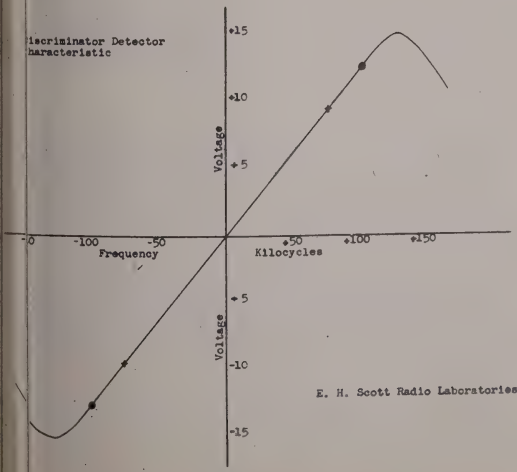
Special FM circuit developments include a voltage and temperature stabilized oscillator system - high frequency i. f. for maximum image signal rejection ratio - high sensitivity level for weak signal limiting - cascaded limiting stages for maximum range of flat limiter action - cathode ray tuning indication - eight tuned circuits at the intermediate frequency for maximum adjacent channel selectivity - R. F. gain control to prevent overloading on high signal levels - air tuned discriminator circuit of high sensitivity.

E. H. SCOTT RADIO LABS., INC.

MODEL Philharmonic Combination

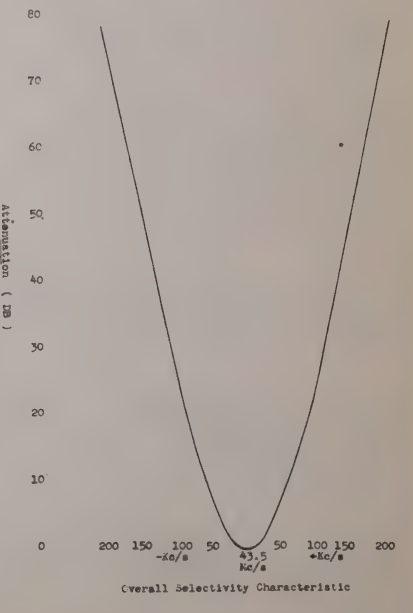


E. H. SCOTT RADIO LABORATORIES, INC.	
PHILHARMONIC FM-AM POWER SUPPLY AND POWER AMPLIFIER	
DRAWN BY	R.G.P.
CHECKED BY	
APPROVED BY	
DATE:	10-24-40



E. H. Scott Radio Laboratories, Inc.

FIG. 5.



Overall Selectivity Characteristic

FIG. 6.

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MODEL FM

E. H. SCOTT RADIO LABS., INC.

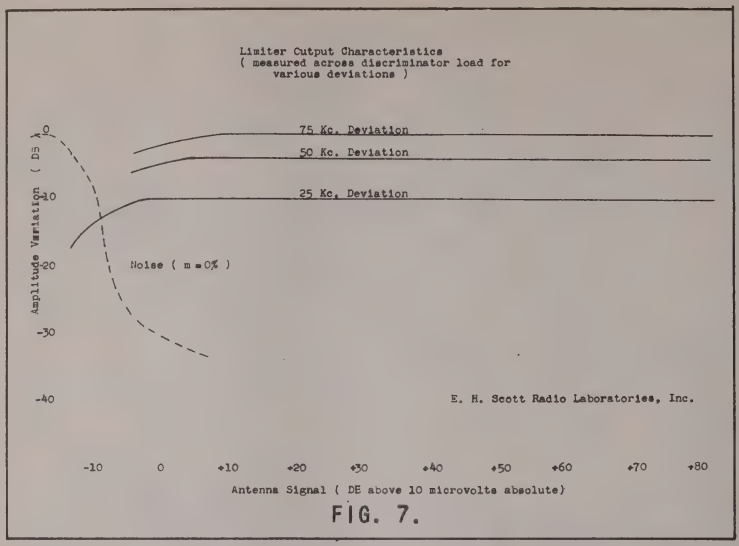

FIG. 7.

THE LIMITING STAGES

The third and fourth i. f. stages, or the first and second limiters respectively employ 6J7G tubes, whose characteristics are most suitable for providing a flat limiting action once the signal has reached sufficient amplitude to cause this characteristic to come into play. By using a cascade arrangement of these tubes, weak signals can produce limiting action at the second limiter and stronger signals cause both limiters to act on various impulse noises, such as ignition, arcs, etc

A factor of considerable importance in the limiting of ignition and other fast types of impulse noise is the time constant of the limiter grid leak-condenser combination. The first limiter has a grid circuit time constant of 2.5 microseconds and the second has a constant of 1.25 microseconds, thus insuring a fast action on noises possessing a steep wavefront.

A perfect degree of limiter flatness, once the action begins, is obtained by the proper choice of limiter plate and screen grid voltages.

THE DISCRIMINATOR-DETECTOR

A phase bridge type of frequency discriminator circuit is interposed between the plate of the second 6J7G limiter tube and the 6H6 diode detectors. Both the primary and secondary are tuned by means of air trimmers and are inductively coupled to a degree necessary for the proper discriminator peak separation, which is approximately 250 kc. Thus on either side of resonance the discriminator characteristic extends about 125 kc. before a peak is reached. Linearity up to $\pm$100 kc. is maintained so that a margin of safety for overmodulation beyond $\pm$ 75 kc. at the transmitter is possible without distortion.

The balanced detector action of the 6H6 diodes acts to cancel amplitude modulation present on weak signals and both diodes must be in proper condition to maintain the balance of discriminator symmetry. Conversion from frequency to amplitude modulation is achieved uniformly from 30 to 15000 cycles and the pre-emphasis of high audio frequencies at the transmitter is corrected by means of a resistance-capacity network directly following the diode load.

TUNING INDICATION

The control grid of a 6E5 "magic eye" tuning indicator is fed through a voltage divider and audio filte from the grid leak resistor of the 2nd limiter stage. The tuning indication provided by this arrangement is similar to that obtained from the indicator used in the amplitude modulation bands; that is, th correct tuning point occurs when the eye shadow is closed to the fullest extent. This method is based upon the fact that the peak of the i f. selectivity curve coincides with the zero voltage point on the discriminator characteristic.

The adjustment of the shadow on this indicator is made in a similiar manner to that employed in the amplitude modulation bands The control grid voltage on the 6E5 in this band is regulated by a potentiometer in the grid circuit of that tube. It should be adjusted so that the shadow eye is just closed for signals having a strength of approximately 100.000 microvolts.

In the combination receivers the operation of the tuning indicator in the AM bands is unchanged.

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VOLTAGE REGULATION

VR150 type tube supplies 150 volts to the plate of the 6E5 tuning indicator to prevent shifting of he zero setting of the shadow angle under varying voltage conditions, and 100 volts through a esistance-capacity filter to the oscillator section of the 6SA7 mixer.

AUDIO AMPLIFIERS (COMBINATION RECEIVERS)

n the Phantom and Philharmonic FM-AM models the basic features of the original amplifiers, with the xception of the high frequency compensation, have been retained. Owing to the fact that both the ew single speaker and the three speaker combination provide a considerably better high frequency esponse than was obtainable previously, it was decided to eliminate the high boost choke and to eplace it with a resistor. Thus, the electrical audio fidelity is substantially flat for F. M. re- roduction and is somewhat better than was previously attainable with the old speakers in the AM positions.

udio filters have been added to prevent the FM limiters from feeding noise voltages through the "B" supply.

n the Philharmonic FM-AM receiver the audio system has been rearranged and the volume range expander has een eliminated in order to make room for the FM components on the same chassis as used previously.

AUDIO TONE CONTROLS

n all of the combination receivers the tone controls operate as usual in the AM bands. In the FM osition the treble control operates to attenuate the high audio frequencies much the same as with M. However, the bass control in the FM band operates only to vary the amplitude of the low frequency ompensation provided by the low boost choke. This action results in a variation of the bass response ound 100 cycles and does not affect the low frequency response over as wide a range as is the case n the AM positions. This arrangement is used so that the electrical fidelity of the receiver is ubstantially flat when the bass control is fully retarded and the treble control is fully advanced. he cabinet or speaker system, of course, can alter the response from its true electrical fidelity haracteristic.

POWER SUPPLIES

he power supply of the Scott FM Tuner is self contained, employing a 5Y3G rectifier and power trans- rmer for 60 cycle operation. A combination choke and resistance filter is used for audio hum elimina- ion in the B supply. To prevent the pickup of induction hum in the oscillator and mixer circuit a uble magnetic shield is placed over the power transformer.

the combination models the conventional power supply in its usual position furnishes voltage and rrent for both the AM and FM sections

THE WIDE RANGE LOUDSPEAKER SYSTEM

order to reproduce audio frequencies above 8500 cycles with better fidelity a combination loud- eaker system, consisting of 1 - 12 inch low frequency unit and 2 - 5 inch tweeter type high frequency its has been introduced. To provide minimum distortion and maximum power handling capacity a con- ant resistance filter network is used to feed all frequencies below 2000 cycles to the L. F eaker and all frequencies above 2000 cycles to the H. F speakers A wiring diagram and schematic rcuit of the filter system is shown in Figure 9. This speaker system may be used on AM programs well as FM programs with beneficial results.

SERVICE PROCEDURE

the AM and audio portions of the combination receivers the same service procedure as outlined in he service manuals should be applied to each of the respective AM sets.

ALIGNMENT PROCEDURE FOR FM TUNER AND FM SECTIONS OF COMBINATION RECEIVERS

o provide a better understanding of the performance characteristics to be attained when the FM ection of a Scott receiver is properly aligned the following curves are shown:

Figure 5 Discriminator Characteristic
Figure 6 I. F. Selectivity Characteristic
Figure 7 Limiter Output Characteristic

hese curves have been obtained with Scott receivers at the factory and alignment in service hould produce substantially the same results, although slight variations in the selectivity f discriminator characteristic can be tolerated with no audible difference in performance. eference to these curves should be helpful to the serviceman in familiarizing himself with he desirable FM characteristics.

DISCRIMINATOR ALIGNMENT

fter removing the chassis bottom plate the discriminator alignment point can be readily located. t will be found on the 6H6 socket at terminal #4 or after the 50,000 ohms resistor in series with his point. A circuit diagram of the connections for this operation is shown in Figure 10. Connect he zero center microammeter with series resistor as shown and connect the output of the I. F. ignal generator (tuned to 5 25 mc.) through a .05 mfd. condenser to the grid cap of the 2nd 6J7G imiter. If the generator has a high output impedance, the grid cap and lead of the 6J7G should be

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removed and instead a 1 megohm grid leak should be inserted. Increase the output of the I. F. signal generator to the 2 or 3 volt level. Rotate the plate trimmer condenser at the top of the discriminator transformer shield can until the zero center microammeter swings to a maximum deflection in either direction from zero. Then rotate the secondary trimmer condenser at the bottom of the discriminator transformer until the meter indicator swings through zero with increasing or decreasing current depending upon the direction of rotation of the trimmer adjustment. Adjust for zero meter indication under these conditions.

Detune the signal generator back and forth about ±150 kc. If the discriminator circuit is operating properly the indicator meter will swing through a positive peak in one direction and through a negative peak in the other direction. However, these peaks may not be of equal amplitude They can now be adjusted for equality by going back to the plate trimmer at the top of the discriminator transformer and making a slight readjustment. If the high frequency peak is of greater amplitude than the low frequency peak, the plate trimmer should be readjusted so that the amplitude of the former is reduced slightly. Then by detuning the generator back and forth the low frequency peak will be seen to have increased. By compromising between the two peak levels and going back over the plate trimmer adjustment the serviceman will soon find that it is relatively simple to attain peak equality in the discriminator circuit.

The peaks should be about 250 kc apart or ±125 kc. from the resonance frequency, which is 5.25 mc., and the variation of the zero center meter current should be linear on either side up to at least ±80 kc. The final goal of discriminator alignment is to attain this linearity over at least ±80 kc. and after obtaining peak linearity, the serviceman should finally readjust the plate trimmer slightly to obtain this result even at a sacrifice of peak equality. The linearity and equality of the ±80 kc. deviation characteristics are essential to distortionless audio reproduction for a wide band FM receiver. If it is found to be linear out to ±100 kc. when finally adjusted, it is so much the better to allow for overmodulation at the transmitter.

When the adjustment of the discriminator transformer is completed the zero center meter should indicate zero when the signal generator is tuned to 5.25 megacycles.

The general shape of the discriminator characteristic should resemble that shown in Figure 5.

I. F. AMPLIFIER ALIGNMENT

The 0-1 ma. milliammeter should be inserted in the ground side of the 25,000 ohms grid leak in the input circuit of the 2nd 6J7G limiter tube. A jumper connection and by-pass condenser have been provided under the chassis at this point in each receiver. In the FM Tuner it is located under the fourth i. f. transformer, near the socket of the 2nd 6J7G and the combination receivers it is under the FM extension section near the fourth i. f. transformer. The wire from the i. f. transformer is color-coded slate and white.

After the meter is inserted the i. f. signal generator (tuned to 5 25 mc.) should be connected through a .05 mfd. condenser to the grid cap of the 1st 6J7G limiter and the primary and secondary alignment screws of the fourth i. f. transformer should be adjusted for maximum limiter grid leak current. The output of the signal generator should be adjusted so that the limiter current is about .2 milliamperes while the tuning adjustments are being made. Since it is possible to align the i. f. coils with the cores either out or in, it is important to make sure that they are peaked with the adjustment screws in the outward position in order to insure proper coupling between the coils. The receivers in the field will be found to have their adjustments made in this manner.

The third, second and first i. f. transformers should be aligned in this order by moving the signal generator input progressively forward to the 2nd 1232, 1st 1232 and the 6SA7 grid. All of these connections are on the respective sockets, because of the single-ended construction of these tubes. Each transformer alignment screw should be adjusted for maximum 2nd limiter grid current, as the signal input is fed into the amplifying tube directly in front of it. After all of these adjustments have been made, the individual stages should not be realigned except by the above procedure, that is, the i. f. adjustments should be made individually for each stage by the point-to-point method and no overall readjustments should be made.

The overall i. f. selectivity characteristic may be checked by detuning the signal generator at least ±75 kc or more from the 5 25 mc. point and observing the amount of attenuation. The characteristic should resemble the curve shown in Figure 6 However, a certain amount of dissymmetry can be tolerated as indicated in that figure, because of the limiting characteristic of the Scott receivers.

R. F. CIRCUIT ALIGNMENT

With the 0-1 ma. meter in the 2nd limiter grid leak circuit, connect the R. F. Signal Generator output through a .05 mfd. condenser to the grid terminal of the 6SA7 mixer tube. Observe whether the dial pointer stops at 41 mc. when it is turned fully to the end of the scale. If it does not, slide it along the drive cable until that condition exists when against the stop at that end. Then turn the tuning knob to rotate the pointer to 50 mc. and adjust the signal generator for a 50 mc. signal. With sufficient output from the generator to enable an easy location of the signal (1000 to 5000 microvolts) rotate the oscillator trimmer until a peak of limiter grid current is reached. The oscillator must be peaked on the low frequency side of the incoming signal and, while the capacity values in the oscillator circuit are such that it is difficult to align on the high frequency side, this condition might happen if some defective part should be present. Therefore, the best procedure is to make sure that the oscillator is on the low frequency side by observing that the image signal is on that side. This check can be made rather easily after a peak is reached by simply tuning the signal generator to approximately 39.5 mc. and noting that a repeat signal of about equal intensity comes in at that point. When this check shows the correct alignment, the oscillator is properly adjusted.

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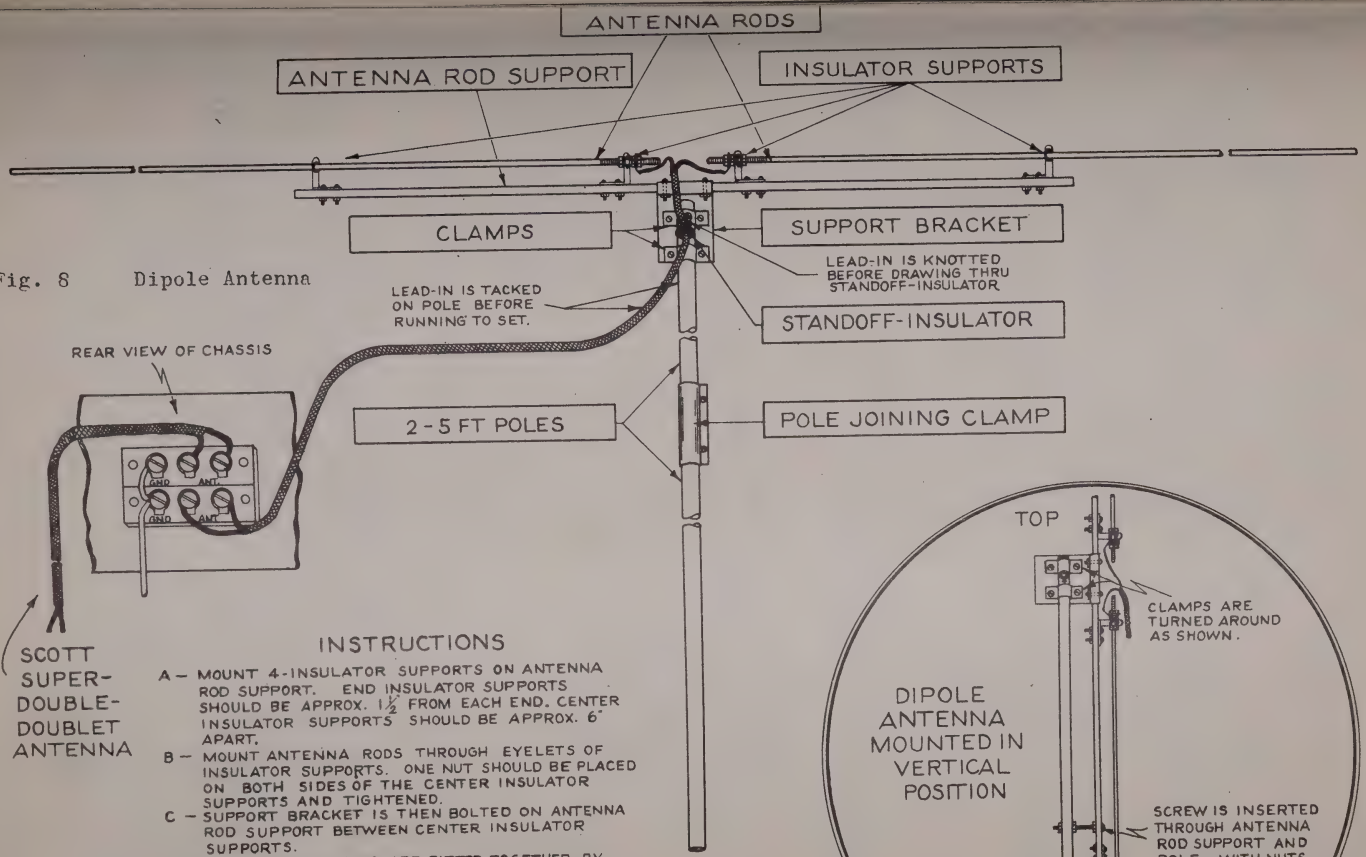


Fig. 8 Dipole Antenna

INSTRUCTIONS

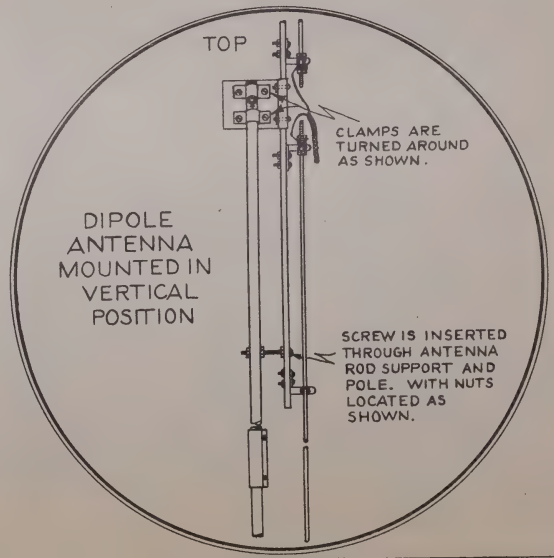
A – MOUNT 4-INSULATOR SUPPORTS ON ANTENNA ROD SUPPORT. END INSULATOR SUPPORTS SHOULD BE APPROX. 1½ FROM EACH END. CENTER INSULATOR SUPPORTS SHOULD BE APPROX. 6" APART.

B – MOUNT ANTENNA RODS THROUGH EYELETS OF INSULATOR SUPPORTS. ONE NUT SHOULD BE PLACED ON BOTH SIDES OF THE CENTER INSULATOR SUPPORTS AND TIGHTENED.

C – SUPPORT BRACKET IS THEN BOLTED ON ANTENNA ROD SUPPORT BETWEEN CENTER INSULATOR SUPPORTS.

D – THE TWO 5-FT. POLES ARE FITTED TOGETHER BY THE POLE JOINING CLAMP AND THEN BOLTED ON THE SUPPORT BRACKET BY CLAMPS

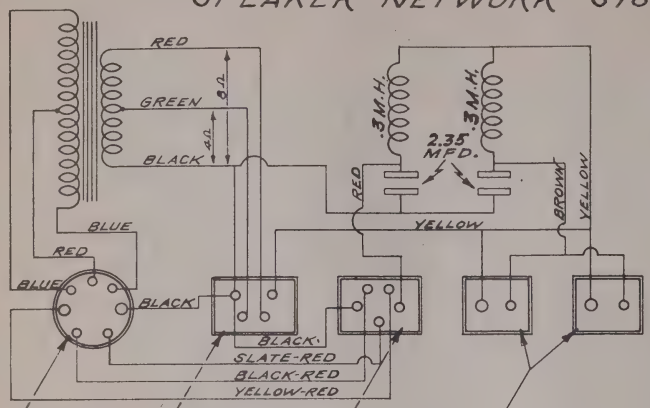
E – FINALLY, FIT LEADS WITH TERMINALS ON ANTENNA RODS AND TIGHTEN WITH NUT.

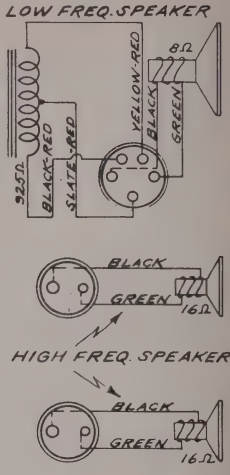

TOP
CLAMPS ARE TURNED AROUND AS SHOWN.
DIPOLE ANTENNA MOUNTED IN VERTICAL POSITION
SCREW IS INSERTED THROUGH ANTENNA ROD SUPPORT AND POLE. WITH NUTS LOCATED AS SHOWN.

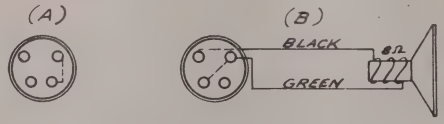
SCOTT

DIPOLE ANTENNA ASSEMBLY

SPEAKER NETWORK SYSTEM







NOTE:- PRONG SIDE OR (FRONT VIEW) IS SHOWN ON ALL PLUGS.

EXTENSION SPEAKER

WHEN EXTENSION SPEAKER IS NOT USED PLUG IS WIRED AS SHOWN AT (A) AND LEFT IN EXTENSION SPEAKER SOCKET.
WHEN AN EXTENSION SPEAKER IS USED PLUG IS WIRED, AS SHOWN AT (B).

FILTER SYSTEM SHOWING VALUES FOR INDUCTANCE AND CAPACITY ARE FOR 6 K.C. AND SUPERCEDES THE VALUES FOR 2K.C WHICH WERE .9 M.H. FOR EACH INDUCTANCE & 7 MFD. FOR EACH CONDENSER.

FIG. 9.

ALIGNMENT CONNECTIONS FOR ALL F.M. RECEIVERS

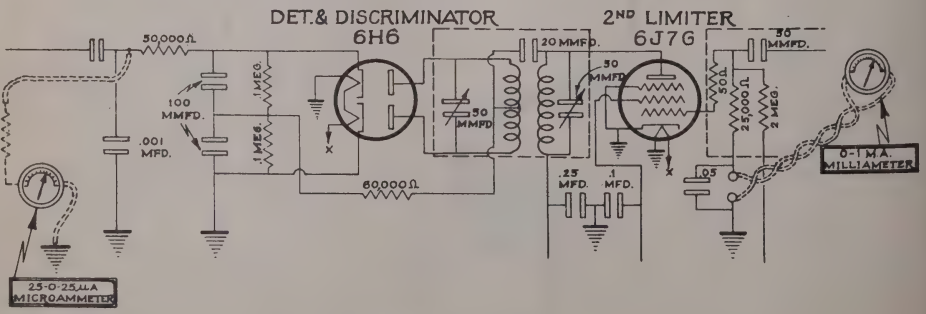


FIG. 10.

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Connect the signal generator output to the grid of the 1853 r. f. tube and align the trimmer of the r. f. circuit following that tube for maximum output, that is, maximum limiter grid current; and proceed to the antenna terminals. In the Philharmonic connect the generator to the r. f. grids moving progressively toward the receiver input point and aligning each trimmer in that order.

The output of the signal generator should be fed to the antenna terminals through a 100 ohms resistor, provided the signal generator has a low internal impedance. If its internal impedance is high, the dummy resistor will have little effect; but a value of 100 ohms can still be used to avoid a complete short-circuit of the generator output If one side of the generator output is grounded, the receiver antenna terminal adjacent to the ground terminal should also be connected to ground by the jumper wire. With signal generator still tuned to 50 mc. the antenna shunt trimmer should be aligned for maximum limiter grid current.

After this alignment at the high frequency end of the band is completed the dial should be rotated to the low frequency end, about 43 mc., and the sensitivity level at that point should be compared with that which was noted at 50 mc. It should be substantially the same. Since fixed padding condensers are used in the antenna and r. f. circuits, a lack of sensitivity would indicate that the value of one of these might have changed or that the inductance of the coils might have shifted. An examination of these parts and the replacement of any defective ones should restore the sensitivity to normal. If the r. f. or antenna secondary inductance is slightly off, this may be remedied by pushing end turns slightly to obtain maximum sensitivity.

The r. f. signal generator output should be kept at a level which results in a 2nd limiter grid current of about . 2 milliamperes during the alignment operations.

OBSERVATION OF LIMITER OPERATION

When the r. f. alignment is completed it is important to observe that the limiters are functioning properly. The characteristic shown in Figure 7 indicates that a high degree of flatness of this characteristic can be expected. This action can be observed best by detuning the r. f. generator either + 75 kc. or - 75 kc. with the zero center meter connected across the discriminator load as was done for the alignment of that circuit

Set the output of the r. f. signal generator to about 25 microvolts and observe the reading of the zero center meter. Then increase the output of the generator to the full 100,000 microvolts and observe the meter reading as this change is made. It should remain substantially constant. If it changes noticeably, the limiter tubes may be defective or their supply resistors may have become defective. Another cause for change in this reading is oscillator frequency shift due to a defective 6SA7. However, the latter defect will manifest itself in a different way and can be definitely isolated by tuning the signal generator to resonance which is indicated by zero discriminator voltage, and observing whether this zero point shifts when the signal level is varied from 25 to 100,000 microvolts If the oscillator frequency remains constant with varying signal input, the zero center point will not vary.

If the limiter characteristic is not flat, distortion will be noticed and the noise elimination will be somewhat less complete than normal

The following equipment is necessary for the accurate alignment of the FM sections of all Scott receivers:

1 - 0-1 ma d c. milliameter

1 - 25-0-25 ma. d c. microammeter with 500,000 ohms series resistor

1 - I. F. Signal Generator having a frequency range of at least 5 to 5.5 megacycles with maximum dial bandspread and 100 microvolts or less minimum to 2 or 3 volts maximum output voltage. Modulation unnecessary

1 - R. F. Signal Generator having frequency range of 40 to 50 megacycles with r. f. output attenuator and output range of 1 microvolt to 100,000 microvolts. Modulation not essential, but variable frequency modulation is desirable.

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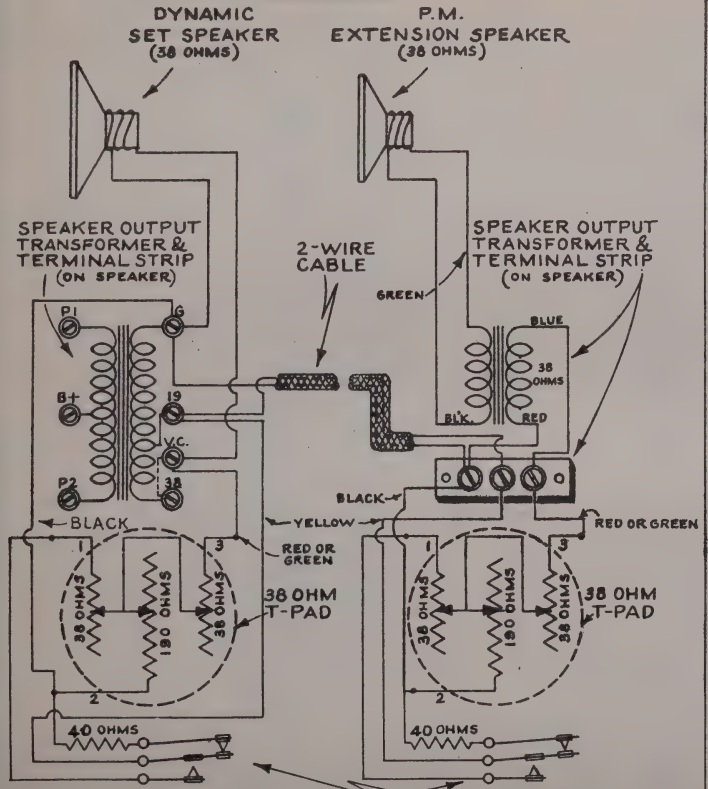
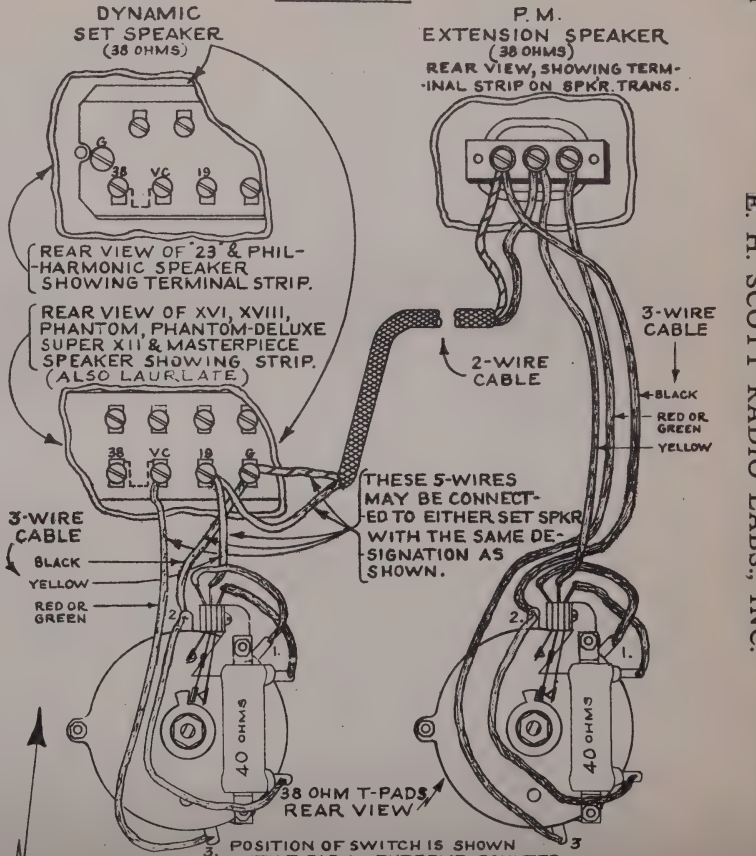
SINGLE SPEAKER & EXTENSION SPEAKER WITH T-PADS

CIRCUIT



SKETCH


DYNAMIC SET SPEAKER (38 OHMS)
P.M. EXTENSION SPEAKER (38 OHMS)
REAR VIEW, SHOWING TERMINAL STRIP ON SPKR. TRANS.
REAR VIEW OF 23 & PHILHARMONIC SPEAKER SHOWING TERMINAL STRIP.
REAR VIEW OF XVI, XVIII, PHANTOM, PHANTOM-DELUXE SUPER XII & MASTERPIECE SPEAKER SHOWING STRIP. (ALSO LAURLATE)
2-WIRE CABLE
3-WIRE CABLE
BLACK
RED OR GREEN
YELLOW
THESE 5-WIRES MAY BE CONNECTED TO EITHER SET SPKR WITH THE SAME DESIGNATION AS SHOWN.
3-WIRE CABLE
BLACK
YELLOW
RED OR GREEN
40 OHMS
38 OHM T-PADS REAR VIEW
POSITION OF SWITCH IS SHOWN WITH T-PAD IN EXTREME COUNTER-CLOCKWISE POSITION, LOOKING AT CONTROL SHAFT SIDE, OF T-PAD.

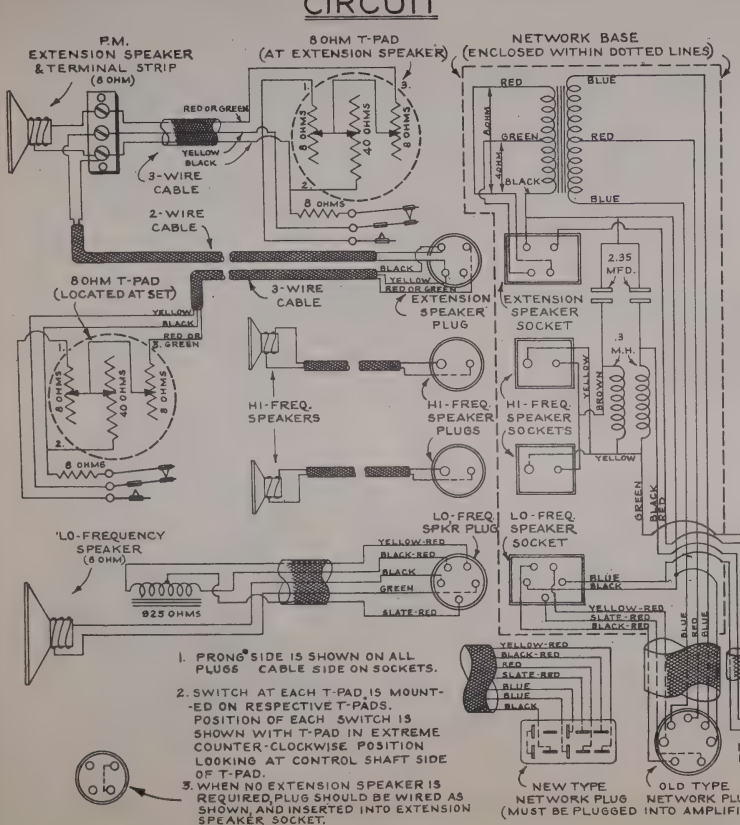
NOTE:—DOTTED LINES SHOW JUMPER WIRE BETWEEN 38 AND V.C. ON SET SPEAKER PLEASE REMOVE WHEN USING THIS CIRCUIT

John F. Rider

NETWORK SPEAKER SYSTEM & EXTENSION SPEAKER WITH T-PADS

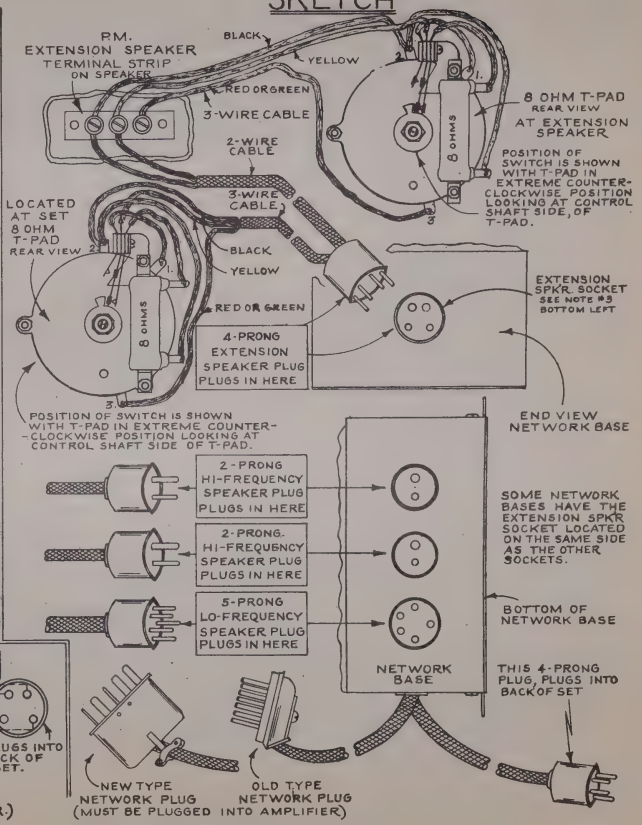
E.H. SCOTT RADIO LABORATORIES INC. CHICAGO

CIRCUIT



1. PRONG SIDE IS SHOWN ON ALL PLUGS CABLE SIDE ON SOCKETS.
2. SWITCH AT EACH T-PAD IS MOUNTED ON RESPECTIVE T-PADS. POSITION OF EACH SWITCH IS SHOWN WITH T-PAD IN EXTREME COUNTER-CLOCKWISE POSITION LOOKING AT CONTROL SHAFT SIDE OF T-PAD.
3. WHEN NO EXTENSION SPEAKER IS REQUIRED, PLUG SHOULD BE WIRED AS SHOWN, AND INSERTED INTO EXTENSION SPEAKER SOCKET.

SKETCH


P.M. EXTENSION SPEAKER TERMINAL STRIP ON SPEAKER
BLACK
YELLOW
RED OR GREEN
3-WIRE CABLE
2-WIRE CABLE
8 OHM T-PAD REAR VIEW AT EXTENSION SPEAKER
POSITION OF SWITCH IS SHOWN WITH T-PAD IN EXTREME COUNTER-CLOCKWISE POSITION LOOKING AT CONTROL SHAFT SIDE, OF T-PAD.
LOCATED AT SET 8 OHM T-PAD REAR VIEW
8 OHMS
EXTENSION SPKR. SOCKET SEE NOTE #3 BOTTOM LEFT
4-PRONG EXTENSION SPEAKER PLUG PLUGS IN HERE
POSITION OF SWITCH IS SHOWN WITH T-PAD IN EXTREME COUNTER-CLOCKWISE POSITION LOOKING AT CONTROL SHAFT SIDE OF T-PAD.
END VIEW NETWORK BASE
2-PRONG HI-FREQUENCY SPEAKER PLUG PLUGS IN HERE
2-PRONG. HI-FREQUENCY SPEAKER PLUG PLUGS IN HERE
5-PRONG LO-FREQUENCY SPEAKER PLUG PLUGS IN HERE
SOME NETWORK BASES HAVE THE EXTENSION SPKR SOCKET LOCATED ON THE SAME SIDE AS THE OTHER SOCKETS.
BOTTOM OF NETWORK BASE
NETWORK BASE
THIS 4-PRONG PLUG, PLUGS INTO BACK OF SET
NEW TYPE NETWORK PLUG (MUST BE PLUGGED
OLD TYPE NETWORK PLUG INTO AMPLIFIER)

E. H. SCOTT RADIO LABS., INC.
SCOTT PAGE 14-15
MODEL FM

MODEL Hi-Fidelity All Wave E. H. SCOTT RADIO LABS., INC.

WHEN REPLACEMENTS ARE REQUIRED BE SURE TO ORDER BY STOCK NUMBERS SHOWN BELOW

Fig. 3

Stock No.	Part
35	Condenser No. 310
75	Grommet - 1/2" No. 430
96	Meter - 0-8
269	Cable - 7 wire, part No. 4
272	Coil - B. P. No. 298 1/25
276	Coil - Blue and red band primary
279	Condenser - .05 mfd. 200 volts
281	Condenser - .1 mfd. 400 V. Tubular new
282	Condenser - trimmer long spacers 11/32 - 50 mmf
295	Condenser - 5000 mmf reg Hole
296	Condenser - Trimmers, No. 8C-465
298	Dial Lights - 6.3 volts - No. 40
299	Drum Dial - for Imperial Model
319	Resistor - 250,000 ohms 1/4 watt
367	Resistor - 1000 ohms 1/4 watt
442	Dial Strips - Imperial
450	Shield - B. P. No. 295
451	Shield - B. P. No. 295-A
468	Strips - B. P. No. 291
477	Transformer - Audio 3088
932	Condenser - No. 858
933	Condenser - No. 878
950	Coil - M. H. 8

15

Fig. 4

15	Brackets - Resistor
45	Condenser - 50 mmfd type S reg
46	Condenser - 100 mmfd type S Regular Bakelite
47	Condenser - 250 mmfd type S Regular Bakelite
49	Condenser - 350 mmfd type S regular Bakelite
76	Grommet - 3/8" - No. 240
108	Resistor - 600 ohms 17058
120	Resistor - 100,000 ohms 1/4 watt
123	Resistor - 500,000 ohms 1/4 watt
124	Resistor - 1,000.000 ohms 1/4 watt
194	Switch - 2 blade with push button ST213
279	Condenser - .05 mfd 200 volt Tubular new
280	Condenser - .1 " " " " "
281	Condenser - .1 " 400 " " "
285	Condenser - 25 mmfd regular bakelite S
295	Condenser - 5000 mmfd regular new type W
319	Resistor - 250,000 ohms 1/4 watt
321	Resistor - 2,000,000 ohms 1/4 watt
364	Potentiometer - Type P 35-2000
366	Resistor - 750 ohms 1/4 watt
367	Resistor - 1000 ohms 1/4 watt
368	Resistor - 1500 ohms 1/4 watt
369	Resistor - 2500 ohms 1/4 watt
370	Resistor - 3500 ohms 1/4 watt
371	Resistor - 5000 ohms 1/4 watt
373	Resistor - 10,000 ohms 1/4 watt
374	Resistor - 15,000 ohms 1/4 watt
386	Resistor - 3,000,000 ohms 1/4 watt
389	Rotor plate - 292 Assembly L
398	Rotor plate - 292A Assembly S
391	Rotor Shaft - Bearing B. P. No. 310
449	Shield - B. P. No. 293
460	Socket - 18 P Special
469	Switch B. P. No. 325
470	Switch E. Spec. 14
492	Volume Control - 7075 - F Spec. 13 - Imperial
498	Shield - No. 5 AF
491	Voltage Divider - X349
897	Potentiometer - 20,000 ohms wire wound type

Fig. 5

49	Condenser
97	Mounting
192	Support
216	Tubing
282	Trimmer Long
283	Trimmer Short
293	Condenser
295	Condenser
437	Condenser
	Broadcast Band Oscillator Coil
	Blue band oscillator coil
	Blue band R. F. coil
	Red band oscillator coil
	Red band R. F. coil
	Green band oscillator coil
	Green band R. F. coil

Fig. 5A

45	Condenser - 50 mmfd. type S. reg.
88	Lugs - No. 1465
270	Can - 2x2x2 No. 01806
273	Coil - B. P. No. 299 Diode
274	Coil - 8 Millihenry
280	Condenser - .1 mfd 200 V
281	Condenser - .1 400 V. Tubular new
283	Condenser - 50 mmfd. V810 new type shor
285	Condenser - 25 mmfd. regular bakelite S
288	Condenser - 75 mmfd. regular bakelite S
367	Resistor - 1000 ohms 1/4 watt
373	Resistor - 10,000 ohms 1/4 watt

LIST OF PARTS FOR AMPLIFIER

Fig. 6

10	Fuse Base - 4 amp
37	Condenser - 2 mfd 200 volt
40	Condenser - 656 - .05 400 volt
72	Fuse - 4 amp
78	Phone Jack
165	Sockets - 2A3
166	Sockets - 5Z3
190	Attenuator Strip
200	Terminal - 1 lug
648	Condenser Bracket
649	Attenuator Bracket - B. P. No. 322
651	Choke - 30 Henry
652	Choke - 10 Henry
654	Choke coil - 3.6 M. H.
655	Choke coil - 72 M. H.
657	Condenser - .1.1 mfd 400 volt
658	Condenser - A.13 mfd 300 volt
660	Condenser - Electrolytic
661	Condenser - Electrolytic - 100 mfd.
665	Fuse - 3/4 Amp.
667	Fuse Base - 3/4
669	Hum Control - 10 ohm
670	Resistor - 10 ohms 1/2 watt
671	Resistor - 150 ohms 10 watt
672	Resistor - 500 ohms 10 watt
675	Socket - Speaker connecting
676	Socket - Set connecting
677	Socket - 83 V
679	Switch - Hi-Low
680	Transformer - Audio
681	Transformer - 110 volt 60 cycles
682	Transformer - 220 volt
683	Transformer - 110 volt 25 cycle
949	Condenser - .25 - .25 1250 volt

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MODEL Hi-Fidelity
All Wave

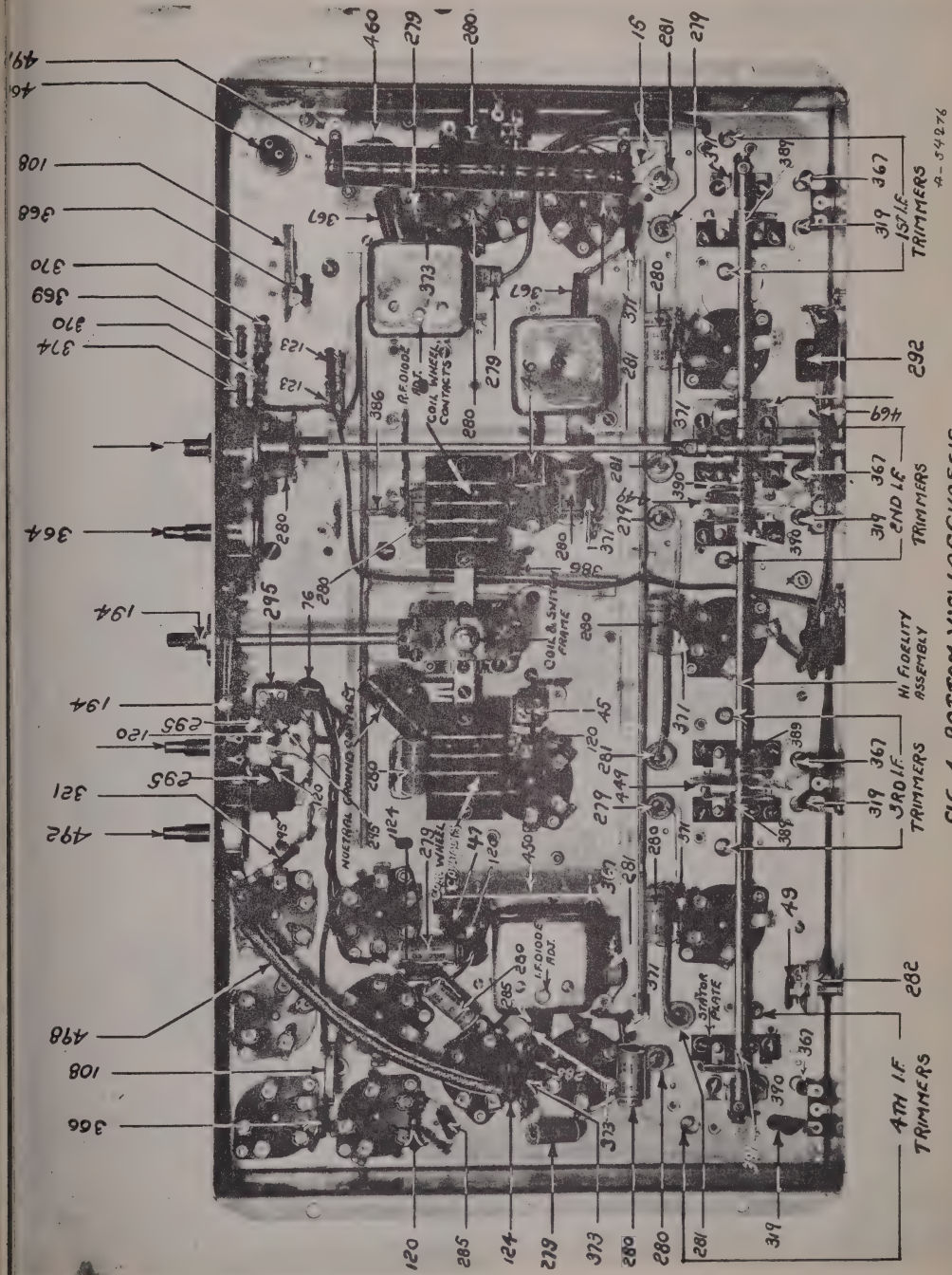

FIG. 4-BOTTOM VIEW OF CHASSIS

MODEL Hi-Fidelity
All Wave

E. H. SCOTT RADIO LABS., INC.

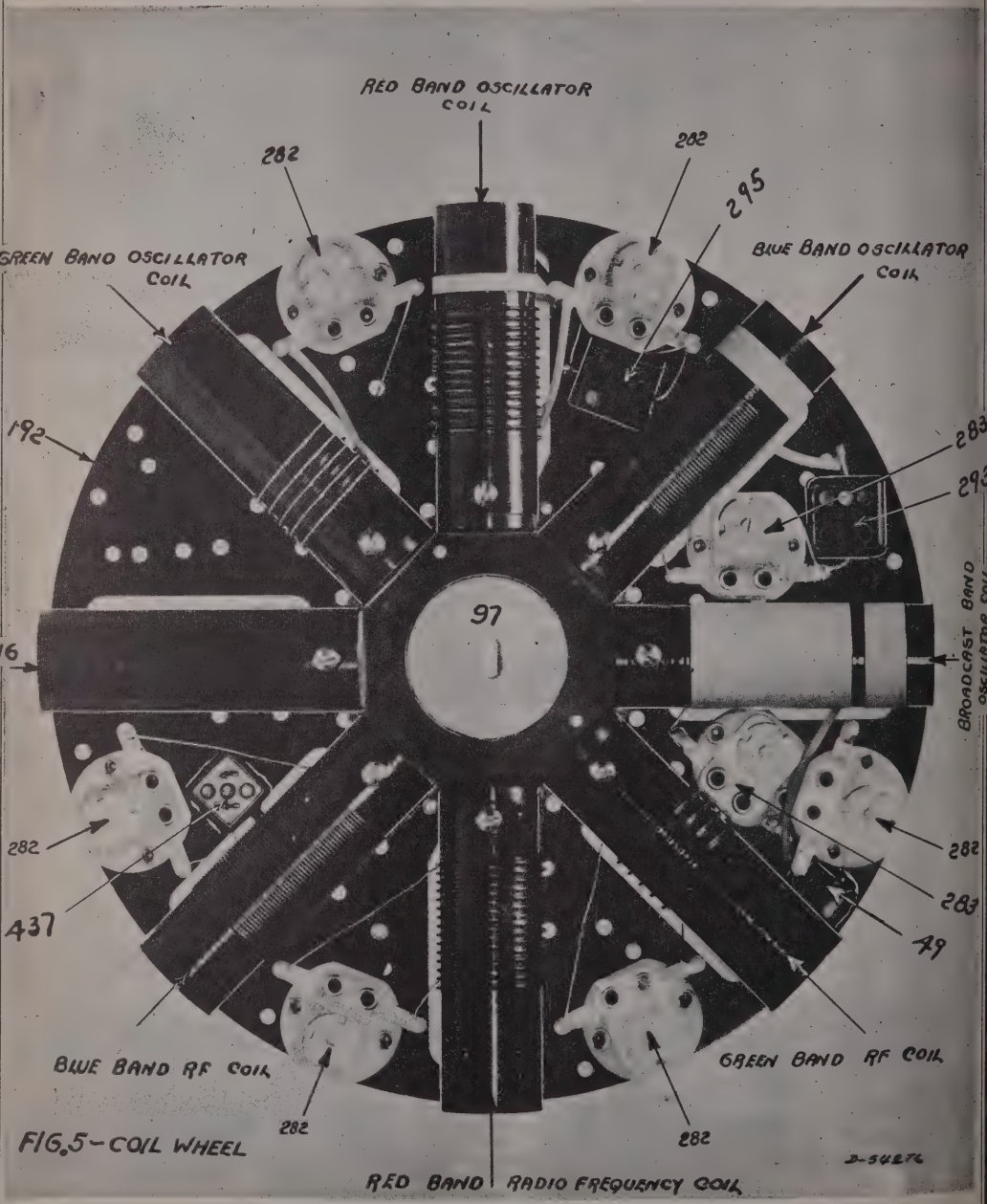

FIG. 5 - COIL WHEEL

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MODEL Hi-Fidelity
All Wave

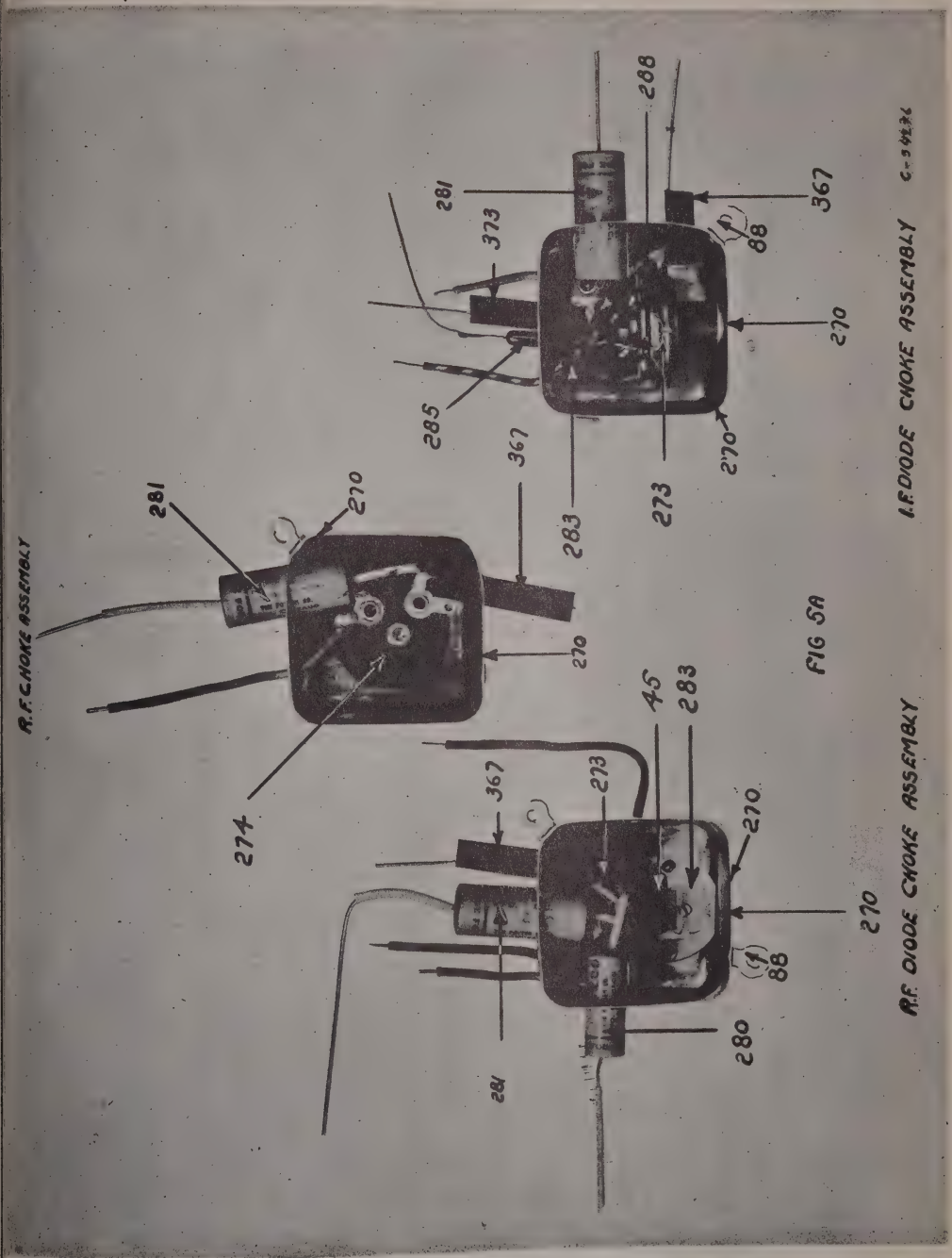

FIG 5A

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CALIBRATION OF DIAL IS NOT CORRECT

If the tracking is not correct stations will not come in at the correct dial point. The calibration of the oscillator dial should not be off more than 5 kc. on the broadcast band nor more then 1/2 of one percent on any of the short wave bands.

The dial strip should first be checked to see if it has slipped off its support. If the dial settings are off on all stations by the same amount, the dial has probably slipped on the shaft and will have to be re-set. The method of checking this is to turn the dial to the low frequency end, the marker should be approximately at the bottom of the words KIL-MEG. If it has moved considerably either way, loosen the 2 screws that hold the dial to the shaft and re-set the dial. If this does not remedy the difficulty it may be due to the fact that the inter-electrode capacity in the oscillator tube has changed, or if a new tube has been used, it is different from the one used when the set was calibrated. If this appears to be the case other oscillator tubes should be tried.

If the above suggestions do not clear up the trouble further tests should be abandoned and the I. F. Amplifier should be aligned before attempting to track.

HOW TO ADJUST THE INTERMEDIATE FREQUENCY

Due to pronounced AVC action in the Scott Full Range Receiver the ordinary method of using an output meter to indicate alignment and tracking is not entirely satisfactory and if possible a 0-30 D.C. Microameter such as the Weston Model 600 should be used. It should be shunted by a 10,000 ohm resistor and a 500,000 ohm resistor placed in series with the side. An oscillator for generating a frequency of 465 Kc. is also required. The Microameter is connected to the terminal that the 10,000 ohm resistor and lead going to the volume control is soldered. The positive side of the microameter is connected to ground (chassis base).

The signal should be fed to the Control Grid of the 6A7 tube with an .025 condenser in series with the oscillator lead to prevent shorting out of the bias of this tube. Put all tube shields on the set and ground chassis.

Refer to the figure showing underside of chassis and location of I. F. transformers. Now with a strong signal of 100 M.V. or over, begin adjusting the I. F. Diode trimmer for Maximum reading on Microameter of output meter. Now do the same for the 4th I. F., 3rd I. F., 2nd I. F. and first I. F. transformer. Make certain that the Selectivity Control is in Maximum selectivity position, Wave Change Switch in broadcast position, Bass Control in minimum position, and Sensitivity Control set to Maximum. Now measure the bias from the cathode of the noise suppressor tube and set this bias to 9.5 Volts by the small adjustable 600 ohm resistor.

CALIBRATING DIAL FOR BROADCAST BAND

With the marker now set so that it is at the bottom of the Kil-Meg mark the actual calibration may now be undertaken. Reference to Fig. 7 will indicate the order of adjustments.

NOTE: It is unlikely that the following procedure will need to be carried out in full for coils that have been previously adjusted, but is given for use where new coils are to be used. Otherwise only trimmers need be adjusted.

It is unnecessary to remove the cover from the three gang condenser. DO NOT BEND THE PLATES OF THE 3 GANG CONDENSER as these are adjusted at the factory and should never have to be touched. We strongly urge the use of a tuning wand for doing this work accurately. One end of this device has a core such as Polyiron and the other brass. When the inductance of a coil is high, insertion of the brass end will decrease it to the proper resonant value; whereas, insertion of the other end will increase it to the correct resonant value.

Have the wave change switch set to the broadcast position. Sensitivity Control in Minimum position, selectivity control in Maximum selective position, or in extreme counter clockwise position, and bass control in minimum position to left. Remove the shield cans from the antenna and R. F. Coils and substitute similar ones having holes in the top for access to trimmers. Set these trimmers to minimum capacity and connect oscillator into Antenna post thru the correct "dummy".

Set the signal generator and receiver dial to 1400 kc. then adjust the oscillator trimmer at B until the signal is loudest, set signal generator and receiver to 600 kc. and adjust the padder at A until signal becomes maximum. Made certain that all shields are in place while making these adjustments. Trim the R. F. and antenna coils at 1400 kc. Turn back to 600 kc. and see if the adjustment still holds by checking the antenna and R. F. coils with a tuning wand. If insertion of the brass end increases the signal the inductance is too high and turns will have to be removed. If insertion of the other end raises the signal then turns must be added, but if either end causes the signal to drop the coil inductance is correct. Now set the selectivity control to the maximum selective position (all the way to the left). Turn the receiver tuning dial back to 1400 kc. and check the adjustment of the antenna and R. F. trimmer condensers. The output meter should show maximum output under these conditions. If it does not, readjust the antenna and R. F. trimmer and recheck at 600 kc. as outlined above. It will be found that the trimmer condensers will be almost at a minmum when the set is correctly aligned.

ADJUSTING THE BLUE BAND

The antenna tuner cover should be removed by taking out three screws from the bottom of the chassis base. The coil wheel shield plate should now be replaced. Throw the Wave Change switch to the blue band, sensitivity control to Maximum position, selectivity control to maximum selectivity and bass control to minimum bass. Set the signal generator and the main dial to 4 megacycles and adjust trimmer at B until the oscillator signal is heard. Adjust the R. F. trimmer at C and antenna trimmer at E to maximum output on the output meter.

NOTE: When adjusting the short wave bands and using a strong signal, there will be an "image" signal removed from the fundamental frequency by 930 kilocycles. Be careful to select the right peak, which is obtained when the oscillator is tuned 465 kc. above (not below) the signal frequency.

The low frequency end is adjusted at 2 Megacycles by adjusting the inductance of the oscillator and R. F. coils. If the signal tune is high in frequency the inductance is decreased by spreading the turns at the ends of the coils. If low in frequency the inductance is increased by pushing the turns together.

To check the proper inductance of the antenna and R. F. coil, the tuning wand is used as decribed previously.

ADJUSTING THE RED BAND

The wave change switch is now set to the red band position. All other controls are left as described previously.

Set the signal generator and the main dial to 10 Megacycles. Adjust the trimmer at A until the signal is heard. Now adjust the R. F. trimmer at C and antenna trimmer at F to Maximum output.

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The low frequency end is adjusted at 6 Megacycles and is accomplished in the same manner as described previously.

ADJUSTING THE GREEN BAND

Set the wave change switch to the green band. All other controls are left as described previously. Set the signal generator and the main dial to 20 Megacycles and carefully adjust the trimmer at A until the generator signal is heard. Adjust the R. F. trimmer at C and the antenna trimmer at C until maximum output is obtained.

The low frequency end is adjusted at 12 Megacycles by changing the inductance of the coils as previously described.

In the latest Scott Allwave High Fidelity receiver air tuned condensers are used in the I. F. amplifier. These condensers maintain their capacity settings and are more stable than the older type. It is especially desirable to use them in humid climates. Where the I. F. Amplifier seems weak and has low sensitivity it may be advisabe to change the trimmer type and use the air tuned condensers. The following instructions should be carefully followed:

INSTRUCTIONS FOR INSTALLING AIR CONDENSERS IN THE SCOTT FULL RANGE HIGH FIDELITY RECEIVER

1. Remove the bottom plates from the receiver.

2. Remove the large round cans from the I. F. Coils. Be very careful in removing these cans so as not to damage the I. F. Coils in any way.

3. Unsolder all wires from the trimmer condensers. Be very careful so as not to burn or otherwise damage I. F. coils for if one strand of wire is broken the coil is ruined and must be replaced. The resistance of each coil is 11 ohms. If one strand or more of the wire is broken the resistence will be less.

4. Loosen the two screws holding the trimmer to the chassis base which can be gotten at from the underside. After the trimmers are loosened, remove them and replace with the air condensers. You will notice that seven of these air condensers are alike. That is, two plates are missing from the fixed section and one of the condensers has the full number of plates. This condenser mounts in the First I. F. stage in the plate circuit of the converter. This means that the I. F. coil for this circuit also has to be changed. We will send a coil with the proper inductance which is 8 Milihenry inductance. We wish to caution you again to be very careful in making changes so as not to damage the I. F. coils. Now replace all wires and make certain that the same connections are made.

5. Now replace the I. F. cans, and be careful in removing the grid caps from the wire so that the same grid leads can be used.

6. Remove the two condensers and resistors which are in series with the grid leads of the audio transformers.

7. Turn the terminal holding the .05 audio coupling condenser so that there will be room to mount the shield plate 5 5/8" from the left hand end of the chassis and 4" from the front. This plate should be mounted parallel to the end of the chassis and is used to shield the oscillator coil from the diode and audio frequency circuits. If this shield is not used, the set will oscillate violently at the lower frequency end of the broadcast band. It will be noticed that there are two mounting holes on this shield. After the shield is in place as described, mark the chassis base for these two holes drilling them with a No. 31 drill and tapping for 6/32 screws. Be very careful in drilling these holes so as not to go thru too far, thereby damaging the audio transformer. Be sure to mount this shield so that the end having the shortest flange from the mounting hole is toward the front of chassis.

8. The series audio condensers and resistors that were removed are mounted on this shield on the opposite side of the oscillator coil very near to the bottom of the shield.

9. Mount the 1/2 Meg. 1/4 watt resistor across the Primary of the 4th I. F. coil. The best position for this is from the resistor end in insulated sleeve to the air trimmer terminal.

10. Remove the old antenna leads from the antenna coil and ant. binding post to the 4 point switch and replace with the shielded leads furnished. Ground shield to chassis.

11. Remove the .025 mfd. condenser from the audio Compensator switch and move all the other condensers one contact point forward or "down" on the switch when chassis is underside up. The required parts for the change are:-

1 - 1/2 Meg. 1/4 watt resistor	1 - Air Condenser No. 678 - 933
1 - I. F. shield part No. 450	8 - Brackets for mounting air condensers Part No. 947
1 - Ant. shield wire 11 1/2" No. 937	2 - 1/8 x 6/32 R.H.N.P. Screws No. 393
1 - Ant. shield wire 10 3/4" No. 936	1 - 1/2 x 6/32 R.H.N.P. Screws No. 142
1 - .8 M. H. I. F. Coil, No. 950	1 - Nut 6/32 N.P. No. 99
7 - Air Condensers No. 856 - 932	

Also in the power amplifier of early design it has been found that the two 1/4 mfd. tubular condensers across the 523 and 83-V choke inputs occasionally give trouble, and these should be replaced by a dual unit incased in a can. This is part No. 952. It is only necessary to remove the tubular condenser. Mount this unit in the amplifier opposite the 2 mfd. unit in the block can be drilling three holes, and wire in place of the tubular condensers. With the amplifier underside up and the condenser mounted, the two top lugs are the terminals of one condenser and the bottom lugs are the terminals of the other condenser. Check the continuity meter if there is doubt.

In sets used in Europe, the attenuator coils and condensers have different values than for American use, since it is designed for 9-kc attenuation.

It will be noticed on the schematic that the output transformer secondary is tapped and designated as 19 and 30 ohms. This refers to the impedance of the load or voice coil that these windings are to match and not their ohmic resistance. All other chokes and resistances are marked with their ohmic resistance. The input and output transformers have winding resistances as shown below.

	PRIMARY RES.	SECONDARY RES.
Input transformer No.3088 (6C6 to PP 6C6)	1800	3000 to C.T.
Input transformer No.3078 (PP 6C6 to PP 2A3)...	180 to C.T. ...	700-0-1000
Output transformer in speaker	50-0-48	(G-T2) - 2 ohms (G-T1) - 3 ohms
Voice coil resistance	15 ohms	

Some of the earlier sets have the tubular type 1000-volt, 0.25-mf condensers across the 523 and 83V choke input circuits. Later sets use a dual 1250-volt unit mounted in a can.

An improvement has recently been made in the oscillator circuit for eliminating weak spots in the green band. Refer to the sketch showing these new oscillator connections. It consists in directly grounding the cathode of the oscillator by a lug riveted to the chassis. This is shown in the sketch.

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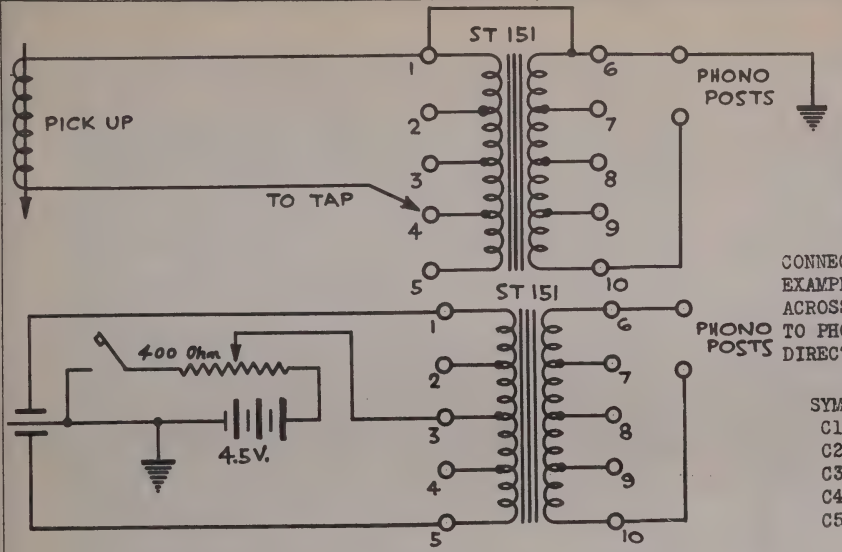


CONNECTIONS WHEN USING CARBON MIKE

PRIMARY		SECONDARY	
TAP	IMPEDANCE	TAP	IMPEDANCE
2-3	12.5	6-7	1560
3-4	25	6-8	6250
4-5	50	6-9	25000
1-2	75	6-10	100000
1-3	150		
1-4	300		
1-5	600		

CONNECT PICKUP ACROSS TAPS WHICH MATCH ITS IMPEDANCE EXAMPLE: FOR PICKUP OF 2000 OHMS; CONNECT PICKUP ACROSS SECONDARY TERMINALS 6-7; TERMINALS 6 AND 10 TO PHONO POSTS. PICKUPS OVER 4000 OHMS CONNECT DIRECTLY TO PHONO POSTS.

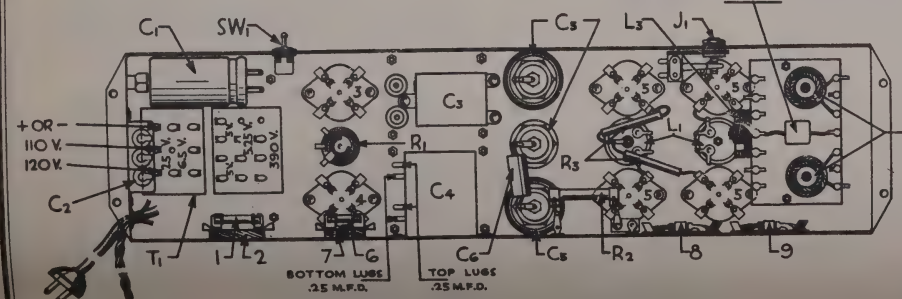
PHONOGRAPH CONNECTIONS TO SCOTT XXIII

SYMBOL	VALUE	STOCK NO.
C1	100 mf,50 v	661
C2	.1-.1, 300 v	657
C3	2 mf,200 v	37
C4	2×.25 mf,1250v	949
C5	30 mf,475 v	660
R1	10 ohms	669
R2	150 "	671
R3	.25 meg	673
T1	Pwr.Trans	681
1	Fuse- 4amp	961
C6	.05 mf,400v	655
C7*	(See below)	
C8	.13 mf	656
C9	3500 mf	664
R1	10 ohms	669
2	Fuse Base	10
3	83V Socket	677
4	5Z3 "	166
5	2A3 "	165
6	Fuse-.75 amp	665
7	Fuse Base	667
8	Socket set	676
9	" Speaker	675
L1	1 mh	653
L2	3.5 mh	654
L3	72 mh	655
J1	Phone jack	78
SW1	Hi-Low Switch	679
Attenuator strip		190
Switch Off-On		193
A-F Transformer		680
Choke	30 h.	651
"	30 h.	652
A-C Cable		21

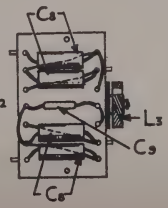
EXPORT SET VALUES

C8	.15 mf	799
L2	3.7 mh	707
L3	84 mh	708
T1	Pwr.Trans-25 ~	683
T1	" 220-volt	682

*C7-CONDENSER OF REQUIRED VALUE TO TUNE ATTENTUATOR



BOTTOM VIEW OF AMPLIFIER



BOTTOM VIEW OF ATTENUATOR UNIT

EXTRA SPEAKER
SET SPEAKER
CABLE TO HI-FREQUENCY SPEAKERS
VOICE
C 120 150 240
P1 G5
P2 B+ C
T1 T2 G 925
"X"
"X"
OFF-ON SWITCH
CONNECT TO TERMINAL AS MARKED FOR VOLTAGES OF 150 OR 240
SHOWING HOW CONTROL MAY BE INSERTED AT POINTS "X-X" FOR CONTROLLING VOLUME OF REMOTE SPEAKER
TO VOICE INPUT ON EXTRA SPEAKER
EXTENSION CABLE #16 WIRE OR LARGER
SPADE LUGWIRE THIS CONNECTS TO TERMINAL "T1" WHEN EXTRA SPEAKER IS NOT USED
TO 'T2' & 'G' POSTS ON SET SPEAKER
BACK VIEW OF CONSTANT IMPEDANCE VOLUME CONTROL

FIG. 10

• EXTRA SPEAKER INSTALLATION FOR SCOTT FULL RANGE • • • HI-FIDELITY ALLWAVE RECEIVER •

MODEL Hi-Fidelity
All Wave

E. H. SCOTT RADIO LABS., INC.

TEST NO.	A AMPLIFIER VOLTAGE READINGS TEST POINT Line Voltage 112 volts	CORRECT VOLTAGE READING	PROBABLE CASE OF INCORRECT READING
1.	C. T. of 83-V Hi Voltage Wndg. to plates of 2A3's (2A3 Plate V.)	310	Defective 83-V shorted filter condenser Line voltage low, Shorted. 25 mfd. input Condenser. Defective 10 HEN. Choke shorted attenuator. Open M.H. coils. Open Primary on output transformer. Defective 2A3 tubes.
2.	C. T. 83-V Hi-Voltage Wndg. to Gnd. (2A3 - BIAS V)	63	3/4 Amp. fuse open. Bias filter condenser shorted. Open connections to fields in Hi-Frequency speaker, or to field resistor in low-frequency unit if used. Hi-frequency field open. Field resistor open. Defective 5Z3. Shorted 2 mfd. condenser.
3.	C. T. Pri. P.P. 2A3 Input Transformer to Gnd.	250	Defective 5Z3. Shorted .25 mfd. input condenser. Shorted filter condensers open or shorted fields. Defective 30 HEN. choke. Defective B-Stick in set Chassis. Shorted or grounded by-pass condensers or resistors in set.
4.	C. T. 5Z3 Hi Volt Wndg. to gnd. (Noise Suppression Bias)	20	Defective 5Z3. Shorted 100 mfd. dry electrolytic. Open or shorted 150 ohm resistor. Short in chassis divider network.
5.	Across 925 ohm speaker field.	135	Shorted .05 condenser across field Shorted or open field.
6.	Filaments	2.5 For 2A3 6.5 For set 5 on Rectifiers	Shorted wiring or windings. Defective hum control.

SET CHASSIS VOLTAGE READINGS

Volume control - Minimum; Sensitivity Control - Maximum; Fidelity Control - Minimum - Line Voltage 112 volts.

7.	Plates 6C6 Audio to Gnd.	235	Open Pri. on P.P. Input Trans. Same Tests as in No. 3
8.	Plates 6C6 1st Audio	230	Open Pri. on 1st Audio Trans.
9.	2nd Stage Audio Bias & 1st stage audio Bias. Measure from CT Secondary of 1st Audio Trans. to GND.	7 1/2	Defective Bias resistors. Defective 6C6 tubes. Shorted contacts on Condensers or open resistors in bass control. Open Audio Trans. winding.
10.	Plates 4th, 3rd, 2nd, 1st I. F. Tubes	235	Open plate resistors or open I.F. primary coils.
	3rd, 2nd, 1st, I.F. Screen	90	Open Screen Resistors. Shorted by-pass condenser.
11.	Cathode of Noise Suppressor to Gnd.	9 1/2	Open Resistors
12.	Tuning Meter Amplifier Plate V.	238	Same test as No. 3. Open cathode resistor or wrong 600 ohm resistor adjustment.
	Cathode to Gnd.	9 1/2	
13.	Oscillator Plate	118	Shorted by-pass condenser. Open coil or 10,000 ohm resistor.
14.	4th IF Bias, measure from outside 1/4 meg. Grid coil Resistor.	4 1/2	Defective resistor, 6D6 tubes or shorted by-pass.
	4th IF Screen	95	Open screen Resistor
15.	Converter Plate	230	Open plate resistors or I.F. Primary Test as in No. 3.
	Converter Screen Converter Bias at Resistance Network	70 3	Defective Resistor, divider or by-pass
16.	RF (AVC) Plate	230	Open Coil of Resistor Test as in 3
	Screen	100	Open Resistor in Plate
	Bias (Cathode to Gnd.)	6	Defective Resistors or by-pass.
17.	R. F. Plate	225	Open Plate Primary Resistor
	R. F. Screen	92	Open Resistor, shorted .1 mfd.
	Bias Measure at network	3	
18.	Beat oscillator Plate	225	Open coil - Poor Switch Contact
19.	Neon, Oscillator Side to ground	120	Open 10,000 ohm resistor
	per tube	60	

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ALIGNMENT OF FM SECTION

DISCRIMINATOR ALIGNMENT

A circuit diagram of the connections for this operation is shown in Fig. 3. Connect the zero center microammeter with series resistor as shown and connect the output of the model 12 generator (tuned to 5.25 Mc) through a .05 mfd. condenser to the grid terminal of the 6SJ7 limiter. Increase output of the model 12 signal generator to its maximum output level. Rotate the plate trimmer condenser at the top of the discriminator transformer shield can until the zero center microammeter swings to a maximum deflection in either direction from zero. Then rotate the secondary trimmer condenser at the bottom of the discriminator transformer until the meter indicator swings through zero with increasing or decreasing current depending upon the direction of rotation of the trimmer adjustment. Adjust for zero meter indication under these conditions.

Detune the signal generator back and forth about + 200 kc. If the discriminator circuit will swing through a positive peak in one direction and through a negative peak in the other direction. However, these peaks may not be of equal amplitude at this stage of the alignment procedure. They can now be adjusted for equality by going back over the plate trimmer adjustment the serviceman will soon find that it is relatively simple to attain peak equality in the discriminator circuit.

The peaks should be about 300 kc apart or + 150 kc. from the resonance frequency, which is 5.25 Mc, and the variation of the zero center meter current should be linear on either side up to at least + 80 kc. The final goal of discriminator alignment is to attain this linearity over at least + 80 kc. and after obtaining linearity, the serviceman should finally readjust the plate trimmer slightly to obtain this result even at a sacrifice of peak equality. The linearity and equality of the + 80 kc. deviation characteristics are essential to distortionalists audio reproduction for a wide-band FM receiver. If the characteristics is found to be linear out to + 100 kc. then finally adjusted, it is so much the better to allow for overmodulation at the transmitter.

When the adjustment of the discriminator transformer is completed, the zero center meter should indicate zero when the signal generator is tuned to 5.25 mc.

The diagram of the general shape of the discriminator characteristics will be found in Fig. 5 under model Philharmonic.

FM IF AMPLIFIER ALIGNMENT

The 0-1 ma. milliammeter should be inserted in the ground side of the 25,000 ohms grid leak in the input circuit of the 6SJ7 limiter tube. A jumper connection and bypass condenser have been provided under the chassis at this point in the receiver. The wire from the IF transformer is color-coded slate and white and is connected to a terminal strip near the 6SJ7.

After the meter is inserted the IF signal generator (tuned to 5.25 Mc) should be connected through a .05 mf. condenser to the grid terminal on the socket of the second 6AC7 IF amplifier and the primary and secondary alignment screws of the third IF transformer should be adjusted for maximum limiter grid leak current. The output of the signal generator should be adjusted so that the limiter current is about .2 milliamperes while the tuning adjustments are being made. Since it is possible to align the IF coils with cores either out or in, it is important to make sure that they are peaked with the adjustment screws in the outward position in order to insure proper coupling between the coils.

The second and first IF transformer should be aligned in this order by moving the signal generator input progressively forward to the first 6AC7 and the 6SA7 grid. All of these connections are on the respective sockets, because of the single ended construction of these tubes. Each transformer alignment screw should be adjusted for maximum limiter grid current, as the signal input is fed into the amplifying tube directly in front of it. After all of these adjustments have been made, the individual stages

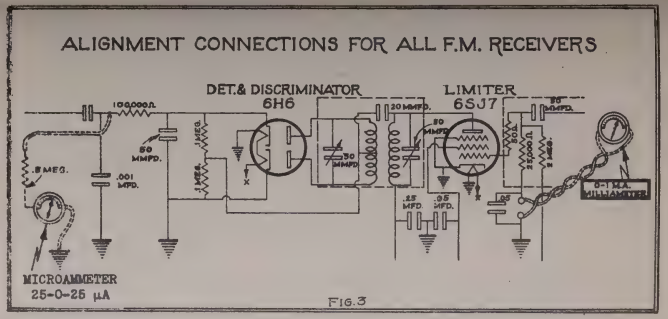

FIG.3

should not be realigned except by the above procedure; that is, the IF adjustments should be made individually for each stage by the point-to-point method and no overall re-adjustments should be made.

Because of the high gain in each IF stage of the Scott Laureate it may be found when the IF alignment is completed that the overall selectivity peak does not occur at exactly 5.25 MC, where the signal generator was set during the procedure. If this is the case, the signal generator should be tuned to the point where maximum output occurs, and the tester should go back to the secondary trimmer of the discriminator transformer and readjust it slightly so that the zero current point coincides exactly with the peak of limiter grid current. The IF signal should then be fed into the grid of the limiter and discriminator linearity should be rechecked and adjusted to equality by the primary tuning condenser if necessary. This readjustment of the discriminator to align its characteristic exactly with the wave shape of the IF selectivity curve is essential for optimum results and minimum distortion. However, in no case should the required readjustments be more than slight. If the discriminator zero and the selectivity peak are too far removed excessive regeneration is indicated.

The overall IF selectivity characteristic may be checked by detuning the signal at least + 75 kc or more from the frequency of maximum output and by observing the amount of attenuation. The characteristic should resemble that shown in Fig. 6 of the Scott Frequency Modulation Data Manual. As pointed out there, a small amount of dissymmetry can be tolerated, because of the limiter characteristic.

FM RF CIRCUIT ALIGNMENT

With the 0-1 Mc. meter in the limiter grid leak circuit, connect the Model 12 signal generator output through a .05 mfd. condenser to the grid terminal of the 6SA7 mixer tube.

Observe that the dial pointer still travels exactly to the low frequency end stop used for AM alignment. Turn the tuning knob to rotate the pointer to 50 Mc. and adjust the signal generator for a 50 Mc signal. With sufficient output from the generator to enable an easy location of the signal, rotate the oscillator trimmer C8 until a peak of limiter grid current is reached. Since the oscillator must be peaked on the low frequency side of the incoming signal, it should be observed that the trimmer C8 is set a about 50% of its total capacity.

Connect the signal generator output to the grid of the 6AB7 RF tube and align the trimmer C9 of the RF circuit for maximum limiter grid current.

Proceeding to the antenna terminals the output of the signal generator should be fed through a 100 ohms resistor. The receiver antenna terminal adjacent to the groun

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terminal should be connected to that point by a jumper wire. With the signal generator still set at 50 Mc., the antenna shunt trimmer C10 should be aligned for maximum limiter grid current.

After this alignment at the high frequency end of the band is completed the dial should be rotated to the low frequency end, about 43 Mc., and the sensitivity level at that point should be compared with that which was noted at 50 Mc. It should be substantially the same.

Since fixed padding condensers are used in the antenna and RF circuits, a lack of sensitivity would indicate that the value of one of these might have changed or that the inductance of the coils might have shifted. An examination of these parts and the replacements of any defective ones should restore the sensitivity to normal. If the RF or antenna secondary inductance is slightly off, this may be remedied by spreading or pushing end turns slightly to obtain maximum sensitivity.

BUILT-IN ANTENNA ALIGNMENT

The use of a built-in loop antenna introduces a new alignment problem in the AM broadcast and short wave ranges. In checking a receiver on the bench it will be desirable to remove the loop from the cabinet and perform alignment operations on this circuit under conditions which may be slightly different than those in the cabinet. Also whenever a receiver is installed in the cabinet after servicing, it will be desirable to make the necessary slight readjustments to assure that the loop circuits are in resonance.

When alignments are made on the bench precautions should be taken to insure that the loop is remote from metal objects which may seriously affect its inductance. Also the signal pickup is quite high on the broadcast band loop and usually a large number of stations will be tuned in unless the receiver and the antenna are placed inside a screened room, from which all aerial lead-in wires are completely removed. However, it is possible to obtain satisfactory alignment even in the presence of considerable outside signal pickup, if the signal generator is set at such frequencies that its signal does not coincide with that of some of the local broadcast stations.

Connect the signal generator input through a 100 ohm resistor to the antenna terminals on the loop terminal board. The antenna terminal nearest to the ground terminal should be connected to that point. In the AM broadcast band align C3 for maximum tuning eye closure at a frequency around 1,400 kc. and adjust L3 for maximum closure at a frequency around 600 kc. In the short wave band align C7 for maximum closure at 15 megacycles and L4 for maximum closure at 10 megacycles. Correct alignment can also be detected by listening to inter-station noise provided the local noise level is not too high. If tuning eye indication is used, the eye can be snapped out of its holder and allowed to hang down in the rear of the chassis where it can be seen.

CONNECTING EXTRA SPEAKER

Provision is made for connecting an extra speaker to either the single 15" speaker system or the co-axial high fidelity speaker. In the case of the former the extra speaker must sith have a voice coil impedance of 38 ohms or must be matched to that value by a suitable transformer. In the latter case provision is made for plugging an extra speaker having an 8 ohm voice coil impedance into the dividing network.

In case the extension speaker is disconnected from the single speaker system the jumper must be changed to connect terminals "VC" and "38" together. In the case of the co-axial system a small plug which is furnished with the dividing network must be reinserted when the extra speaker plug is removed.

WAVE CHANGE SWITCH TROUBLE

Poor contact in the wave change switch can generally be corrected by slightly bending the contacts involved. However, in case a switch section is accidentally damaged beyond repair, this section can be replaced by removing the two screws which support the wave change detent plate and very carefully pulling out the wave change switch shaft. The damaged section can then be unsoldered, removed and replaced with a new unit which should be obtained from the Scott Laboratories in Chicago before the change is made in order to assure exact duplication of switch position and connections. Note particularly that the small notch near the center of the switch rotor must be in the same position in each switch section.

SYMPTOMS OF TROUBLE

If the set is tuned to a strong local station and the tuning meter moves back and forth as the sensitivity control is varied, this indicates that the I-F amplifier is weak or out of adjustment. The antenna should be disconnected and with volume and sensitivity full on and fidelity control one-third to the right, there should be a rushing noise over the whole of each band. If this does not happen, the I-F adjustment is off and this should be corrected as outlined.

If the sensitivity appears to drop off rapidly as selectivity is increased, it is also an indication of poor I-F adjustment or incorrect bias. This bias will vary from 3 volts for max. fidelity and selectivity to 9.5 for min. fidelity and max. sensitivity. Do not loosen any of the band-spread condensers on the common shaft, as the spacing of the plates has been set.

HUM

If the set appears to have undue hum, it is probably due to an unbalanced condition of the 2A3 tubes. Adjust the hum control for min. output on an output meter and try all possible combinations of the 2A3's in their different sockets. Carefully avoid any possibility of inductive or stray pickup from cables, phonograph leads, and wiring. Tubes should also be checked.

PHONOGRAPH OPERATION

On the older type 23-tube receivers, the phono input was of the low-impedance type and was connected in the cathode circuit. On the newer receivers, the input is of the grid injection type or high-impedance input. On the new receivers, pickups from 4000 ohms inpedance and up may be directly connected to the phono posts, while on the older receivers, matching transformers are required in most cases.

OPERATION OF EXTRA SPEAKERS

The output transformer normally matches a 10-ohm voice coil, but it is arranged so that another 19-ohm voice coil may be connected in series with the set speaker and the total load connected to T1 with correct loading. T pads may be used for individual controls and a suggested arrangement is shown in Fig. 10. (Note the terminal C is not ground on this speaker, but is the ungrounded side of voice coil.)

The earlier type loud speaker was arranged with an output transformer with the following output impedances: 38 ohms; terminal G to T1, for one single Scott speaker (38-ohm voice coil) --- 19 ohms; terminal G to T2 for two Scott speakers (38-ohm voice coils) --- 4 ohms; terminals T1 to T2 for single low-impedance speaker. One side of the voice coil in the speaker is connected to the frame of the speaker, the other side is brought out to a spade lug so that it may be connected to either of two terminals. For a single speaker the flexible lead marked C is normally connected to T2. When an extra speaker is desired, the flexible wire with the spade lug is connected to T1. The voice coil leads of the extra speaker are then connected to terminals marked G to T2. This provides operation of two 30-ohm impedance voice coils in parallel.

CAUTION

Never remove the 5Z3 tube from the amplifier when the set is on, as it will blow the fuses and may damage the receiver.

TUNING METER

If the tuning meter cannot be made to respond by tapping it, it should be tested for continuity and, if found defective, should be replaced. Its removal will not affect general operation.

ADJUSTING THE BLUE BAND OR LONG-WAVE BAND ON EXPORT RECEIVERS

Remove the antenna tuner cover and replace the coil wheel shield plate. Throw the wave-change switch lever to the long-wave band, sensitivity control to one-half max., selectivity to max., and bass control to min. Set the signal generator and the main dial to 170 kc and adjust the padder at A until the oscillator signal is heard. Repeat at 350 kc and trim at B. With less generator input, spot 170 again and align. Repeat at 350 kc and adjust the R-F trimmer at C and antenna trimmer at E to max. output on the diode or output meter. This must all be done after the BC band has been aligned.

The Scott Phantom covers all frequencies from 550 Ko. to 22.2 Megacycles in four bands, taking full advantage of a high gain R.F. stage on all bands. The perfected Scott Supershield Antenna Coupling System is employed to provide effective antenna lead-in noise reduction on the important shortwave bands, and broadcast band. In addition, a new and advanced type of noise-reducing double-doublet is employed on all bands.

Other circuit developments include a means for providing control of bass and treble frequencies - a highly stabilized electron coupled oscillator - silent tuning between stations - separate R.F. and I.F. AVC control systems - self-balancing phase inverter - cathode ray tuning indication - phonograph input - beam power output stage with inverse feed-back - noise limiter circuit - automatic scratch suppression and an I.F. amplifier having variable selectivity.

ELECTRICAL DESCRIPTION OF THE CIRCUIT

R. F. Section

The antenna input circuit is arranged so that when operating on the two shortwave bands and broadcast band, the signal picked up on the flat top portion of the doublet antenna is transferred to the R.F. tube grid by means of the special shielded ring coupling system, achieving a high degree of noise reduction. Noise reduction is also achieved on all bands due to the use of a special filter at the antenna. On the police band the signal is fed directly into the primary coil shorted out to minimize circuit loss. The first tuned circuit resonates and amplifies the desired signal. On shortwave and police the second tuned circuit operates directly from the plate of the R.F. tube and feeds directly into the converter grid reducing losses to a minimum. A 6U7G tube, having high mutual conductance is used in the R.F. stage which gives high sensitivity on all bands.

Converter Section

The amplified signal from the R.F. amplifier is applied to the 6L7G converter control grid and the oscillator output is coupled to grid No. 3. These two input signals now both modulate the converter cathode emission and the result will be a difference in frequency component in the plate circuit of the converter which represents the I.F. frequency.

Oscillator Section

The proper combination of series padders, shunt trimmers, and coils in the oscillator circuit provide a signal frequency 455 Ko. higher than that to which the R.F. section is tuned. The efficient 6J5G type oscillator tube is used in an electron coupled circuit. Oscillator potentials are carefully by-passed and filtered, and the circuit is made extremely stable by the use of Silver Cap condensers and a special metalized grid resistor.

I.F. Section

The I.F. amplifier consists of three stages employing three 6K7G tubes. The I.F. transformers are wound in single pi sections in both primary and secondary coils, and are permanently tuned by a combination fixed and adjustable air condenser. In addition, each stage is arranged with resistance capacity filters for each circuit. The I.F. system is arranged for three degrees of selectivity by means of a small tapped coil connected to the grid return of the I.F. secondary and closely coupled to the primary in the 2nd and 3rd stage. The degree of coupling is then controlled by varying the selectivity switch. The signal developed in the converter plate circuit is highly amplified in the I.F. amplifier at 455 Ko. and is passed to the second detector.

R.F. and I.F. AVC Systems

The Scott Phantom employs two separate AVC systems. In the R.F. AVC circuit the control grid of the 6B8G tube is capacitatively coupled to the plate of the 6L7G converter tube. I.F. and signal frequency are amplified and rectified by this tube and applied as control on the 1st R.F. grid and converter tube. This prevents overload in the R.F. stage and helps to reduce the effects of noise and distortion when tuned to powerful locals and also protects the first tube from these effects when the set is tuned to a weak distant station that is near in frequency to a powerful local. This AVC action operates only when the input signal exceeds about 1,000 microvolts.

In the I.F. AVC circuit the 6H6G tube acting as part of the noise limiter circuit and diode detector supplies AVC voltage for control on the 1st and 2nd I.F. tube grids and prevents overload and distortion in this part of the circuit.

Just below the volume control is the sensitivity switch which will decrease the maximum sensitivity of the receiver, when to the extreme left, by increasing the minimum bias of the I.F. AVC to approximately 30 volts. This provides silent tuning between stations but in no way affects the normal AVC action on the stations which are well above the noise level.

Detector

As mentioned above, the 6H6G tube acts as a second detector in addition to its other functions, and handles high percentage modulation signals with a minimum of distortion.

Record Scratch Suppression

The Scott Phantom employs the feature of automatic scratch suppression using a 6B8G and a 6J7G in a special circuit which attenuates the higher audio frequencies (corresponding to record scratch) when they are very weak, but passes unattenuated the stronger high frequencies (corresponding to useful high fidelity reproduction).

The 6B8G tube operates as an amplifier and diode to supply rectified bias voltages, (proportional to input signal amplitude for frequencies above 1,500 cycles) to the control grid of a 6J7G tube. The circuit is arranged so that the effective capacity of a 35 mmf. condenser, amplified to a maximum of approximately 3,000 mmf. by the gain of the 6J7G tube, is in shunt with the first A.F. 6K7G tube grid at audio frequencies.

When the higher audio frequencies are weak no rectified bias is developed by the 6B8G tube allowing the 6J7G tube to operate at maximum gain, shunting a high capacity from the grid of the first AF tube to ground, thus practically eliminating record scratch. However, when the higher audio frequencies are strong, considerable rectified bias is developed in the 6B8G tube and applied to greatly reduce the gain of the 6J7G tube, thus reducing the effective capacity, shunting the input to the first A.F. tube and allowing all frequencies to pass unattenuated.

Audio Amplifier

When the wave change switch is set to position "P" the input to the three stage audio system is automatically connected to the phonograph input terminals on the rear of the chassis. A volume control tapped for bass compensation is employed at the input circuit of the 6K7G first audio tube and in the plate circuit of this tube the variable bass and treble control circuits are connected. The bass circuit utilizes a high "Q" resonator choke system and provides a boost of about 15 db at 75 cycles in the maximum position.

The first audio tube is followed by the 6J5G phase inverter tube. This circuit is self-balancing and couples into the grids of the 6J5G pushpull 2nd audio

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tubes which operate into the balanced primary of a special driver transformer, the secondaries of which in turn apply the signal to the 6V6G beam power output stage.

The power output stage incorporates inverse feed-back which helps to flatten loudspeaker response and improves reproduction.

Noise Limiter Circuit

Part of the diode detector is utilized as a noise limiter device so that peaks of local electrical interference may be "chopped" off resulting in some reduction of noise when the receiver is tuned to a weak signal, particularly on shortwaves.

Power Supply

The power supply used is of the heavy duty type employing two of the new 5V4G heater type rectifier tubes. The primary of the power transformer is arranged for standard 115 volts on the domestic model. On the foreign model it is designed to accommodate either 115 volts or 230 volts AC by proper placement of the fuses. This is clearly shown on the schematic diagram. The rectified plate voltages are filtered by the use of three high capacity electrolytics, a choke and the speaker field employed as another choke. In addition, the bias voltage is further filtered by the use of a 50 mfd. condenser.

Loud Speaker

The loud speaker employed is arranged to provide connections for an external speaker. It is necessary only to remove the terminal cover, disconnect the jumper wire between terminals V.C. and 38, and connect it between V.C. and 19 instead. Now connect a 38 ohm speaker to the terminals marked 19 and G. "T" pads may be added by reference to the diagram showing these connections.

HUM TESTS ON RECEIVER

Make certain that there are no soldering irons near the chassis and that the power transformer end of the amplifier is as far away from the chassis as possible. Connect a good output meter, having a resistance of 3,000 ohms or more to the 6V6G plates (No. 3 prong) and have a 1 to 2 mfd. condenser in series with one lead to the meter.

With bass full on, treble full, and volume off, the hum should not exceed .2 of a volt. To make overall tests, remove the 2nd audio 6J5G tubes. The hum should now drop to less than 0.1 volt. If it does not, the amount of hum read on the meter is the hum in the amplifier itself. Leave the tubes just removed out and change the 6V6G tubes in the amplifier, at the same time adjusting the hum control on the amplifier until the hum is reduced to a minimum. There may be filament shorts also. Check the circuit and connections to get the hum out of the amplifier before proceeding with the rest of the test.

NOTE: It is highly important, in minimizing hum, to use the spiral heater type 6K7G and 6J5G tubes in the audio system since while considerable bass boost is available, tubes are the sole source of hum, there being no hum pickup whatsoever in chokes, transformers, etc.

After the amplifier is found to be OK replace the 2nd audio tubes and remove the inverter and 1st audio, substituting a new tube for the 2nd audio tube until the hum is reduced to a minimum, allowing sufficient time in each case for the tubes to heat up properly. Next try the inverter tube in the same manner and follow with the 1st audio 6K7G. It may be necessary to push the filament wires nearer the base and away from the grid wiring on some of the tube sockets; also, the dial light circuit may be shorted against the dial frame. All these points should be checked along with the trying of new tubes.

AUDIO GAIN TEST

With an audio input signal of 0.5 volt at 400 cycles an output reading of between 18-20 volts should be obtained on the output meter which is connected across the voice coil. Make this test with volume full, bass control full, fidelity full and band switch in phono position. If the gain is low it may be due to defective tubes, wrong voltages, shorts or open circuits, either in the set or power amplifier. Both should be checked.

AUDIO FIDELITY TESTS

For correct high fidelity reproduction it is important that the electrical frequency response of the audio system, from the phono posts to a 38 or 40 ohm dummy voice coil resistor approximate 5 volts at 75 cycles and 6 volts at 6,250 cycles with the bass and fidelity controls on full, after the output has been carefully adjusted, by means of the volume control, to 1 volt at 400 cycles with an input of 0.1 volt at each frequency. Failure of the system to approximate this response (if you are certain that your meters are accurate and that no series meter condenser, which would "cut" low frequencies, is being used) should lead to analysis of the low or high frequency circuit involved to determine and eliminate the trouble.

HOW TO ADJUST THE AUTOMATIC RECORD SCRATCH SUPPRESSION CIRCUIT ON THE SCOTT PHANTOM

Connect an output meter across the voice coil circuit (V.C. to G.). Connect an audio oscillator and a sensitive output meter to the phono posts, and turn the wave switch to position "P" (all way to right). With the bass control set to minimum, treble control full on, and scratch suppressor switch off, (to left) apply 0.25 volt at 3,500 cycles to the phono posts. The scratch suppressor switch is on the back of the set. Set the volume control so that 1 volt is obtained on the output meter across the voice coil. Turn on (to right) the suppressor switch and the 1 volt reading should just start to drop (say to .9 v.). Now turn the suppressor switch off and reduce the audio oscillator input to 0.05 volts, reset the volume control to obtain a 1 volt reading again on the voice coil output meter and now turn on the suppressor switch. The 1 volt reading should now drop to a level of 0.2 of a volt or slightly under. This gives a reduction ratio of 5 to 1 and this is the proper ratio to maintain. If this 5 to 1 reduction is not obtained the 6 volt bias should be reduced slightly by varying the small slider arm in the C divider network, until the hiss is reduced slightly. It will have to be determined by substitution of various resistors. If too much control is obtained, the 6 volt bias may be raised by adjusting the slider arm.

The 6B8G tube determines the level at which the circuit starts to cut high frequencies and the 6J7G tube determines the amount of this cut.

Alignment of I.F. Section

Connect a good signal generator to the input of the I.F. system. Turn the wave band switch to the broadcast band; have sensitivity switch to maximum position (to right); turn tuning dial pointer to Hi-Freq. end of dial. Ground the I.F. AVC line by connecting a jumper wire from it to Gnd. Now set the selectivity switch in the sharp position (all the way to left).

Connect the negative terminal of a 20,000 ohm per volt DC voltmeter using the 25 volt scale, (or a sensitive microammeter with a 0.5 meg. resistor connected in series with its negative terminal) to the "I.F. Diode Output Point", and connect the positive terminal to the chassis.

Apply an unmodulated 455 Kc. signal of sufficient strength to produce a diode output voltage reading of approximately 10 v. (or 20 microamperes for the microammeter) and very carefully adjust the 1st, 2nd, 3rd, I.F. transformers and I.F.

exceeding the above figures.

Adjust the R.F. diode transformer for maximum output after the I.F. stages are aligned. Remove the 1 meg resistor from ground that is connected to the R.F. diode output point (10,000 ohm) and put the high resistance DC meter in series with the 1 meg resistor to ground, the positive side of the meter going to ground. If there is sufficient signal from the generator it will be OK to merely connect the negative terminal of the microammeter to the R.F. diode output point. Put in a strong signal until a variation is noted and adjust the R.F. diode for maximum output. Adjust the diode trimmers very carefully. Also shunt out the coil you are not adjusting, with a 10,000 ohm resistor while trimming the other circuit; namely, put 10,000 ohms from B+ to the 6B8G plate then trim the secondary. Shift the resistor to diode plates and 10,000 ohm diode output point and trim the primary.

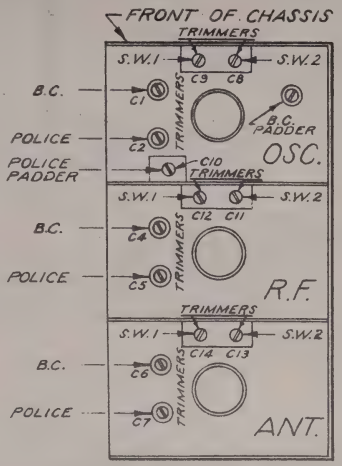

Fig. 2 - Location of Trimmers

Alignment of R.F. Sections

Before starting on this portion of the set, it is important to understand how the tuning wand tool works. One end of this device has a core of material such as Polyiron while the other end is brass. When the inductance of a coil is high, insertion of the brass end will decrease it to the proper resonant value; whereas, insertion of the other end will increase the effective inductance. This gives a very convenient means of determining whether or not it is necessary to add or remove turns from the coil. In the following instructions only a slight adjustment of trimmers and padders should be necessary where original coils are used. Full instructions, however, are given to cover the case where new coils are to be used.

Broadcast Band Alignment

First turn the dial pointer completely to the low frequency dial stop and see that the pointer reaches 1/16" beyond the lowest frequency mark. Turn the wave band switch to the "Broadcast A" position, set the bass control to minimum, treble control to maximum and sensitivity switch to minimum and connect an output meter across the voice coil. Adjust oscillator trimmer C1, until a 1,400 Kc. signal as set on the dial is tuned in from the generator. Rotate the dial to 600 Kc. and tune in a 600 Kc. signal from the generator by adjusting the padding condenser C3. Check the dial at 950 Kc. and if it tunes high in frequency spread turns on the oscillator secondary, If it is low in frequency push the turns together and then readjust trimmer condenser C1, and padder condenser C3, as before.

With the oscillator circuit correctly spotted, tune in a signal from the generator at 1,400 Kc. and use the output meter as indicated.

Have as weak a signal as possible and adjust trimmers C4 and C6 for maximum output. Turn the dial to 600 Kc. and check the alignment of the R.F. antenna and pre-selector stages with a tuning wand, spreading turns on the coil where less inductance is needed and pushing turns together if more inductance is required. Readjust the trimmer condenser C4 and C6 for maximum at 1,400 Kc. Turn the dial to 950 Kc. and check the alignment of the R.F. and antenna stages.

Police Band

Set the wave band switch to the Police "B" band position and turn the diel to 3.7 megacycles. Tune in a signal from the generator by adjusting trimmer C2, then turn the dial to 1.8 megacycles and tune in a signal from the generator by adjusting the padder C10. Check the alignment at 2.5 megacycles and if off, either push together or spread turns on the oscillator secondary as described under "Broadcast Band Alignment". Readjust trimmer C2 and padder C10 until correctly aligned. Tune in a signal at 3.7 megacycles and adjust trimmers C5 and C7 to maximum output. Now check the alignment on 1.8 megacycles with a tuning wand and make any necessary corrections by pushing or spreading turns on the coils and readjusting trimmers C5 and C7. Recheck the alignment at 2.5 megacycles.

Foreign S.W. -C- (SW 1)

Set the wave band switch to the "C" position and tune in a signal at 9 megacycles by adjusting trimmer condenser C9. Turn the dial to 5 megacycles and if necessary to correct the calibration do so by spreading or pushing turns on the coil and readjusting the trimmer condenser C9. Check the calibration at 6.0 megacycles.

With the oscillator calibrated, tune in a signal at 9 megacycles and adjust trimmer condensers C12 and C14 for maximum output. Check the alignment at 5 and 9 megacycles and make any necessary corrections by pushing or spreading turns on the coils and readjusting trimmers C12 and C14.

Foreign S.W. -D- (SW 2)

Set the wave band switch to "D" position and tune in a signal at 20 megacycles by adjusting trimmer C8. Check and if necessary correct the calibration at 12 megacycles by pushing or spreading the turns on the oscillator coil. Check the calibration at 15 megacycles.

With the oscillator correctly aligned tune in a signal at 20 megacycles and adjust trimmers C11 and C13 for maximum output. Check the alignment at 12 and 15 megacycles and make necessary corrections by pushing or spreading turns on the coils. Now, readjust trimmers C11 and C13.

CONNECTING EXTRA SPEAKER

The new type High Fidelity Scott permanent magnet 38 ohm voice coil speaker may be readily connected to a Scott redeiver with the optional "T" pad inserted in the voice coil leads where separate control of the extension speaker volume is desired. In case the extension speaker is disconnected the jumper might be changed to connect terminals "V.C." and "38" together.

WAVE CHANGE SWITCH TROUBLE

Poor contact in the wave change switch can generally be corrected by slightly bending the contacts involved. However, in case a switch section is accidentally damaged beyond repair, this section can be replaced by first removing the dial face, then removing the two screws which support the wave change detent plate and very carefully pulling out the wave change switch shaft. The damaged section can then be unsoldered, removed, and replaced with a new unit which should be obtained from the Scott Laboratories in Chicago before the change is made in order to assure exact duplication of switch position and connections. Note particularly that the small notch near the center of the switch rotor must be in the same position in each switch section.

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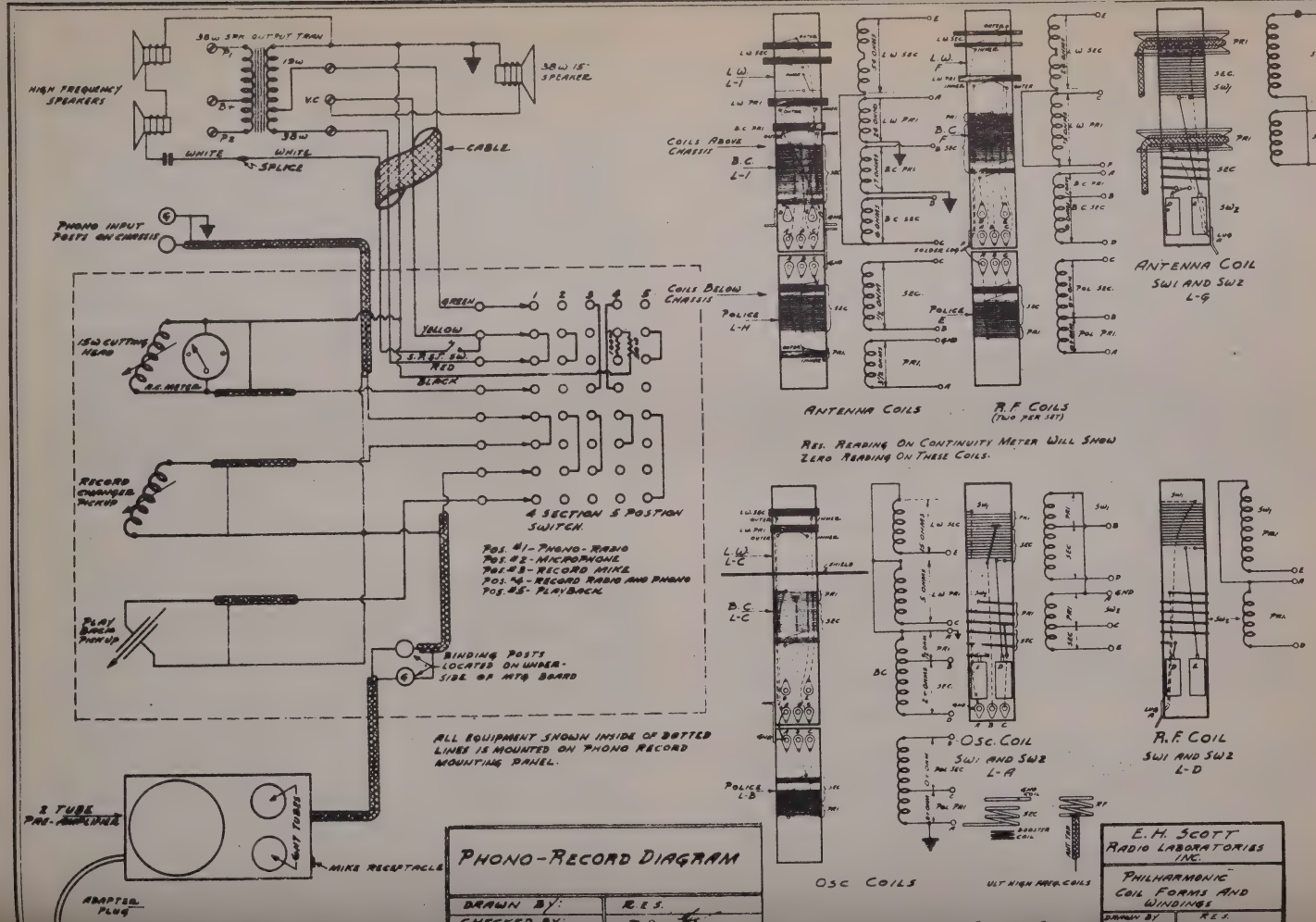


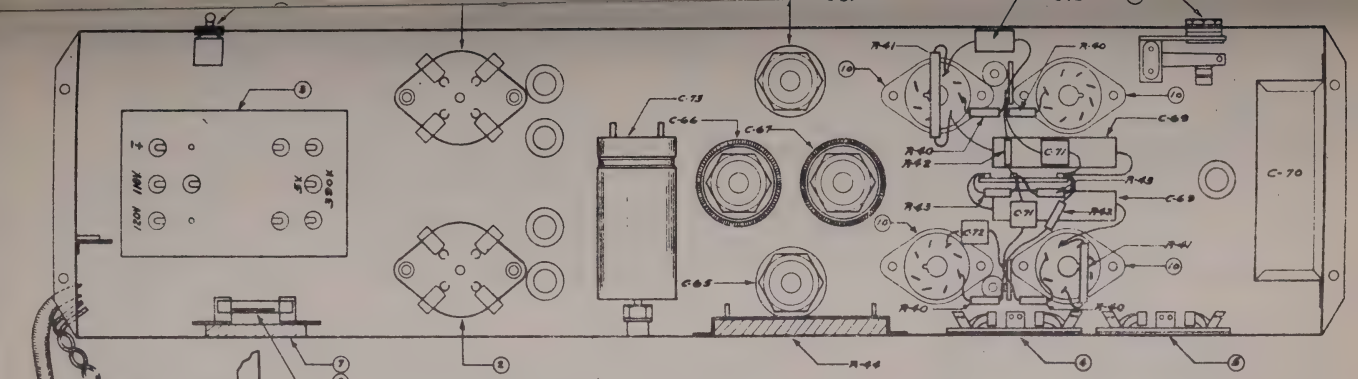
PHONO-RECORD DIAGRAM

DRAWN BY:	R.E.S.
CHECKED BY:	J.P.
APPROVED BY:	H. J. Scott

E. H. SCOTT RADIO LABORATORIES INC.

PHILHARMONIC COIL FORMS AND WINDINGS

DRAWN BY	R.E.S.
CHECKED BY	J.F.
APPROVED BY	H. J. Scott
DATE	5-22-1937



BOTTOM VIEW OF AMPLIFIER

SYMBOL	VALUE	STOCK NO.
1	Hi-Lo Switch	679
2	83V Tube socket	677
3	Power transformer	377
4	Socket, speaker	1329
5	Socket, set	676
6	Phone jack	1361
7	Fuse base	10
8	Fuse, 5 amp, 250 v.	1353
9	Fuse, 3 amp (220 v. amp)	72
10	6L6G tube socket	1163

PART	STOCK NO.
Switch "Off-On"	193
Choke 30 h.	651
Choke 10 h.	652
A-C Cable	21
Transformer, audio	376

SYMBOL	VALUE	STOCK NO.
R-40	150 ohms, 1/4 watt	427
R-41	75,000 ohms, 1 w.	564
R-42	.25 meg, 1/4 w.	319
R-43	6000 ohms, 1/4 w.	438
R-44	125 ohms, 10 w.	544
C-65	60 mf, 300 v.	803
C-66	40 mf, 450 v.	802
C-67	30 mf, 475 v.	660
C-68	60 mf, 300 v.	803
C-69	.1 mf, 600 v.	1157
C-70	16 mf, 475 v.	1244
C-71	500 mf,	526
C-72	50 mf,	45
C-73	100 mf, 50 v.	661

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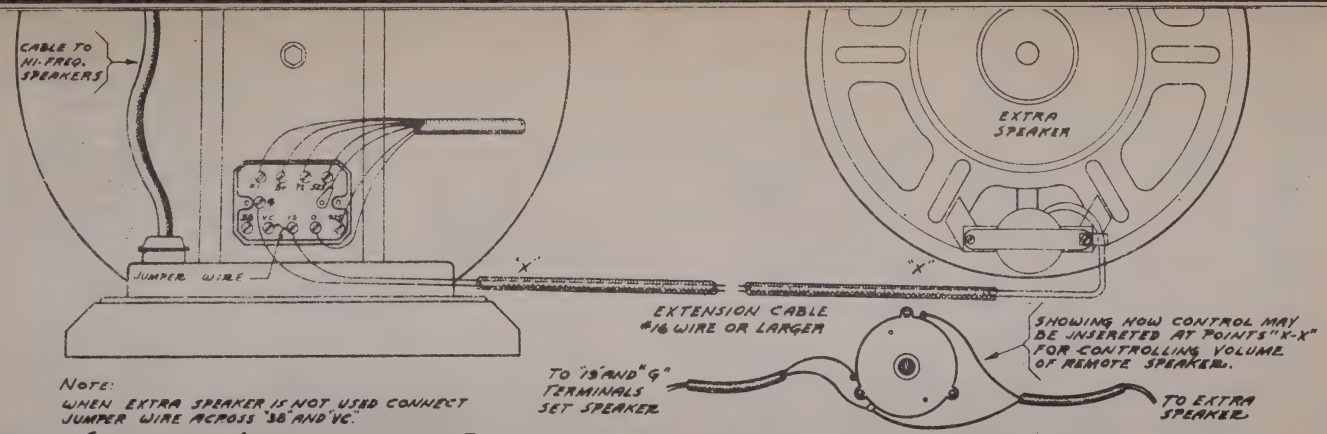
CABLE TO HI-FREQ. SPEAKERS
JUMPER WIRE
"X"
"X"
EXTRA SPEAKER
EXTENSION CABLE #16 WIRE OR LARGER
SHOWING HOW CONTROL MAY BE INSERETED AT POINTS "X-X" FOR CONTROLLING VOLUME OF REMOTE SPEAKER.
TO "S" AND "G" TERMINALS SET SPEAKER
TO EXTRA SPEAKER
Note:
WHEN EXTRA SPEAKER IS NOT USED CONNECT JUMPER WIRE ACROSS "SB" AND "VC"

BACK VIEW OF CONSTANT IMPEDANCE VOLUME CONTROL

Extra Speaker Installation For Scott Philharmonic Receiver

AMPLIFIER VOLTAGE READINGS
- - -
Line Volts 110
Hi-Lo Switch Down

TEST NO.	VOLTAGE MEASURED, TEST POINTS	CORRECT VOLTAGE	POSSIBLE CAUSE OF WRONG READING
1	Rectifier d-c output voltage: C.T. 83-V high-voltage winding to FIL. prong of 83-V	430	Defective rect.tubes; shorted high-voltage sec. winding; shorted 1st filter condenser
2	6L6 Plate voltage: C.T. 83-V Hi-voltage winding to 6L6G plates	410	Defective filter condensers; open primary on output transf.; shorted 50-mmf neutralizing condensers; open 10-henry choke
3	Input spkr.field voltage: Output lead of 30-henry choke (red blue tr) to ground	375	Shorted filter cond.; open 30-h. choke
4	B voltage to set: C.T. (green wire) 6L6G input transf. to ground	250	Shorted filter condensers; Pri. of 6L6 input transf. grounded; spkr. field open or shorted; B-divider shorted in set.
5	Speaker field volts drop 0 to 925 terminals on speaker	125	Shorted or open field

(CONTINUED ON NEXT PAGE)

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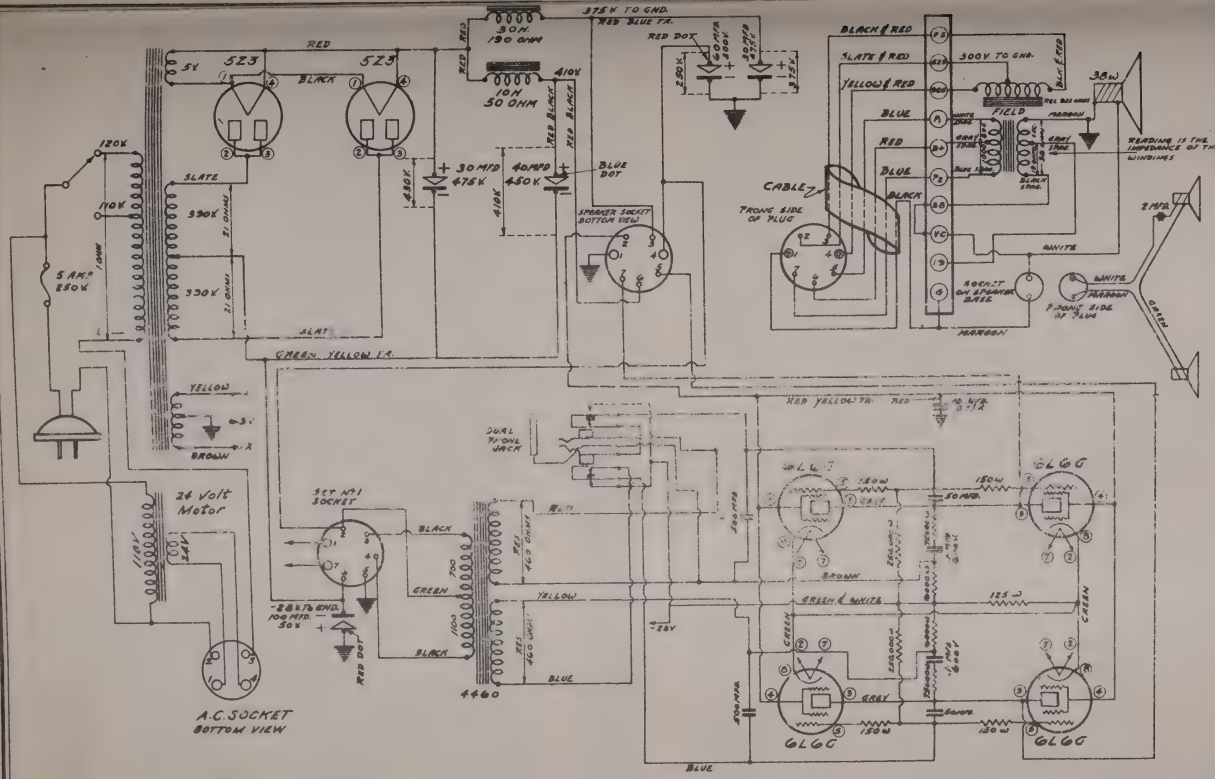

TEST NO.	VOLTAGE MEASURED, TEST POINTS	CORRECT VOLTAGE	POSSIBLE CAUSE OF WRONG READING
AMPLIFIER VOLTAGE READINGS (Continued)			
6	Bias voltage supply C.T. high-volt. winding to ground	-28	Shorted 100-mf electrolytic; shorted C-divider in set
7	Cathode 6L6G (Prong 8) to gnd.....	-3	Shorted 125-ohm cath. resistor
8	Screens 6L6 (Prong 4)	300	Open field tap
9	Filaments: 83-V (Prongs 1-4).....	5	Shorted wiring or windings
	To set (Yellow and brown)	6.3	

MODEL Philharmonic

E. H. SCOTT RADIO LABS., INC.

GENERAL

The Scott Philharmonic XXX is an advanced type of superheterodyne incorporating rather elaborate special features such as: Separate tuned R. F. stages for each band using two stages on all except the ultra high frequency section, separate 6J5G oscillator operated in a special electron coupled oscillator circuit arranged with an auxiliary VR150 voltage regulator tube for stabilizing the oscillator tube voltage; noise reducing shielded antenna input system for the wave lengths between 12 3 and 76 meters; continuously variable selectivity operating in conjunction with an R. F. band-pass system for high fidelity reception; four stage I. F. amplifier having electrostatic shield partitions between transformer primary and secondary coils; separate automatic gain control systems on the R. F. and I. F. amplifiers; continuously variable sensitivity control - dual bass boost and bass compensation for low volume - needle point 10,000 cycle attenuation system; push-pull expansion circuit; automatic phonograph needle scratch suppression circuit; 4 stage high gain audio amplifier with parallel push pull output stage; dual acoustical channel having one high fidelity 15" speaker and two high frequency units for extended range.

ELECTRICAL DESCRIPTION OF THE CIRCUIT

The circuit of the Philharmonic XXX will appear rather complicated, however, it can be easily understood when "broken down" section by section. It is recommended that the circuit be carefully followed as its operation is explained in the following paragraphs.

R. F. SECTION

The antenna input circuit is arranged so that a switch connects the antenna as a regular L - type to the primaries of the long wave, police, broadcast and ultra H. F. bands and as a doublet when on the short-wave 1 and shortwave 2 bands. When on the ultra H. F. band the signal is fed into its own R. F. circuit and the regular antenna and R. F. stage are not in the circuit. In SW_1 and SW_2 bands the signal picked up on the flat top portion of the antenna is transferred to the grid of the 1st R. F. tube by means of the shielded antenna coupling system giving a high efficiency of signal transfer and a high degree of noise reduction. On the other bands the signal is passed to the 1st R. F. grid in the usual manner and the band switch is so arranged that all coils not in use are shorted out, thus avoiding dead spots. When on the regular bands, the first tuned circuit resonates and amplifies the desired signal. The second and third tuned circuits operate in the plate output of the R. F. tubes rather than in the usual grid circuits and thus provide maximum R. F. gain. 6U7G type tubes, having a high mutual conductance are used in the R. F. stages and this factor makes for still higher gain on the higher frequencies.

A switch is ganged to the Fidelity Control so that as the I. F. System is band-passed to a certain point, the switch shunts a .15 condenser across a smaller value of condenser in the primary R. F. tuned circuit and thus broadens or band-passes this circuit for higher fidelity reception.

CONVERTER SECTION

The emission from the 6L7-G converter cathode is modulated by the voltage from the 6J5-G oscillator tube, the output of which is connected to #3 grid of the converter. The amplified signal from the R. F. amplifier is applied to the control grid of the converter. This latter signal also modulates the converter cathode emission and the plate current of the tube will carry the difference frequency component which will be the I. F. frequency

OSCILLATOR SECTION

The 6J5-G oscillator tube is arranged (thru the use of series padder shunt trimmer condensers and correct coils) to operate at a frequency which is 465 kc. higher than the frequency of the R. F. section. The oscillator circuit has been carefully arranged for the best stability and its filament circuit is adequately by-passed; in addition the plate voltage supplied to the tube is kept constant by means of a special voltage regulator tube the VR-150. This latter tube is connected to B + 250 V. through a series resistor of 6,500 ohms.

I. F. SECTION

The I. F. system comprises 4 stages having 4 double tuned I. F. transformers plus a single tuned closely coupled diode transformer. Three 6K7G tubes are used in the first three stages and one dual purpose 6B8G in the fourth I. F. stage. This latter tube acts as a driver for the low impedance diode circuit. Both primary and secondary coils in each I. F. transformer, except the first I. F. primary, are wound in 4 pi sections on special low loss bakelite forms, and tuned by air condensers. The first I. F. coil is a 3 pi section coil. Electrostatic shields are provided between the primary and secondary coils of each I. F. transformer, to eliminate capacity coupling and in addition each stage is arranged with resistance capacity filters for each circuit. The design of this I. F. amplifier assures high gain and provides a large degree of usable sensitivity. Six of the double tuned transformer circuits are provived with small variable condensers which, operating in opposite directions as the control knob is turned, serve to vary the band width as desired. The remaining three tuned circuits maintain the sensitivity mid-band and thus avoid the usual center dip at full band width. Three other controls are ganged to the selectivity hi-fidelity control. One of these is a variable which controls the bias on the I. F. amplifier tubes and keeps the sensitivity of the receiver nearly constant as the fidelity is varied, another control switch is an audio tone control and it cuts the audio response at about the same frequency as that at which the I F. band width is set, this is useful on phonograph reproduction and certain types of shortwave reception. The other switch control band-passes the R. F. when the fidelity control is opened sufficiently.

R. F. AND I. F. A. G. C. SYSTEMS

Two separate automatic gain control systems are employed in the Philharmonic XXX, the first controlling the R F amplifier, using a 6B8G tube and the second system controlling the I. F. amplifier, using one 6B8G tube. In the R. F. A. G. C. circuit the control grid of the 6B8G tube is capacitively coupled to the plate of the converter tube. I. F. and signal frequency are amplified in this tube and rectified in its diode circuit and applied as control on all bands, on the first R. F. tube. This arrangement prevents overload in the R. F. and converter tubes and further helps to eliminate noise and distortion, when tuned to a powerful local, or adjacent channel "slop over" from locals, when tuned to a distant station.

In the I. F. A. G. C. circuit the 6B8G control grid is capacitively coupled to the 2nd I. F. plate by means of a 25 mmf. condenser. The rectified diode out-put is applied as control on the first three stages of I. F. and is proportioned so that practically constant signal level is maintained at all times. In addition this system gives satisfactory tuning indication even when operated at high fidelity.

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VARIABLE SENSITIVITY CIRCUIT

With the efficient AGC circuit of the XXX this means that when tuning between stations the AGC circuit will open up the full sensitivity of the receiver and bring up interstation noise if the location is not "quiet". With the variable sensitivity control, however, the degree of sensitivity may be set to any pre-determined level and thus "throttle" the A.G.C. voltage so that it does not drop below a set level. This action is accomplished in one half of the sensitivity diode 6H6G tube, the other half of this tube is used in a noise "limiter" circuit for reducing some types of noise and interference. This circuit is not shown on the diagram but it is very unlikely that any trouble will ever arise in it.

AUDIO AMPLIFIER

Four stages of class A audio amplification are used giving adequate gain and over 40 watts output with less than 1% harmonic distortion. The first audio stage uses a 6J5G, the second uses another 6J5G as an inverter, the third stage uses two 6J5G tubes in push-pull to drive the 4th audio 6L6G power output stage. The output stage comprises four 6L6G beam power output tubes utilizing the inverse feed-back principle

Audio frequency voltage may be produced across the volume control either by diode rectification, when the radio phono switch is in the "radio" position, or, it may be introduced in the phono-posts by a microphone or phono-pickup and may be amplified in the four stages as outlined above. The volume control has a tap at 20,000 ohms from its ground end and this point is connected to ground through a choke, condenser and resistor combination, which provides balanced bass compensation at low volume. A special 10,000 cycle attenuator system is connected in the plate circuit of the first audio tube. It consists of a variable resistance, two fixed condensers and a choke having a movable core. This arrangement provides for infinite attenuation of the undesired 10,000 cycle adjacent channel whistle without affecting frequencies below 8,500 or above 11,000 cycles. The inverter stage out-put connects into the control grids of the 6L7G P.P expander tubes and while they are primarily for the purpose of expansion, they also serve as a coupling stage between the 2nd and 3rd audio. The dual bass circuit is connected in the plate circuit of the 6L7G tubes and consists of two 175 henry chokes tuned by 0.02 mfd. shunting condensers and coupled by means of .025 mfd. condensers. Bass control is obtained by means of a dual potentiometer control, the one megohm section of which is shunted across the choke circuit and the 10,000 ohm section is connected back to the inverter grid input through a 100,000 ohm fixed resistor. This system provides a wide degree of bass variation and also gives a high boost "peak" at 70 and 45 cycles, but a decided dip at 60 cycles and it also falls rapidly at 120 cycles This feature reduces 60 cycle power line hum and station hum that is often picked up.

RECORD SCRATCH SUPPRESSION

The automatic Record Scratch Suppression System utilizes a 6B8G, the control grid of which is connected to the input to the main audio circuit through a 100 mmf. condenser. This tube operates as a diode to supply rectified voltage to another tube, a 6J7G, operating as a variable mu device so that its gain is a function of the applied bias, and this latter tube causes an effect upon the input to the first audio as though a variable condenser to ground were shunting it. This "condenser" effect at any instant will be determined by the level of signal acting upon the 6B8G grid. Any signal above 1500 cycles which causes 80 V. or more to be applied to the 6J5G grid will cause the tube to be "cut off" and no high frequencies will be lost. Lower level signals, however, in the scratch frequency range will cause the "condenser shunting" effect and therefore, eliminate undesirable needle scratch at low volume but will have no effect on full reproduction of the higher frequencies at normal or high volume.

VOLUME RANGE EXPANSION

This circuit is connected to the audio input circuit by a 1000 mmf. condenser and a suitable means of control is provided. It consists of a 6J5G driver circuit, a 6H6 rectifier and a push-pull amplifier stage. The diode output of the 6H6 is connected to grid #3 of the 6L7-G tubes and this circuit is arranged with the necessary variable adjustments so that a very flexible system is thus provided. This circuit enables the volume as cut by the recording or monitoring engineer to be restored to the original volume range at which the program was played.

POWER SUPPLY

The power supply is of the heavy duty type, the primary of the power transformer being tapped and the circuit is arranged with a hi-lo switch so that it may be operated on line voltages between 100-130 V. The secondary high voltage winding utilizes two 83V tubes in a full wave rectifier circuit. This circuit works into a condenser input filter and additional sections provide a high degree of filteration. Over 260 mfd. of capacity is used in this amplifier and any ripple voltage is smoothed out to a minimum. The field of the speaker is utilized as a filter choke and this also supplies field excitation for the speaker. Tapped bleeder resistors are mounted in the chassis and serve to divide the C and B voltages, to the desired values.

LOUD SPEAKER SYSTEM

The power output transformer located in the base of the loud speaker is arranged to provide the following output impedance: 38 ohms from terminal marked 38 to G (ground) and 19 ohms from terminal marked 19 to G. When it is desired to use an extra speaker it must have a 38 ohm voice coil, then it is only necessary to change the jumper wire so that it is connected between terminals VC and 19 and the extra unit's voice coil is now connected in parallel with the main speaker from G to 19. We can supply output transformers on special order having the necessary taps or windings for any combination or arrangement of extra speakers. (See diagram)

TUNING INDICATOR AND EXPANDER EYE

An amplifying type 6G5 cathode ray tube is used to indicate tuning resonance and its grid is tied to a suitable point at the audio diode output. The expander indicater grid is connected to grid #3 of the expander 6L7G tubes and serves to indicate the amount of expansion. The 6E5 amplifying type cathode ray tube is used to indicate exactly the amount of expansion on phonograph or radio reproduction.

HEADPHONE JACK

A special jack is provided so that headphones may be plugged in to the first notch, and both speaker and phones will operate, while if pushed in all the way only the headphones will operate. *

PHONOGRAPH, MICROPHONE OPERATION AND RECORDING

The phono-input will take any type of high impedance phono-pickup device from 4000 ohms and upward. Matching transformers and arrangements for low impedance types are illustrated in the drawings relating to this. Any type microphone may be used but we recommend the new crystal type, and a pre-amplifier. A recording arrangement is available and a schematic diagram is shown.

* The head phone jack is optional and is not supplied as standard equipment.

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SET CHASSIS VOLTAGE READINGS

VOLUME CONTROL MIN. Sensitivity Control off - Record Scratch off - Expander off
Fidelity 3/4 on Wave change switch in B C position.
Line Volts at 110 V - Hi Lo Switch down

TEST NO.	Voltage Being Measured & Test Pts. to Ground	Correct Voltage	Possible Cause of Incorrect Reading
1	3rd Audio P.P. 6J5G:		
	Plates #3 prong	240	Audio transformer open
	Bias #8 prong	8	800 ohm bias resistor open or shorted.
2	P.P. Expander Amp., 6L7-G		
	Plates #3	205	(Plate resistors defective. (Bass boost chokes shorted or open.
	Screen #4"	100	Open or shorted screen circ.
	Grid #1 Bias (green yellow wire @ 1 Meg.)	-10.5	Expander adjustments shorted.
	Grid #3 Bias		
	Expander-OFF adjustment C. T.	-(8-10)	" "
	Expander-ON adjustment C. T.	-(11-14)	" "
3	Exp. Driver, 6J5-G		
	Plate #3	120	Open or shorted plate resis
	Grid bias, bias side 2 meg. grid res.	-6	Grid circuit open.
4	Inverter 6J5-G.		
	Plate #3	175	Defective Plate Resistor or plate filter condensers.
	Cathode #8	+17	Open or shorted cathode.
	Outside end 2 meg. grid resistors.	+10	
5	1st Audio, 6J5-G:		
	Plate #3	150	Defective plate resistors, plate filter condenser, or Hi Boost choke.
	Bias @ .5 Meg. end grid filter	-6	Defective components in grid circuit.
6	Record Scratch Control Tube 6J7-G:		
	Plate #3	75	Plate feed resistor defective.
	Screen #4	100	Shorted Screen.
7	Record Scratch Diode, 6B8-G.		
	Plate #3	110	Shorted plate filter condens. or resistors.
	Screen #6	55	Open or shorted screen.
	Bias:		
	R. S. off (outside end 1 meg going to Record Scratch Switch)	-28	Defective control switch or short circuit.
	R. S. on (inside end 1 meg. going to Record Scratch switch	-6	Shorted bias.
8	RF A.G.C. Tube 6B8-G:		
	Plate #3	235	Shorted on open diode coil pri. or plate circuit resistor.
	Screen #6	150	Open screen.
	Grid Bias		Short in cathode or grid circ.
	Junction of 3000 and 1500 ohm Cathode resistors.	+32	
	Cathode #8	+44	
	1st RF Min. Bias: Outside end 1 meg. res. to RF A.G.C. Line	4½	
	Developed Diode V. depends on signal		
9	I.F. A.G.C. 6B7-G:		
	Plate #3	235	Same Test as #8
	Screen #6	125	
	Bias, bias end 2 meg. grid resis tor. Diode V depends on signal	4½	
10	1st - 2nd - 3rd I.F. 6K7G:		
	Plates #3	235	I.F. coils shorted to shield tube
	Screen #4, 1st and 2nd I.F.	100	turned wrong in sockets.
	Screen #4, 3rd I.F.	125	I.F. trimmers grounding to shield
	A.V.C. line voltage determined by signal.		Fidelity condensers shorting.

*#4 B T C., refers to socket pin number except where reference is made to grid #1, Grid #8, etc.

(Continued on next page)

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TEST NO.	Voltage Being Measured & Test Pts. To Ground	Correct Voltage	Possible Cause of Incorrect Reading
11	4th I.F. Audio Diode 6B8G:		
	Plate #3	235	As test #10 Diode Plate winding open or shorted to shield can.
	Screen #4	125	Screen circuit open or shorted.
	Bias - measured at junction of 5 meg. and .05 meg. resistors shunting sensitivity control	-7	Defective grid circuit compon nt
12	Sensitivity Diode 6H6G: Cathode #8		
	Sensitivity Min.	28	Defective sensitivity control or defective resistors shunting it.
	Sensitivity Max.	7	
13	Oscillator 6J5-G:		
	Plate #3	140	Plate voltage dropping resistors defective.
14	Converter, 6L7-G:		
	Plate #3	235	Open I.F. Pri. coil, shorted .05 filter cond. or defective 1000 ohm res. to I.F. Pri.
	Screen #4	150	Open screens.
	Bias..... (Measure at Hi-end sensitivity control)	-9	Shorted bias circuits.
15	1st and 2nd R.F. 6U7-G:		
	Plate #3	235	Shorted R.F. coil trimmer open primary coils or plate circuit resistors shorted plate filter condenser. Open or shorted secondaries or filter circuits.
	Screen #4	100	Screen open.
	Bias (2nd RF) Bias end 1 meg. grid res. (1st RF) See test #8	-6	Bias circuit shorted or open.
16	Oscillator voltage regulator VR 150		
	Pin #2	150	Grounded plate circuit. Open or shorted 6500 ohm resistor.

RESISTANCE MEASUREMENT IN POWER AMPLIFIER

TEST NO	Points Where Resistance is Measured in Circuit	Resistance ohms	Possible Reason for incorrect reading.
1	Primary of power transformer (across	1	Open, shorted turns
2	Power transformer High V. secondary CT to 390 each side	21	Shorted or open.
3	Audio interstage transformer Primary:		
	C.T. to outside	(1100 (700	Shorted or open Pri.
	Secondary Junction of 150 ohm 6L6-G Grid resistor on 1 Pr. of tubes to brown sec. lead	475	Phone Jack not making contact Open or shorted winding
	Same measurement on other pair of tubes to yellow wire	475	
4	Chokes-		
	Red lead to red with blue tracer	190	Open or shorted
	" " " " " black "	50	
5	Output transformer:		
	B+ to P1	1000	Shorts or open circuits.
	B+ to P2	800	
	Secondary: -		
	38 to G	1.5	
	38 to 19	5	
	19 to G	1	
6	Voice Coil: -		
	VC to G	26	Open voice coil
7	Field -		
	O - 925	910	Open winding
	O - tap	525	

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RESISTANCE TEST MEASUREMENTS OF CIRCUITS IN SCOTT PHILHARMONIC XXX

TEST NO.	Points Where Resistance is Measured in Circuit	Resistance Ohms	Possible reason for incorrect reading
1	B +250 V. tap on B-divider to ground	4250*	I. F. Pri-Coils shorted to shield. R. F. trimmers shorting. Wave band switch contacts shorting.
	*Later divider	4750	
	150 V. tap on B-divider to ground...	3050	R. F. - A. G. C. or converter screens shorted
	125 V. tap on B-divider to ground...	2630	I. F. - A. G. C. 3rd or 4th IF screens shorted.
	100 V. tap on B-divider to ground...	2200	Screen circuits shorted.
2	Expander and tuning eye adjustments approximately.		
	Exp. Diode - OFF adj. C. T. to ground	200	
	Exp. Diode - ON adj. " " "	175	Cases of adjustments shorted to ground
	Exp. Eye " " " "	85	
	Tuning Eye " " " "	100	
3	C-Bias Divider to ground		
	20 Volt tap	260	
	15 " "	148	
	6 " "	60	Shorted wiring and as in Test #2
	4½ " "	50	
	3 " "	40	
4	Bass Boost choke B + to outside: (Bass full on)	2000) 2500)	Shorted choke or associated wiring and coupling condens.
5	Compensated bass choke - (across)	10	Shorted or open
6	Hi-Boost choke (across)	1100	As in 5
7	10,000 cycle adjustable choke (across)	250	As in 5
8	I. F. Coil circuits Primaries: Plates of Conv-1st IF -- 2nd and 3rd IF to B +	1100	Coils shorted to shield can. IF trimmers shorted. 1000 ohm resistors to pri. coils open or shorted.
	Secondaries: Grids of 1st and 2nd IF to AVC line	250,000	Resistors to secondaries open or shorted. Secondaries open.
	Grid of 3rd IF to outside end of grid resistor	1 meg.	Open or, shorted coil or resistor
	Grid of 4th IF to Junction point of .5 and .05 megohm resistor across sensitivity control	250,000	Resistor to coil open or shorted.
9	Diode coil circuits; - Outside end 10,000 ohm diode coil resistor to diode plates #4 and 5 on IF. A. G. C. -RF-AGC, and 4th IF.	10,000	Open diode coil, open or shorted. 10,000 ohm resistor.
	B + 250 V to plate on IF-AGC-RF-AGC; and 4th IF	1100	Open plate coil winding
10	Antenna coil circuits: - Primaries- Measure at outside ANT. post to GND.		
	Position of Wave-Switch		
	UH	Open	Open coils or circuit shorts
	LW	57	
	POL	4	
	BC	20	
	SW1 and SW2	0	
	SECONDARIES: - 1st RF Grid to common Secondary terminal of SW ANT coil (A) SW1 and SW2 Pos. of Wave Switch	25	

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TEST NO	Points Where Resistance is Measured in Circuit	Resistance Ohms	Possible reason for incorrect reading
	1st RF Grid to common of LW-BC-POL		
	ANT (E)		Open ,coils or shorts
	Switch position		
	BC	35	
	POL	27	
	LW	50	
	UH	0	
11	RF1 and RF2 circuits		
	Primaries		
	SW - Position and coil		
	BC .....RF tube plate to Point A	1	
	POL. RF Tube Plate to Point A	0	
	LW...RF tube Plate to Point F	75	
	UH... " " " " " "	0	
	SECONDARIES:		
	SW POSITION and COIL		
	BC... Tuning Condenser Stator to A	7	
	POL.. " " " " "	0	
	LW .. " " " " F	20	
12	Oscillator Coil Circuits		
	Switch Position for Primary Coils		
	SW2 .....Gnd to Osc. Catho.	0	
	SW1 ..... " " " "	100	
	BC ..... " " " "	500	
	POL ..... " " " "	500	
	LW ..... " " " "	5	
	Sec. coils: Measure at coil points		Open coils, open resistors or shorts
	SW2 .....Gnd. (A) to point E	0	
	SW1 ..... " " " " D	0	
	BC ..... " " " " D	3	
	POL ..... " " " " B	0	
	LW ..... " " " " E	15	
	UH Spread out Grid 6J5 Osc. to 36 mmf. on stator	0	

INSTRUCTIONS FOR ADJUSTMENTS OF THE AUDIO CIRCUITS

With receiver cable not plugged into amplifier socket, test filaments to ground with the continuity meter. Turn Expander and eye adjustments near center and the resistance from center to ground should be above 75 ohms if not shorted. Connect the receiver to the a-c line through a voltage control device, such as the Variac and adjust the voltage to 112 volts with the Hi-Lo switch up. Where no such arrangement is available, allowance must be made for line voltage variation. Begin test by measuring voltages existing at the C and B dividers.

B - DIVIDER

	Volts	Res.to Gnd.*
Red	245	4250
Red green tr	150	3050
Red blue tr	125	2630
Red green tr	100	2200
Green	28	260
Green black tr	15	148
Green red tr	6	60
Red yellow tr	4.5	50
Black green tr	3	40

* With set plug not in amplifier

The set has the proper divider network in it, but if a new B-divider is installed, the C bias should be checked. Where the C bias is over 28 volts, it will be necessary to connect a resistor of about 2000 ohms from the 28-volt tap to ground. Use a decade resistance box to determine the correct resistor. Where the B voltage is much below 250 look for shorts in the plate circuits of the tubes.

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EXPANDER ADJUSTMENT

With Fidelity Control 3/4 of the way on, Volume Off, expansion off, Bass minimum, and in phono position, connect an audio oscillator to the phono posts with suitable rectifier type A.C. meters across the input directly, and across a 40 ohm dummy voice resistor or voice coil itself if desired, (GND. to 38) Feed 1 volt into phono-posts, and turn volume control until 1 volt is read at the output. Turn the Expander control just on and the output reading should drop to .4 of a volt, if it does not, vary the exp. diode - on adjustment on top of chassis. These adjustment controls are between tube shields near expander tubes. The Exp-on adjustment is nearest front of chassis. Turn the Expansion control knob to full and it should read 1.25 V. on the output meter. If it is too high or too low, turn the control knob to "off" position and set the Exp. diode-off control, (the one next to Exp-diode adjustment) for a new level, reset the Volume Control for 1 volt reading.and repeat as before until the correct results are obtained. Change tubes if necessary

With the Expander adjusted, and a 1 volt signal into phono, turn the Expansion Control knob to "just on" and adjust the Expander eye until it closes, by means of the adjustment screw nearest back of chassis. The eye should open full when the Expansion knob is all the way on, and a strong signal is being received.

RECORD SCRATCH SUPPRESSOR ADJUSTMENT

With expansion off and controls as above, feed 0 25 volts at 3500 cycles into the phono posts and adjust volume control for 1 volt output. Pull the Scratch Suppressor Switch "out" and the output reading should just start to drop. Now with Suppressor switch off, reduce the input to 0.05 volts, reset the volume control to obtain 1 volt again and turn the suppressor switch on. The output reading should drop to 0.2 giving a ratio of 5 to 1. If a 5 to 1 reduction ratio is not obtained the 6 volt bias applied to the 6B8G Record Scratch diode tube should be reduced by shunting this point to ground by a suitable resistor, using the decade resistance box method, or substituting various resistors until the correct results are obtained. If too much control is obtained it may be due to an abnormal 6J7G or the condenser across its grid and plate may be too high in value

BASS CIRCUIT CHECK

Connect a jumper wire from the tap point on the volume control to ground. Have bass control on full and other controls as before. Feed a signal in the phono posts at 400 cycles and adjust the output voltage for 1 volt across the dummy load resistor. Maintain the input constant as the frequency is varied over the lower range. There should be a peak reading of about 6 volts at 70 cycles, a dip-reading of 2 volts at 60 cycles, and another peak of around 4 volts at 40 cycles. Remember to leave the volume control set as it was at 400 cycles and keep the input constant at some convenient reading, say 1 volt. Sixty cycles may be determined by noting the "beat". If there is a peak at points other than those mentioned, it indicates that the bass chokes are shunted by too high a value of condenser, these condensers should be .02 mfd. If the bass "peaks" are low in output voltage reading, it indicates that the gain is low and this should be checked.

* Later divider measures 4750 ohms to ground on this tap, other taps remain as before.

AUDIO GAIN TEST

With an audio input signal of 0.1 volt at 400 cycles an output of between 10 to 15 volts will be obtained across the dummy voice load. Make this test at full volume, minimum bass, fidelity 3/4 on, Expander and Record Scratch off. If an output of around 20 to 30 volts is obtained look for trouble in the 6J5 PP stage grid circuit. If the gain is low it may be due to tubes, wrong voltages, shorts or open circuits, either in the set or power amplifier. Both should be checked.

10,000 CYCLE ATTENUATOR ADJUSTMENT

Feed an accurately known frequency of 10,000 cycles into the phono-posts and obtain an output reading of about 2 volts in full fidelity position Move the adjustable core on the attenuator choke until a dip in the output reading is obtained Turn the small midget variable control, which is mounted over the 1st audio socket, until the dip point is lowest, now feed in more signal and repeat operations more carefully until a condition is obtained so that the output meter needle is just moving down to its minimum point. The needle should be moving down rather than at the minimum, and the core may now be sealed with coil "dope". In case it is necessary to push the core to the top of the choke, (gap end) the inductance is now minimum, which means that the two 100 mmf condensers are too high in value and will have to be replaced with condensers having closer tolerance. If it is necessary to push the core all the way to the bottom, the inductance will now be greater and it means that the condensers are below 100 mmf. and the higher values are required.

For 9,000 cycles the two condensers should have a value of 125 mmf. each and a 9 kc source of signal will be required, otherwise the same data applies

HUM TESTS

Make certain that there are no soldering irons near the chassis and that the power transformer end of the amplifier is as far away from chassis as possible. Connect the output meter to the 6L6 plates. (Blue wires on P_1 and P_2 speaker terminal plate) having a 0 5 to 1 mfd condenser in series with one lead to the meter. With bass control full on, volume off and fidelity 3/4 open, note hum. It should not be over 0.3 of a volt, overall, at full bass To make overall tests, remove 3rd audio 6J5G tubes. The hum should be zero, and if not, it is in the amplifier Leave the 3rd audio out and replace 6L6G tubes in the power amplifier until the hum is zero. Now replace the 3rd audio tubes and remove expander 6L7G tubes. The hum should not exceed 0.2 volts. Try new tubes if necessary and try pushing filament wires closer to base and away from grids Now remove the 6J5G inverter and 1st audio tubes and insert one of the expander tubes. The hum should not rise above its previous value, if it goes up appreciably try another tube. After selecting one 6L7G leave it in the socket and match it up with another that does not raise the hum above that of the single tube. Next put in the inverter tube and select one that has minimum hum. The 1st audio tube may now be replaced, and this may require a trial of several tubes, if it appears impossible to get the overall hum down to 0.3 volts select other expander tubes and repeat as before. The set filament wiring should also be checked. See that the filament wire on the 3rd audio tubes, 6J5G, is pushed down closely to the base, also the filament wires from the "eyes" and dial lights should be clear of the hi-boost and bass compensator chokes. If it has slipped out of place, push it away from the chokes and over to the corner of the 4th Hi-Fidelity shield can.

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HOW TO ADJUST INTERMEDIATE FREQUENCIES IN THE SCOTT PHILHARMONIC XXX

To satisfactorily align the I F and R F circuits in Scott Receivers, a modern signal generator is a necessity We recommend the use of an instrument such as the model 12 Monarch The ordinary method of using an output meter for indicating alignment is not satisfactory We recommend the use of a sensitive meter such as the Weston model 600 D C Microammeter The meter should be shunted by a 10,000 ohm resistor and a 500,000 ohm resistor should be connected in series with the positive side. Set the controls so that the selectivity fidelity control is in the selective position, bass control minimum, sensitivity control maximum, expander control off, and volume just on The signal generator output lead should be connected to the control grid of the 6L7 converter tube through a 5,000 mmf condenser. The control grid should also be connected through a 1 megohm resistor to the grid lead which formerly connected to its grid cap so that it will be properly biased.

Connect the positive side of the microammeter to chassis ground and the negative terminal to the diode output celanese lead connected to the switch on the selectivity control It is well to have a small 22-1/2 volt C Battery with a number of taps Connect the positive side of the C Battery to chassis ground and either the 10 or 15 volt tap to the A V C line on the I F A G C diode and the -6 volt tap on the R F A G C diode output These two points are at the end of the 10,000 ohm diode resistor which projects through the diode shield can Use the voltage taps on the C Divider if a C battery is not available

Feed a 465 kc signal * from the generator sufficient to show indication on the microammeter and begin adjusting the first I F trimmers Next adjust the 2nd, 3rd and 4th primary and secondary I F trimmers in turn, meanwhile reducing the signal generator input voltage Repeat the above operations more carefully making certain that each I F stage has a double peak as indicated by rotating each trimmer until this is shown Next adjust the audio diode adjustment for maximum output Remove the negative 15 volts from the I F A G C diode output point and replace it on the 2nd I F A V C line Connect the negative terminal of the microammeter to the output point of the I F A G C diode Increase the signal generator input to the converter until the microammeter reads about mid scale Then adjust the variable control on the I F A G C diode for maximum output Put in more signal if necessary

* I.F. frequency is 465 kc. in most cases but may be 456, 472 5 or 475 for some special locations. In some cases it may be better to start at the 4th I.F. and work back to the 1st, especially if one of the stages is defective or weak. Also it may be desirable to "beat" generator with a signal at 930 kc. to determine if the generator calibration is correct

Remove the -6 volt lead from the R.F. - A.G.C. diode output point and connect the negative terminal of the microammeter to this point. Put sufficient signal into the converter to get an indication on the meter and adjust the R.F. - A.G.C. diode for maximum output. It may be necessary to over-load this circuit in order to get sufficient indication. The system should now be correctly aligned.

Remove all tie down biases and with the microammeter connected to the celanese lead on the switch on back of sensitivity control, feed a signal of 2,000 microvolts into the converter grid. The microammeter should read between 16 and 18 volts which corresponds to the standards at our Laboratory. There should be no wide deviation from this standard. The I.F. sensitivity of the set is dependent upon the I.F. coil position, the bias voltage, or screen voltage. The coils are mounted on the brass shield partitions so that in the 1st, 3rd and 4th I.F. stage the distance from the top of the shield to the coil form is 3/16 inch, while in the 2nd stage it is 3/8 of an inch. More sensitivity can of course, be gained by decreasing the distance, however, it should never be necessary to resort to this but the distance should be measured as a "check"

Another way to increase the sensitivity if found necessary, is to decrease the 28 volt bias voltage to about -27 volts by the shunting of the 28 volt tap on the divider, to ground by a suitable resistor. This assumes of course, a line voltage of 112 volts, sensitivity control full, fidelity control in the minimum position, and the hi-lo switch on the amplifier should be in the "up" position.

R F. ALIGNMENT ON PHILHARMONIC LONG WAVE BAND

In the following adjustments it should only be necessary to vary the trimmers and padders for the average case, however, full instructions are included to cover the case where new coils have been installed.

1. Check carefully and make sure that the horizontal line on the left side of the dial cuts through the tuning indicator spot. Connect a jumper wire from center Ant. Post to Gnd. and connect a signal generator to the outside Ant. post. An output meter may be used.

2. Turn the wave change switch to the long wave position and adjust the dial to the reading of 170 kc. Now with the signal generator set to 170 kc adjust the long wave padding condenser C_{21} until proper resonance is indicated. Now turn the dial to the settling of 370 kc. and adjust the long wave oscillator trimmer condenser C_{12} until the 370 kc signal from the generator is tuned in. Next turn the dial back to 170 kc. rechecking the adjustment and making any necessary changes in the setting on padding condenser C_{21}. Check the tracking in the center position at 250 kc. and if any correction is necessary at this setting, it will be necessary to add turns to the oscillator secondary to lower the frequency or on the other hand turns will have to be taken off to raise the frequency as well as to readjust padder condenser C_{21} and trimmer condenser C_{12}

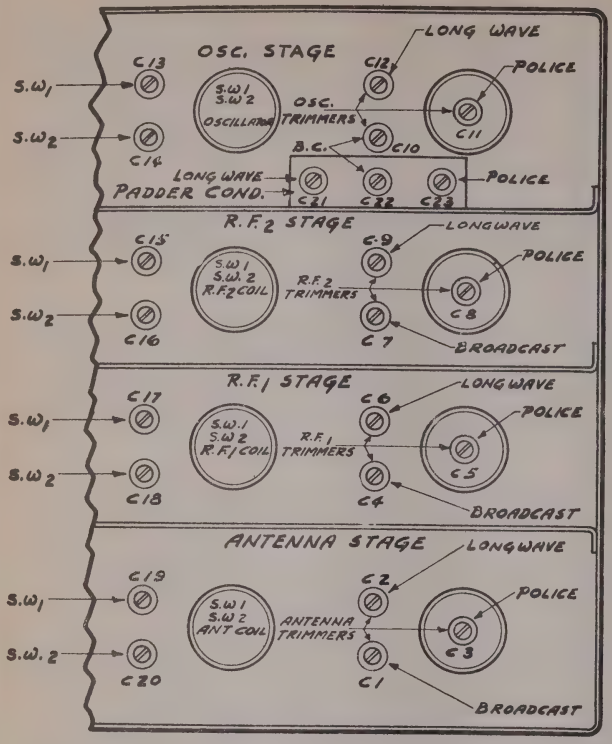
3. With the oscillator stage properly aligned turn the tuning dial to 370 kc and tune in a signal from the signal generator and adjust trimmers C_2 C_6 C_9 to give maximum output. Next turn the dial to 170 kc. and check the alignment by means of a tuning wand. We strongly urge the use of a tuning wand for proper alignment of the receiver One end of this device is a core such as a polyiron and the other brass. When the inductance of the coil is high the insertion of the brass end will decrease it to the proper resonant value, whereas, insertion of the other end will increase it to the correct resonant value. This is a quick method of determining whether or not turns will have to be added or taken off. Add turns if the inductance is low and on the other hand remove turns if the inductance is high at the same time adjusting trimmer condensers C_2-C_6-C_9 at 370 kc. Then recheck the alignment at 250 kc. which should be very close if the dial setting is correct.

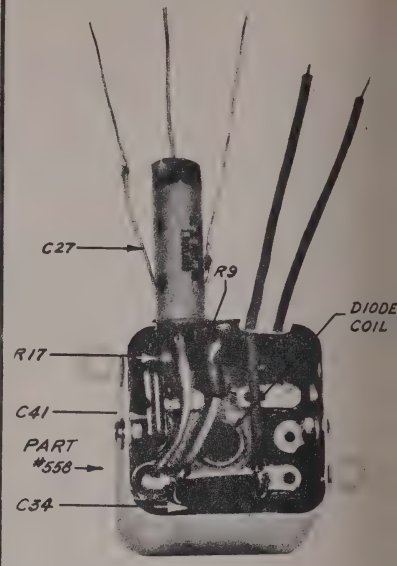
ALIGNMENT OF POLICE BAND

Turn the wave change switch to the police band making certain that the coil shield plate is securely fastened to the chassis and set the tuning dial to 1.8 meg. With the signal generator set at a

MODEL Philharmonic

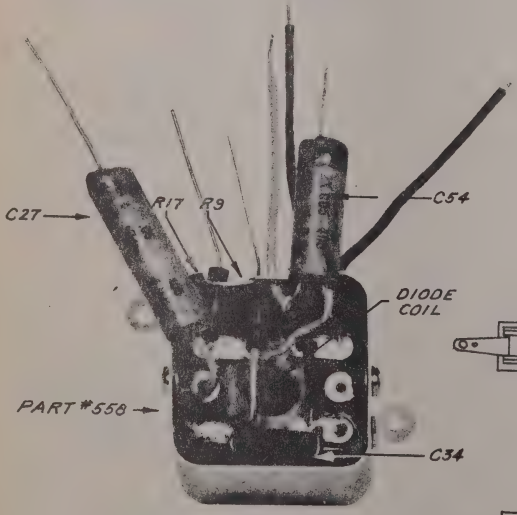
E. H. SCOTT RADIO LABS., INC.





AUDIO DIODE

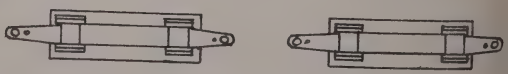
POSITION OF TRIMMER AND PADDER COND.



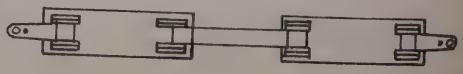
I.F. A.G.C. DIODE
R.F. A.G.C. DIODE

PHILHARMONIC

FOR
110 VOLT OPERATION
2-4 AMP. FUSES



FOR
220 VOLT OPERATION
1-2 AMP. FUSE



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frequency of 1.8 meg. adjust padder condenser C_{23} until resonance is indicated. Now adjust the tuning dial to 3.7 meg. and tune in generator signal by adjusting trimmer condenser C_{11}. Turn the dial back to 1.8 meg. and readjust padding condenser C_{23} if necessary. The middle tracking should be checked at 2.6 meg. making any necessary changes in calibration at this point, by pushing together or spreading the turns on the coil and then, of course, readjust the padding and trimming condensers.

2. After the oscillator stage has been correctly aligned set the tuning dial at 3.7 meg. and adjust the trimming condensers C_3, C_5, and C_8 to give maximum response. Check the alignment at 1.8 meg. making any required changes in inductance by pushing or spreading the turns on the coils and readjusting the trimmer condensers C_3, C_5, and C_8 at 3.7 meg. Finally check the alignment at 2.6 meg.

ALIGNMENT ON BROADCAST BAND

1. For alignment on the broadcast band turn the wave change switch to the broadcast position and employ exactly the same procedure as you did for the police band. Padding condenser C_{22} should be adjusted at 650 kc. and trimming condenser C_{10} at 1420 kc. The middle tracking is checked at 970 kc. with any adjustment in inductance made by pushing together or spreading apart the turns on the coils and realigning the padder and trimmer condensers.

2. After proper alignment has been made on the oscillator stage adjust trimming condensers C_1 - C_4 - and C_7 at 1420 kc. and check alignment with the tuning wand at 650 kc. and 970 kc.

ALIGNMENT OF SHORTWAVE BAND NO. 1

1. First turn the wave change switch to shortwave band No. 1 and turn the tuning dial to 9 meg. By adjusting trimming condenser C_{13} tune in a signal from a signal from the signal generator. Check the alignment at 5 meg. and adjust the calibration by pushing together or spreading apart the turns on the coil. Middle tracking should be checked at 6.5 meg. and if it is necessary to adjust the calibration at this point either spread or push together the turns on the oscillator coil and change the fixed pad on the oscillator coil to correct the calibration at 5 meg.

2. With the oscillator stage properly aligned set the tuning dial to 9 meg. and adjust trimming condensers C_{15}, C_{17} and C_{19} to maximum output. Alignment at 5 meg. should be checked with the tuning wand and any adjustments necessary made by pushing together or spreading turns on the coil. Then check the middle tracking point at 6.5 meg.

ALIGNMENT OF SHORTWAVE BAND NO. 2

1. Place the wave change switch on shortwave band No. 2 and adjust the tuning dial at 22 meg. Tune in the signal from the generator by adjusting trimmer condenser C_{14}. Turn the tuning dial to 12 meg. and adjust the calibration by either pushing together or spreading apart the turns on the oscillator coil. The middle tracking point is checked at 16 meg. and if it is necessary to readjust the calibration at this point either push together or spread apart the turns on the oscillator coil and change the fixed padding condenser on the oscillator coil to correct the alignment at 12 meg

2. When the oscillator stage has been properly aligned set the dial at 22 meg and adjust trimmer condensers C_{16}, C_{18}, and C_{20} to give maximum output. Check the alignment at 12 meg. by means of a tuning wand and make any required adjustments by either pushing together or spreading apart the turns on the coils. Check the middle tracking point alignment at 16 meg

ALIGNMENT OF THE ULTRA SHORTWAVE BAND

1. Set the tuning dial at 30 meg. with the high fidelity control advanced about 1/4 of the way on. Tune in the signal from the generator using a harmonic of 15 meg and adjust the calibration by spreading or pushing together the turns on the ultra high frequency oscillator coil. Be sure to keep the small booster coil at the bottom of the oscillator coil closely coupled. Next adjust the dial to 60 meg. leaving the generator set at 15 meg and check the calibration.

2. With the oscillator properly aligned and the receiver tuned to the generator signal at 60 meg. adjust the trimmer condenser on the ultra high frequency R F coil to maximum slowly rocking the tuning dial back and forth while making this adjustment. Check the alignment at 30 meg. and adjust to maximum by spreading or pushing together the turns on the R F coil and readjusting the trimmer at 60 meg.

CONCLUSION

It will be recognized that it would be quite impossible to enumerate every symptom and its required remedy in a circuit and mechanism as elaborate and advanced as the Scott Philharmonic XXX For this reason a rather detailed description of the functions and operation of practically all parts has been given This information together with the circuit diagram should enable the experienced service engineer to remedy any trouble, however, there may be cases that are particularly baffling and in such events the Scott Radio Laboratories may always be relied upon to cooperate in every way possible.

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WHEN REPLACEMENTS ARE REQUIRED
BE SURE TO ORDER BY STOCK NUMBERS SHOWN BELOW

Symbol	Part	Stock Number
1	100 mmfd. Cond.	46
2	2 meg. 1/4 watt Res.	321
3	.05-400 V Cond.	1284
	(60 mmfd. Air Cond. Fixed	
	(30 mmfd. Air Cond. Variable	932
	(85 mmfd. Air Cond. Fixed	
4A	(30 mmfd. Air Cond. Variable	933
5	3 pi I. F. Coil	948
6	4 pi I. F. Coil	272
7	6S8 Socket	1220
8	300 ohm variable (eyes and Exp. adj.)	1155
9	4370 Choke (Bass)	1371
10	.025-400 V Cond.	1283
11	Selectivity Fidelity Control (2,000 ohms)	1315
12	Volume Control (500M)	1343
13	Bass Control (Dual)	1333
14	Scratch Suppressor Switch	1341
15	Expander Control (500 M)	1342
16	Wave Change Switch	
17	Sensitivity Control and Phono Switch (2000 ohms	700
18	Indicator Eye Tube Bracket	1326
19	5000 mmfd. Mica Cond.	295
20	.02 mfd. 400 V Cond.	1335
21	1-12 Variable	1184
22	SW_1 and SW_2 Ant. Coils (L-G)	1399
23	L. W. and B.C. Ant. Coils (L - 1)	1400
24	L. W. and B. C. R. F. Coils (F)	1408
25	SW_1 and SW_2 R. F. Coils (L-D)	1402
26	Dial Light Cable	1354
27	Tuning and Exp. Eye Cable	
28	L. W. and B. C. Osc. Coil (L-C)	1398
29	SW_1 and SW_2 Osc. Coil (L-A)	1396
30	20 mmfd. Cond.	522
31	2-2 section gang Cond. (front and rear)	534
32	.01-400 V Cond.	1281
33	25 ohms 1/4 watt Res.	286
34	1 meg. 1/4 watt res.	124
35	250 mmfd. Cond.	47
36	1000 ohm 1/4 watt Res.	367
37	1/4 meg. 1/4 watt Res.	319
38	6 mmfd. Cond.	1363
39	2 meg. 1/4 watt Res.	321
40	Police Osc. Coil (L-B)	1397
41	Police R.F. Coil (E)	1404
42	Police Ant. Coil (L-H)	1400
43	100 mmfd. Cond.	46
44	.1 mfd. 400 V.	281
45	.15 mfd. 400 V.	799
46	1000 mmfd.	52
47	Wave Switch Section	1278
48	Wave Switch Shaft	1276
49	Ult. High Freq. Gnd. Coil	1392
50	" " " Sec. Coil	1334
51	" " " R F. Coil	1391
52	" " " Booster Coil	1405
53	20,000 ohm 1/4 watt Res.	341
54	1000 ohm 1/4 watt Res.	367
55	50 mmfd. Cond.	45
56	100 ohm 1/4 watt Res.	414
57	500 ohm 1/4 watt Res.	768
58	800 ohm 1/4 watt Res.	1215
59	300 mmfd. Cond.	48
60	900 mmfd. Cond.	51
61	50 mmfd. Cond. (Trimmer)	296
62	50,000 ohm 1/4 watt	318
63	15,000 ohm 1/4 watt	374
64	.05 mfd. cond. 400 V.	1284
65	.008 mfd. Cond.	1368
66	2500 ohms 1/4 watt Res.	369
67	7,500 ohms 1/4 watt Res.	1322
68	3,500 ohms 1/4 watt Res.	370
69	100,000 1/4 watt Res.	120
70	25 mmfd. Cond.	285
71	500 mmfd. Cond.	536
72	10,000 ohms 1/4 watt	317
73	1 mfd. Cond.	281
74	7 x .5 200 V. 400 V.	1321

SYMBOL	PART	STOCK NUMBER
75	R. F. - A.G.C Diode (assembly)	
76	I.F. - A.G.C Diode "	
77	Audio Diode "	
78	2 Blade Hi-Fi Cond. (L)	389
79	Stator Plate	462
80	Brass Shield	449
81	2 Blade Hi-Fi Cond. (S)	390
82	Band Pass Switch	1314
83	25,000 ohm 1/4 watt Res.	650
84	15,000 ohm 1/4 watt Res.	374
85	Hi-Fi Shaft	1298
86	.7 Henry High Boost Choke (L4) 4443	1370
87	Bass Comp. Choke 24 M.H. (L-3) 4442	1372
88	1 mfd. Cond. 200 V	968
89	150 ohm 1/4 Res.	427
90	500,000 ohm 1/4 watt Res.	123
91	"C" bias Divider	524
92	Gear #1	
93	Gear #2	
94	Gear #3	
95	Hi-Fi Control Switch	
96	2500 mmfd. Cond.	310
97	1,500 ohms 1/4 watt Res.	368
98	3 meg. 1/4 watt res.	386
99	75,000 ohm 1/4 watt Res.	563
100	Attenuator Choke 4446	1373
101	"B" Voltage Divider	523
102	1/2 meg 1/4 watt Res.	123
103	750,000 ohm 1/4 watt Res.	1045
104	200,000 ohm 1/4 watt Res.	1246
105	35 mmfd. Cond.	286
106	2,000 ohm 1/4 watt Res.	840
107	.025 mfd. 400 V Cond.	1283
108	25,000 ohm (Attenuator variable)	1337
109	40,000 ohm 1/4 watt Res.	1048
110	5,000 ohm 1/4 watt Res.	371
111	.006 mfd. Cond.	1275
112	4 x 4 mfd. 300 V.	1259
113	175 Henry Choke	1371
114	.05 mfd. Cond. 100 V.	1284

During the early part of 1939 several improvements and changes were made in the Philharmonic receiver. These changes results in a number of parts being removed from the receiver and other parts added. These changes are not shown on the top and bottom view diagrams but are shown on the circuit diagram. These changes are as follows.

.5 meg ohm 1/4 Watt Resistors	123	.01 400 volt tubular condenser	861
Compensator switch	1312	.05 " " " "	656
300 ohm variable resistor	1155	.25 " " " "	876
Volume Control	1343	.025 " " " "	875
Expander Control	1342	.05 200 " " "	279
Scratch Suppressor Switch	1341	Volume Control (topped at 40,000 R) new	413
50000 mmf. mica condenser	295	Expander control (linear taper) new	409
100,000 ohm 1/4 watt resistors	120	1 meg. ohm midget control	1472
.15 400 volt tubular condenser	799	100,000 ohm midget control - new	
1 mfd. 200 volt condenser in can	968	S. S. Switch midget type (stackpole) new	707
150 ohm 1/4 watt resistor	427	50 mmf. trimmer condensers (teleradio)	296
Volume compensation choke # 1442	1372	Biading post (Marked U.S.) now	410
50,000 ohm 1/4 watt resistor	318	Antenna ring	1197
Switch Section	1278	Switch section	1279
2500 mmf. mica condenser	310	Escutcheon (fidelity) new	
.01 400 volt condenser	361	Escutcheon (scratch suppressor) new	
25 mmf. mica condenser	285	Knobs small	1340
10,000 ohm 1/4 watt resistor	317	Ultra S.W. Coils - new	
100 mmf. mica condenser	46	50 mmf. mica condensers	45
900 mmf. mica condenser	51	25,000 ohm 1/4 watt resistor	341
400 ohm 1/4 watt resistors	1270	900 mmf. Silvercap condenser (new) Cornell	453
600 " " " "	1686	100 mmf. Silvercap condenser (new) Cornell	121
800 " " " "	1216		
15,000 ohm 1/4 watt resistors	374		
500 " " " "	768		
6,000 " " " "	438		
5,000 " " " "	371		
1,000 " " " "	367		
250,000 " " " "	319		

The wire jumpers may now be removed from the 3rd I. F. transformer terminals and the wire jumpers (or the original resistors, if they were used) connected to the 2nd I. F. transformer terminals. The bias jumper may now be removed from points "A" and "B" leaving the I. F. terminals connected as originally found and completing the alignment.

Alignment of R. F. sections:

Before starting on this portion of the set, it is important to understand how the tuning wand tool works. One end of this device has a core of material such as Polyiron while the other end is brass. When the inductance of a coil is high, insertion of the brass end will decrease it to the proper resonant value; whereas, insertion of the other end will increase the effective inductance. This gives a very convenient means of determining whether or not it is necessary to add or remove turns from the coil. In the following instructions only a slight adjustment of trimmers and padders should be necessary where original coils are used. Full instructions however, are given to cover the case where new coils are to be used.

Broadcast Band alignment:

First turn the dial pointer completely to the low frequency dial stop and center the pointer exactly between the two heavy horizontal lines which separate the "Broadcast A" position, set the Bass Control to minimum, Treble control to maximum and sensitivity switch to minimum (pulled out), and connect an output meter across the voice coil. Refer to Fig. 5, and adjust oscillator trimmer C1, until a

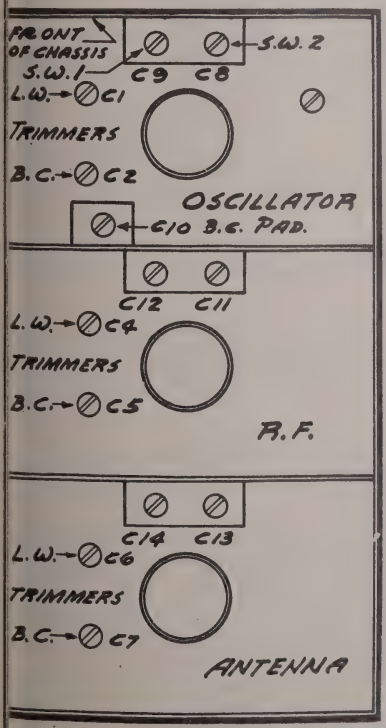

Fig. 4 Location of R.F. Trimmers and padders (Export Model.)

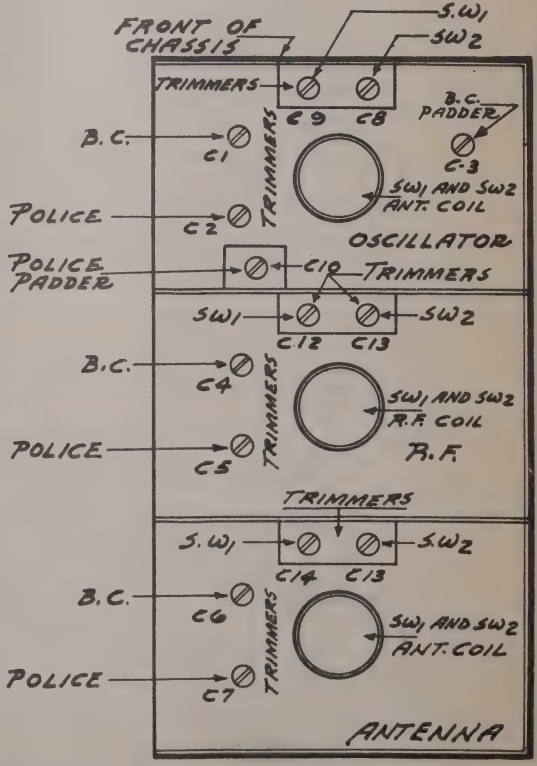

Fig. 5 Location of R.F. Trimmers and padders for Domestic Model.

1400 KC signal as set on the dial is tuned in from the generator. Rotate the dial to 650 KC and tune in a 650 KC signal from the generator by adjusting the padding condenser C3. Check the dial at 970 KC and if it tunes high in frequency spread turns on the oscillator secondary, if it is low in frequency push the turns together and then readjust trimmer condenser C1, and Padder condenser C3, as before.

With the oscillator circuit correctly spotted tune in a signal from the generator at 1400 KC and use the output meter as indication. Have as weak a signal as possible and adjust trimmer C4 and C6 for maximum output. Turn the dial to 650 KC and check the alignment of the R. F. and antenna stages with a tuning wand, spreading turns on the coil where less inductance is needed and pushing turns together if more inductance is required. Readjust the trimmer condenser C4 and C6 for maximum at 1400 KC. Turn the dial to 970 KC and check the alignment of the R. F. and antenna stages.

Police Band:

Set the wave Band switch to the Police "B" Band, position and turn the dial to 3.7 megacycles. Tune in a signal from the generator by adjusting the Padder C10. Check the alignment at 2.6 megacycles, if off, either push together or spread turns on the oscillator secondary as described under "Broadcast Band Alignment". Readjust trimmer C2 and padder C10 until correctly aligned. Tune in a signal at 3.7 megacycles and adjust trimmers C1 and C3 to maximum output, now check the alignment of 1.8 megacycles with a tuning wand and make any necessary corrections by pushing or spreading turns on the coils and readjusting trimmers C5 and C7. Recheck the alignment at 2.6 megacycles.

Long Wave Band on Export Model.

On the Export model the Long Wave Band replaces tho Police Band. To align this model set the wave change switch to L. W. position A and rotate the tuning dial on the set to 370 KC. Tune in a signal from the generator by adjusting trimmer condenser C1. Now turn the set dial to 170 KC and tune in a 170 KC signal from the generator by adjusting the oscillator padding condenser C3. Return to 370 KC and retrim condenser C1. Check the calibration at 250 KC. Add or remove turns from the oscillator coil as required for perfect dial calibration at these three frequencies. Now turn the dial to 370 KC and tune in a weak signal from the generator and adjust trimmers C4 and C6 until maximum output is shown on the output meter. Now turn the dial to 170 KC and check the R. F. and Ant. alignment with a tuning wand. Make any necessary corrections on the coils (where new) by adding or removing turns. Then repeak the trimmers C4 and C6. Check the alignment at 250 KC.

Foreign S. W. - C - (SW1)

Set the wave band switch to the "C" position and tune in a signal at 9 megacycles by adjusting trimmer condenser C9. Turn the dial to 4.5 megacycles and if necessary to correct the calibration do so by spreading or pushing turns on the coil and readjusting the trimmer condenser C9. Check the calibration at 6.5 megacycles.

With the oscillator calibrated tune in a signal at 9 megacycles and adjust trimmer condensers C12 and C14 for maximum output. Check the alignment at 4.5 and 8.6 megacycles and make any necessary corrections by pushing or spreading turns on the coils and readjusting trimmers C12 and C14.

Foreigh S. W. - D - (SW2)

Set the Wave Band Switch to D position and tune in a signal at 20 megacycles by adjusting trimmer C8, check and if necessary correct the calibration at 12 megacycles by pushing or spreading the turns on the oscillator coil. Check the calibration at 15 megacycles.

With the oscillator correctly aligned tune in a signal at 20 megacycles and adjust trimmers C11 and C13 to maximum output. Check the alignment at 12 and 15 megacycles and make necessary corrections by pushing or spreading turns on the coils, now readjust trimmer C11 and C13.

CONNECTING EXTRA SPEAKER

The New Type High Fidelity Scott Permanent Magnet 38 ohm voice coil speaker may be readily connected to a Scott receiver as shown in Fig. 6, with the optional "T Pad" inserted in the voice coil leads where separate control of the extension speaker volume is desired. In case the extension speaker is disconnected the jumper must be changed to connect terminals "V.C." and "38".

WAVE CHANGE SWITCH TROUBLE

Poor contact in the wave change switch can generally be corrected by slightly bending the contacts involved. However, in case a switch section is accidentally damaged beyond repair this section can be replaced by first removing the dial face then removing the two screws which support the wave change detent plate and very carefully pulling out the wave change switch shaft. The damaged section can then be unsoldered, removed, and replaced with a new unit which should be obtained from the Scott Chicago Laboratories before the change is made in order to assure exact duplication of switch position and connections. Note particularly that the small notch near the center of the switch rotor must be in the same position in each switch section.

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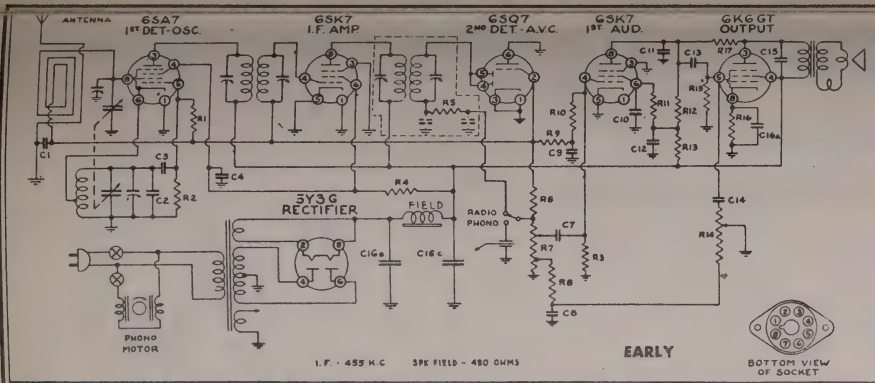
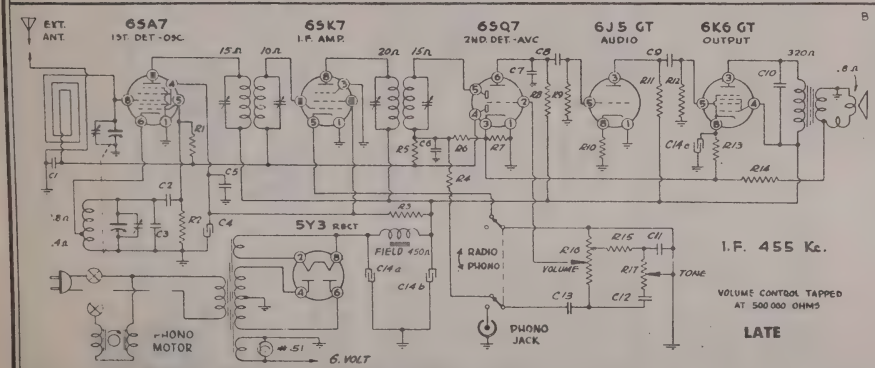
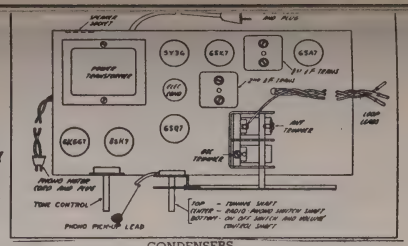






CONDENSERS

Circuit	Capacity	Type			
C1	.05	200v.	C8	.01	400v.
C2	.00005	Mica	C9	.02	400v.
C3	.000025	Mica	C10	.02	400v.
C4	8.Elect	150v.	C11	.02	400v.
C5	.05	400v.	C12	.002	600v.
C6	.00025	Mica	C13	.002	600v.
C7	.00025	Mica	C14a	20.Elect.	350v.
			C14b	20.Elect.	350v.
			C14c	12.Elect.	25v.

RESISTORS

Circuit	Ohms	Type			
R1	10,000,000	½w.	R9	500,000	½w.
R2	20,000	½w.	R10	3,000	½w.
R3	15,000	2w.	R11	50,000	½w.
R4	150,000	½w.	R12	250,000	½w.
R5	2,000,000	½w.	R13	600	½w.
R6	250,000	½w.	R14	350	½w.
R7	22	½w.	R15	30	½w.
R8	250,000	½w.	R16	1,000,000	V.C.
			R17	500,000	T.C.

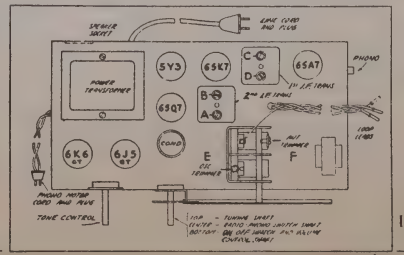
CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.05	200	C10	.05	400
C2	.000025—10%	Mica	C11	.00025	Mica
C3	.00005	Mica	C12	.1	400
C4	.05	400	C13	.01	400
C5	.0001	Mica	C14	.005	600
C6	.0001	Mica	C15	.002	600
C7	.01	400	C16a	20.	25
C8	.02	200	C16b	20.	350
C9	.05	200	C16c	20.	350

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	10,000,000	½	R10	5,000,000	½
R2	20,000	½	R11	1,000,000	½
R3	5,000,000	½	R12	250,000	½
R4	15,000—10%	2	R13	50,000	½
R5	70,000	½	R14	500,000	T.C.
R6	2,000,000	½	R15	500,000	½
R7	500,000	V.C.	R16	600—10%	½
R8	20,000	½	R17	3,000,000	½
R9	1,000,000	½			

C5 and C6 are an integral part of P4858, the 2nd I.F.but are separate condensers when the P4109, 2nd I.F. transformer is used.



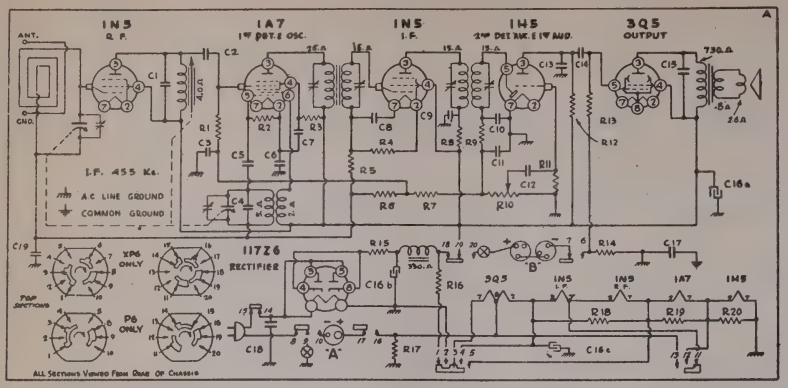
ALIGNMENT PROCEDURE

STEP	Correct Signal Generator to—	Radio and Generator Dummy Antenna Between	Set Generator Controls to—	Set Radio Controls to—	Adj. Following Trimmers to Max. Output
1	Tuning Cond. Ant. Stator	.1 mfd.	455 Kc.	1630 Kc.	A, B, C, D I. F.
2	Tuning Cond. Ant. Stator	.1 mfd.	1630 Kc.	1630 Kc.	E Osc.
3	Loop Radiator	Two feet from Radio No Connection	1400 Kc.	1400 Kc.	F. Ant. (Not used in some models)

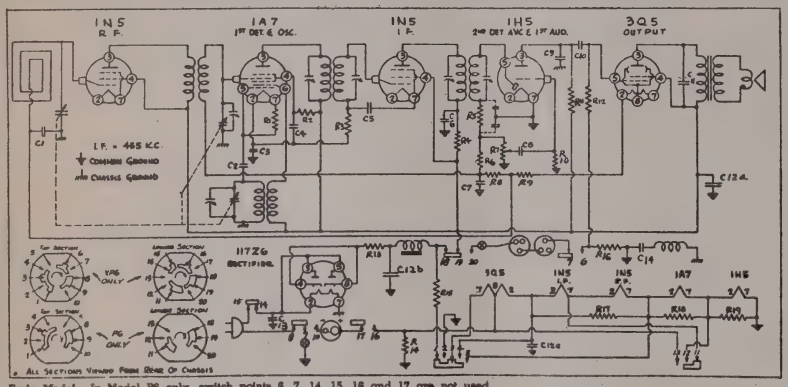
John F. Rider

MODEL P6-XP6

SEARS, ROEBUCK & CO.



Late Model. In model P6 only, switch points 6, 7, 16, and 17 are not used. Power switch in line position. Common ground is chassis ground.



Early Model. In Model P6 only, switch points 6, 7, 14, 15, 16 and 17 are not used.

STEP	Connect Signal Generator to—	Dummy Antenna Between Radio and Generator	Set Generator Controls to—	Set Radio Controls to—	Adj. Following Trimmers to Max. Output
1	Grid 1A7 GT	.1	455 Kc	1600 Kc.	A, B, C, D, I. F.
2	Grid 1N5 GT	.1	1600 Kc.	1600 Kc.	E Osc.
3	Grid 1A7 GT	.1	1400 Kc.	1400 Kc.	F — R. F. (Gang Early) on (Slug Late)
4	Loop Radiator	Two feet from Radio No Connection	1400 Kc.	1400 Kc.	G Ant.

Use Aerometer or three turn loop in series with 400 ohm resistor 10" diameter on Signal Generator in Step 4.

No.	Ohms	Watts
R1	100,000	½
R2	200,000	½
R3	5,000,000	½
R4	5,000,000	½
R5	5,000,000	½
R6	5,000,000	½
R7	3,000,000	½
R8	5,000	½
R9	70,000	½
R10	1,000,000	V.C.

No.	Ohms	Watts
R11	15,000,000	½
R12	1,000,000	½
R13	2,000,000	½
R14	400	½
R15	22	½
R16	2,150	5
R17	3,000	½
R18	500	½
R19	200	½
R20	110	½

No.	Capacity (Mfd.)	Volts
C1	.000367	Silver Mica
C2	.00025	Mica
C3	.01	400
C4	.000015	Mica
C5	.00005	Mica
C6	.25	200
C7	.01	400
C8	.01	400
C9	.05	400
C10	.00005	In I.F. Can

No.	Capacity (Mfd.)	Volts
C11	.0001	Mica
C12	.01	400
C13	.00025	Mica
C14	.01	400
C15	.002	600
C16a	40.	150
C16b	30.	150
C16c	100.	25
C17	.1	400
C18	.05	400
C19	.05	200

No.	Capacity (Mfd.)	Volts
C1	.05	200
C2	.00005	Mica
C3	.25	200
C4	.01	400
C5	.001	600
C6	.05	600
C7	.05	200
C8	.001	600

No.	Capacity (Mfd.)	Volts
C9	.00025	Mica
C10	.001	600
C11	.002	600
C12a	50. Elect.	150
C12b	30. Elect.	150
C12c	100. Elect.	25
C13	.05	400
C14	.2	200

No.	Ohms	Watts
R1	200,000	½
R2	50,000	½
R3	5,000,000	½
R4	5,000	½
R5	70,000	½
R6	3,000,000	½
R7	1,000,000	V.C.
R8	5,000,000	½
R9	10,000,000	½
R10	15,000,000	½

No.	Ohms	Watts
R11	1,000,000	½
R12	2,000,000	½
R13	22—10%	½
R14	1,000	½
R15	2,150—10%	5
R16	400—10%	½
R17	500—10%	½
R18	200—10%	½
R19	110—10%	½

ISSUE A 1942

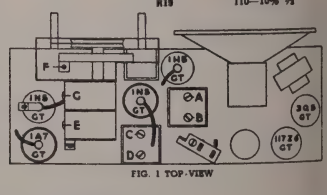


FIG. 1 TOP VIEW

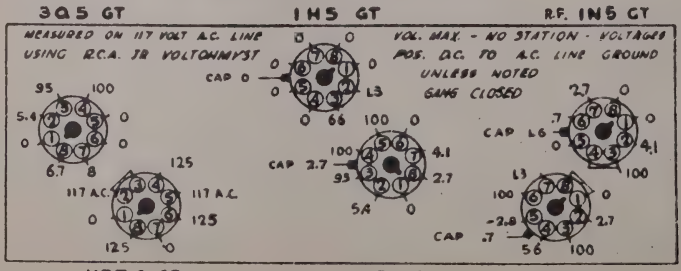


FIG. 2 VOLTAGE CHART

©John F. Rider

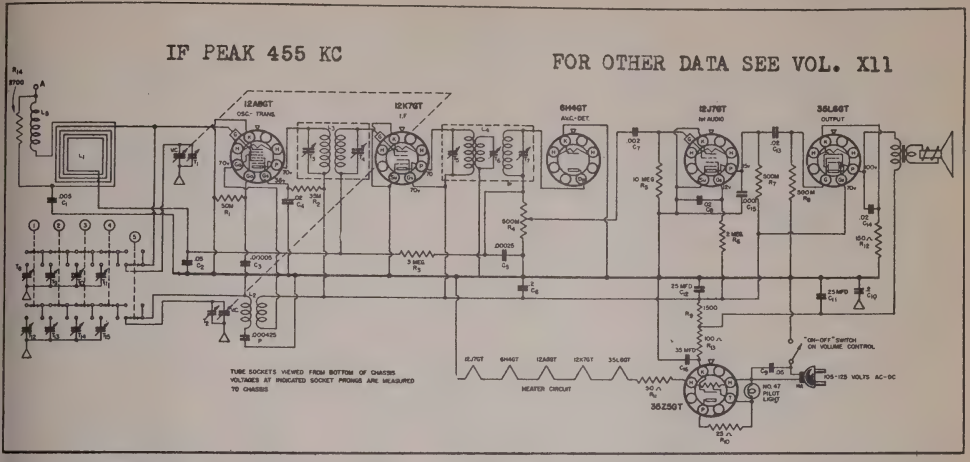
ODEL 2312
h. 163.34

SEARS, ROEBUCK & CO.

MODELS 1661, Ch.110.414-1
1721, Ch. 110.415-1

IF PEAK 455 KC

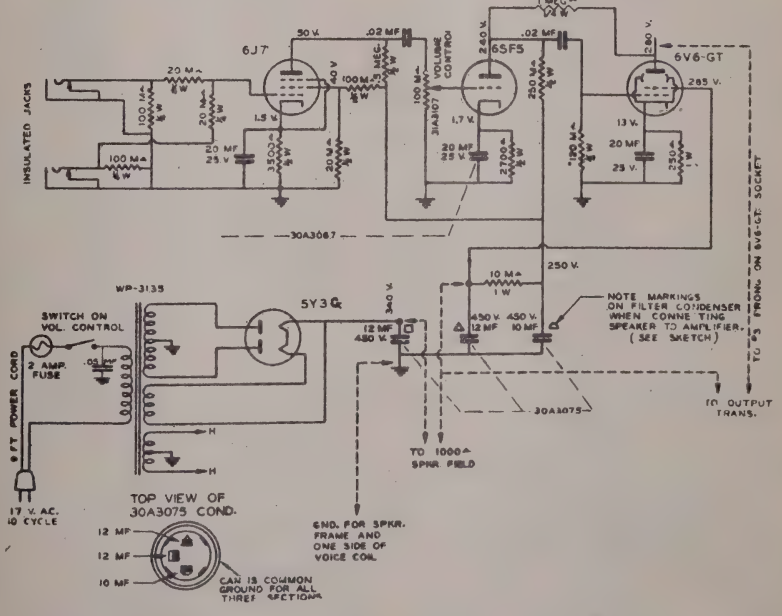
FOR OTHER DATA SEE VOL. X11



CHASSIS IDENTIFIED BY NO. 110.415-1 NO. 110.414-1 HAVE PRIMARY LOOP CIRCUIT REFINEMENTS TO IMPROVE ANTENNA PERFORMANCE. THE CIRCUIT CHANGE CONSISTS OF:

1- Addition of an antenna loading inductance (L5)
2- Addition of a 2700 ohm resistor (R14)

DECEMBER 23, 1940



POWER OUTPUT

Type - Single Beam Power
Max. - 8 Watts
Undistorted - 5 Watts

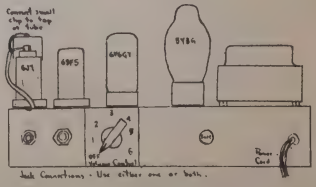
MODEL 2312

A FOUR TUBE GUITAR AMPLIFIER

MARCH 17, 1943

POWER SUPPLY

All Models - 105-125 Volts, 50-60 cycles - 50 Watts

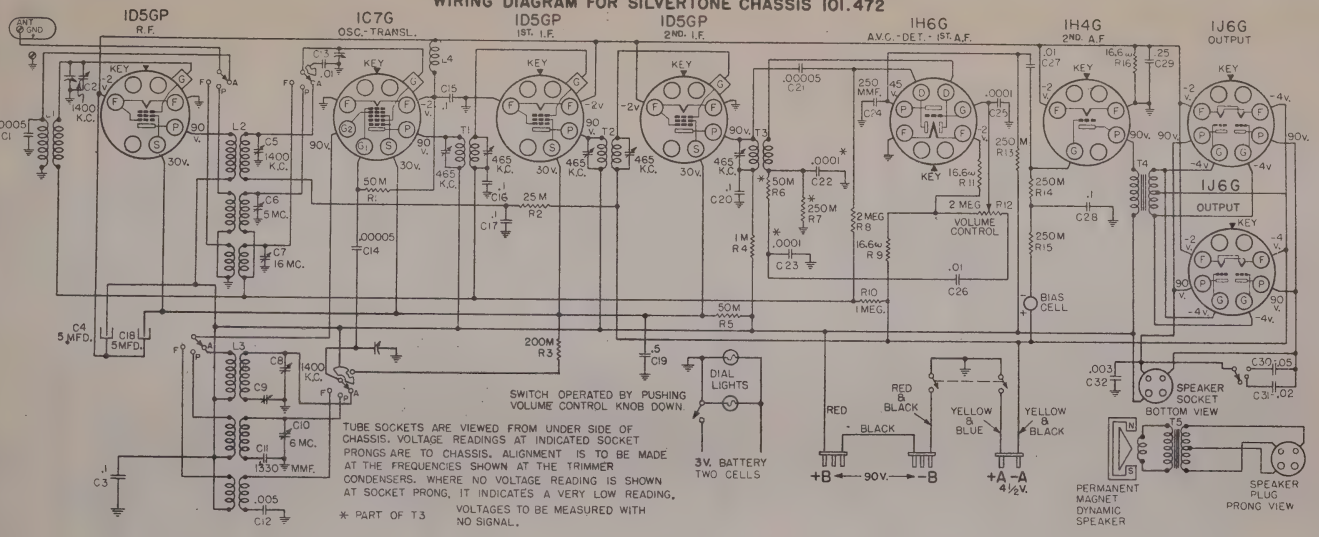


©John F. Rider

MODELS 4608-9, 4628-9,
4638-9, 4648-9,
4723, 4743
Chassis 101.472

©John F. Rider

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.472

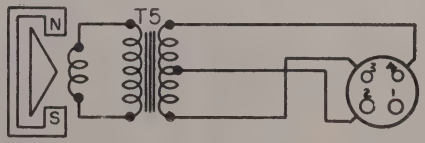


TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES A VERY LOW READING.

VOLTAGES TO BE MEASURED WITH NO SIGNAL.

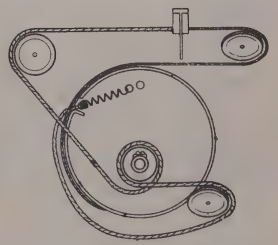
* PART OF T3

PERMANENT MAGNET DYNAMIC SPEAKER



SPEAKER PLUG PRONG VIEW

1. BLANK
3. RED
3. BROWN
4. GREEN



CONDENSER DRIVE HOOKUP

POWER SUPPLY:

"A" Battery (4½ volt dry). 1 - #5032P
"A" Battery (4 volt storage) 1 - #5049
"B" Batteries . . . . . 3 - #5131P

"A" Drain . . . . . 0.54 amperes
"B" Drain . . . . . 33 ma

FREQUENCY RANGES:

Band "A" . . . . . 540-1780 kc
Band "P" . . . . . 1760-6300 kc
Band "F" . . . . . 5975-18500 kc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant.-Transl Trimmer	Padder
Band "A"	1400 kc	1400 kc	600 kc
Band "P"	5 mc	5 mc	Fixed
Band "F"	-	15 mc	Fixed

INTERMEDIATE FREQUENCY . . . . . 465 kc

POWER OUTPUT:

Type . . . . . Class "B"
Undistorted . . . . . 0.5 watts
Maximum . . . . . 1.25 watts

LOUD SPEAKER:

Type . . . Permanent Magnet Dynamic
Size . . . . . 6 and 8 inch

JUNE 23, 1937

SEARS, ROEBUCK & CO.

Chassis 101.472
Chassis 101.472X

ALIGNMENT PROCEDURE
CHASSIS 101.472 AND CHASSIS 101.472X

PRELIMINARY:

Output meter connection . . . . . Across speaker voice coil

Output meter reading to indicate 50 milliwatts . . . . . 0.4 volts

Average sensitivity in microvolts for 50 milliwatts output . . . . . See chart below

Dummy antenna value to be in series with generator output . . . . . See chart below

Connection of generator output lead . . . . . See chart below

Connection of generator ground lead . . . . . Receiver chassis

Generator modulation . . . . . 30%, 400 cycles

Position of Volume Control . . . . . Fully on

Position of Tone Control . . . . . Fully clockwise

Position of Dial Pointer . . . . . To fall on end line of scale (low frequency end). Loosen dial drum set screws and rotate drum if necessary. Tighten set screws after pointer is properly set.

WAVE BAND SWITCH POSITION	POSITION OF DIAL POINTER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"P"	6 mc	465 kc	.1 mfd.	1C7G Grid	T3,T2,T1	IF	20
"A"	1400 kc	1400 kc	.0002 mfd.	Ant. Term.	C8,C5,C2	Osc.,Transl., Antenna	7
"A"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C9	Padder	7
"P"	5 mc	5 mc	400 ohms	Ant. Term.	C10,C6	Oscillator Translator	10
"P"	15 mc	15 mc	400 ohms	Ant. Term.	C7	Translator	15

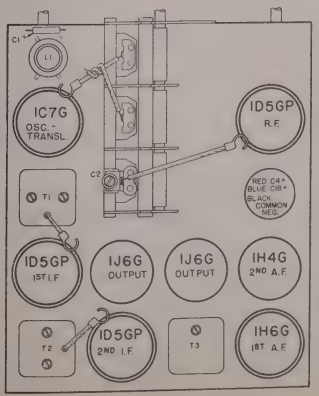
IMPORTANT ALIGNMENT NOTES

Note that the IF must be adjusted with the Wave Band Switch in the "P" position.

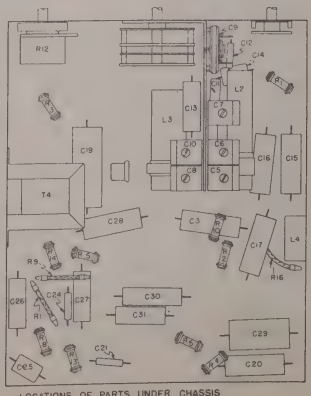
Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Always keep the output from the signal generator at its lowest possible value to prevent the AVC action of the receiver from interfering with accurate alignment. As the receiver sensitivity is increased through alignment, the output from the generator should be decreased to compensate.

SOCKET, TRIMMERS AND CHASSIS
CHASSIS 101.472



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

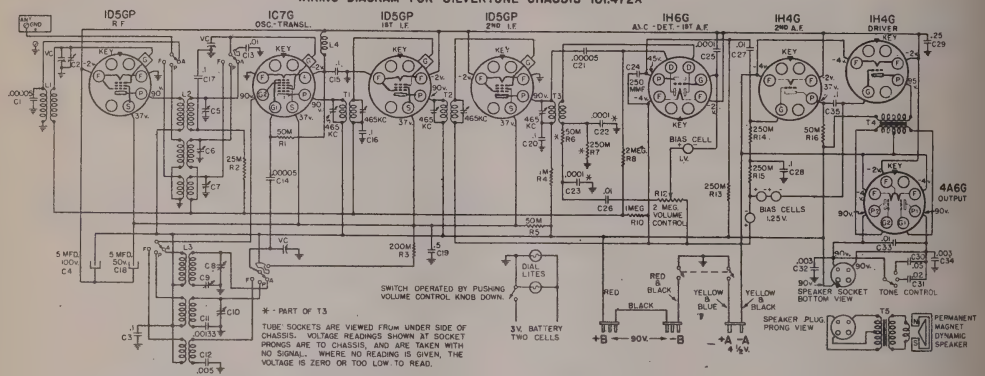
MODELS 4608A-9A, 4628A-9A,
4638A-9A, 4648A-9A,
4728A, 4748A
Chassis 101.472X

SEARS, ROEBUCK & CO.

CIRCUIT REVISION TO REDUCE BATTERY DRAIN

Later production of Chassis 101:472 is 101:472X. The revision consists of the two 1J6G output tubes being replaced by a 1H4G driver tube and a 4A6G output tube. These changes reduce the "A" battery drain from .5 amperes to .3 amperes, and reduce the "B" drain from 23 ma. to 15 ma.

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.472X

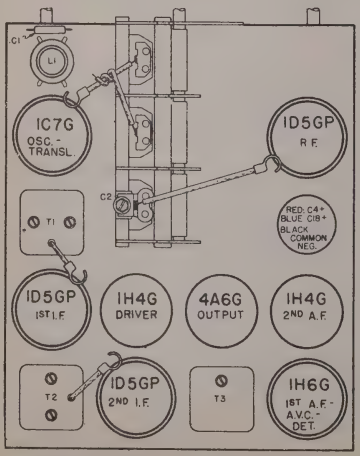

1D5GP R.F.
1C7G OSC.-TRANSL.
1D5GP 1ST I.F.
1D5GP 2ND I.F.
1H6G A.V.C.-DET.-1ST A.F.
1H4G 2ND A.F.
1H4G DRIVER
4A6G OUTPUT
BIAS CELL
BIAS CELLS 1.25 V.
2 MEG. VOLUME CONTROL
TONE CONTROL
SPEAKER SOCKET BOTTOM VIEW
SPEAKER PLUG PRONG VIEW
PERMANENT MAGNET DYNAMIC SPEAKER
DIAL LITES
3V. BATTERY TWO CELLS
SWITCH OPERATED BY PUSHING VOLUME CONTROL KNOB DOWN.
* - PART OF T3
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

ALIGNMENT FREQUENCIES:-

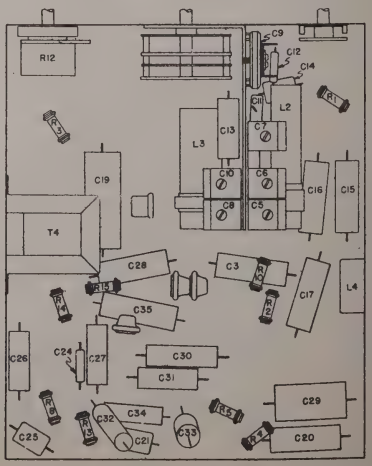
	OSCILLATOR TRIMMER	ANT.-TRANSL. TRIMMER	PADDER
Band "A"	1400 Kc	1400 KC	600 KC
Band "B"	5 MC	5 MC	Fixed
Band "F"	----	15 MC	Fixed

FOR ALIGNMENT SEE CHASSIS 101:472
INTERMEDIATE FREQUENCY PEAK 465 KC

July 6, 1938



LOCATIONS OF PARTS ON TOP OF CHASSIS

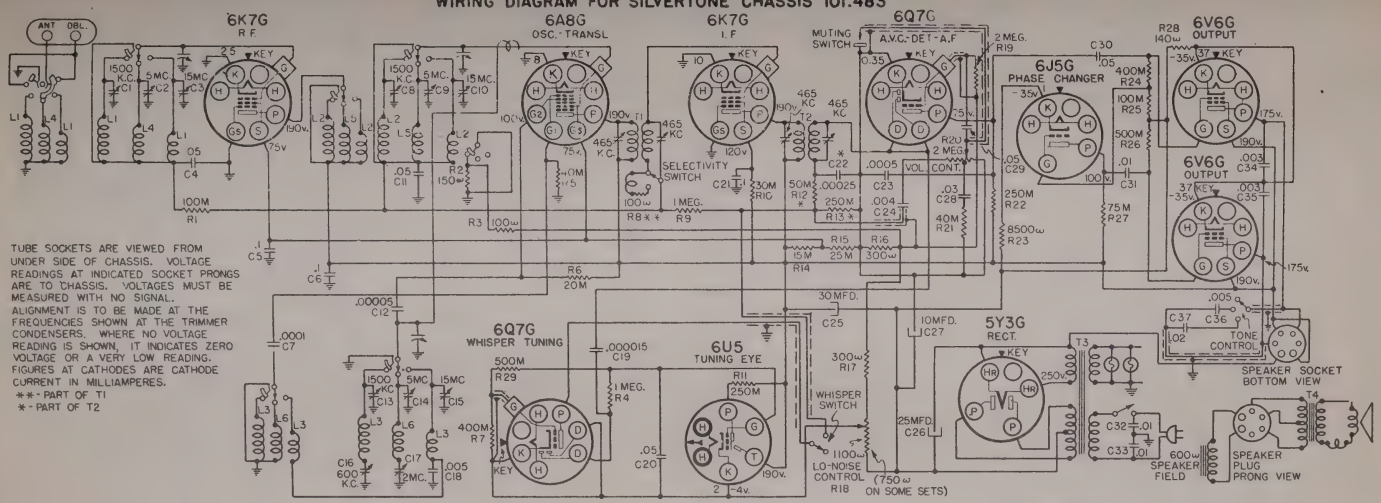


LOCATIONS OF PARTS UNDER CHASSIS

©John F. Rider

©John F. Rider

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.483


ANT DBL.
6K7G R.F.
6A8G OSC.-TRANSL.
6K7G I.F.
6Q7G A.V.C.-DET.-A.F.
MUTING SWITCH
6J5G PHASE CHANGER
6V6G OUTPUT
6V6G OUTPUT
6Q7G WHISPER TUNING
6U5 TUNING EYE
5Y3G RECT.
SELECTIVITY SWITCH
WHISPER SWITCH
LO-NOISE CONTROL R18
(750 ω ON SOME SETS)
TONE CONTROL
SPEAKER SOCKET BOTTOM VIEW
SPEAKER FIELD
SPEAKER PLUG PRONG VIEW
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
**-PART OF T1
*-PART OF T2

POWER SUPPLY:

All models available	105-125 volts, 50-60 cycle, 85 watts
All models available	105-125 volts, 25 cycle, 90 watts

FREQUENCY RANGES:

American Band	540-1600 ko
Intermediate Band	1780-2100 ko
Foreign Band	5.9-18.2 mc

ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Oscil. Padder
Band "AM"	1500 ko	1500 ko	600 ko
Band "INT"	5 mc	5 mc	2 mc
Band "FOR"	15 mc	15 mc	Fixed

INTERMEDIATE FREQUENCY . . . . . 465 ko

POWER OUTPUT:

Type	Push-Pull (Beam Tubes)
Undistorted	6 watts
Maximum	10 watts

LOUD SPEAKER:

Type	Dynamic
Size	6", 8", 10", 12"
Field coil resistance	600 ohms
App. field coil voltage drop	60 volts

OPERATING FEATURES:

- Tone Control . . . . . Three point
- Selectivity Control . . . . Two point
- Lo-Noise Control
- Automatic Volume Control
- Roll Over dial with only one scale visible at a time.
- Automatic Tuning Dial

CHASSIS FEATURES:

Number RF stages	One
Number IF stages	One
Antenna	Doublet or Conventional

- Line Noise Filter Condensers
- Tuning Eye
- Dual Tuning Ratio
- Provision for Phonograph Pick-Up Connections

OPERATING CONTROLS:

1. Left knob . . "On-Off" switch and Volume
2. Next to left knob . . . Wave Band Switch
3. Center knob . . . . . Tuning
4. Next to right knob. Inner: Selectivity. Outer: Lo-Noise.
5. Right knob . . . . . Tone Control

CONTROL OPERATION:

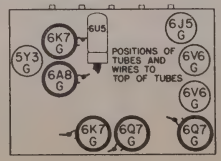
- Turning right: Power on; volume increase
- Turning right: American, Intermediate, Foreign
- Tuning ratio: 6:1; 30:1
- Turning right, inner: Sharp, Broad.
- Turning right, outer: Normal, Lo-Noise.
- Turning right: "LO", "MEDIUM", "HI"

GENERAL INFORMATION

VARIABLE SELECTIVITY:

Variable Selectivity is obtained by a two position switch. It changes the selectivity of the IF Input transformer by connecting or disconnecting coupling turns between primary and secondary. The receiver is about three times more sensitive in the "Sharp" position than in the "Broad" position. This difference in sensitivity will not result in a change of volume unless listening to a very weak station. The "Sharp" position should be used for short wave reception in order to obtain maximum sensitivity.

TUBE LAYOUT



FOR AUTOMATIC TUNING DIAL SEE VOL. X PAGES 10-25 and 10-26

OCTOBER 4th, 1937

MODELS 4666, 4686, 4766,
4786, 4791, 4792
Chassis 101.483

SEARS, ROEBUCK & CO.

SUBJECT: CAUSES AND POSSIBLE CURES FOR HUM WHEN KNOB IS TURNED TO LO-NOISE POSITION.

SUBJECT: OTHER TROUBLES THAT HAVE BEEN FOUND, TOGETHER WITH THEIR POSSIBLE CURES.

CAUSES AND REMEDIES FOR HUM:

CAUSE: Defective 6Q7G control tube, having leaky heater.

REMEDY: Change tube. These tubes will probably operate satisfactorily when used as the 2nd detector and 1st AF amplifier.

CAUSE: Pickup of 60 cycle voltage from heater wiring passing close to socket terminals.

REMEDY: Move heater wires away from socket terminals.

CAUSE: Pickup of 120 cycle voltage in wires running to Lo-Noise control switch, because of their proximity to the rectifier tube socket.

REMEDY: Remove wires from vicinity of rectifier tube socket.

CAUSE: Pickup of spurious hum voltages by 6Q7G Lo-Noise control tube, from tuning eye cable.

REMEDY: Remove tuning eye cable from vicinity of 6Q7G Lo-Noise control tube.

OTHER TROUBLES AND THEIR REMEDIES:

CAUSE: Audio distortion at medium to high volume output, when Raytheon 6V6 tubes are used in output stage.

REMEDY: Change tubes to National Union make. Pass 6V6 plate leads close to chassis mounting plate. This is a second choice.

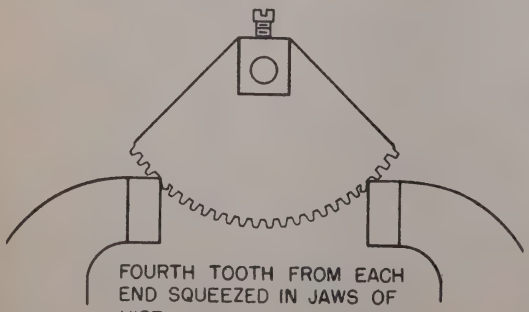
CAUSE: Set noisy when tuning.

REMEDY: This is caused by the intermittent grounding of various parts of the tuning mechanism to the chassis plate through the various pulleys and gears of the tuning assembly. Remedied by locating the intermittent ground and cleaning parts so that steady connection is maintained.

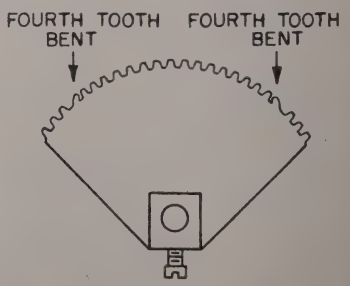
SUBJECT: BENDING WAVE SWITCH GEAR SECTOR TEETH TO PREVENT THE POSSIBILITY OF WAVE SWITCH BEING FORCED PAST ITS STOPS.

Any complaint that the Wave Switch goes beyond its proper stops can be taken care of as described below. This correction was incorporated early in production so that only a very few sets are in service about which there might be complaint. Also, the difficulty occurs only if someone forces the Wave Switch knob quite hard. To prevent the possibility, proceed as follows:

Remove the Wave Switch gear sector and place it in a vise so that the fourth tooth from each end will be bent toward the middle teeth as shown in the Illustration. This will act as a stop to prevent the switch from being turned too far. Then replace the gear sector.



FOURTH TOOTH FROM EACH END SQUEEZED IN JAWS OF VISE.



APPEARANCE OF GEAR SECTOR AFTER FOURTH TOOTH FROM EACH END HAS BEEN BENT IN VISE.

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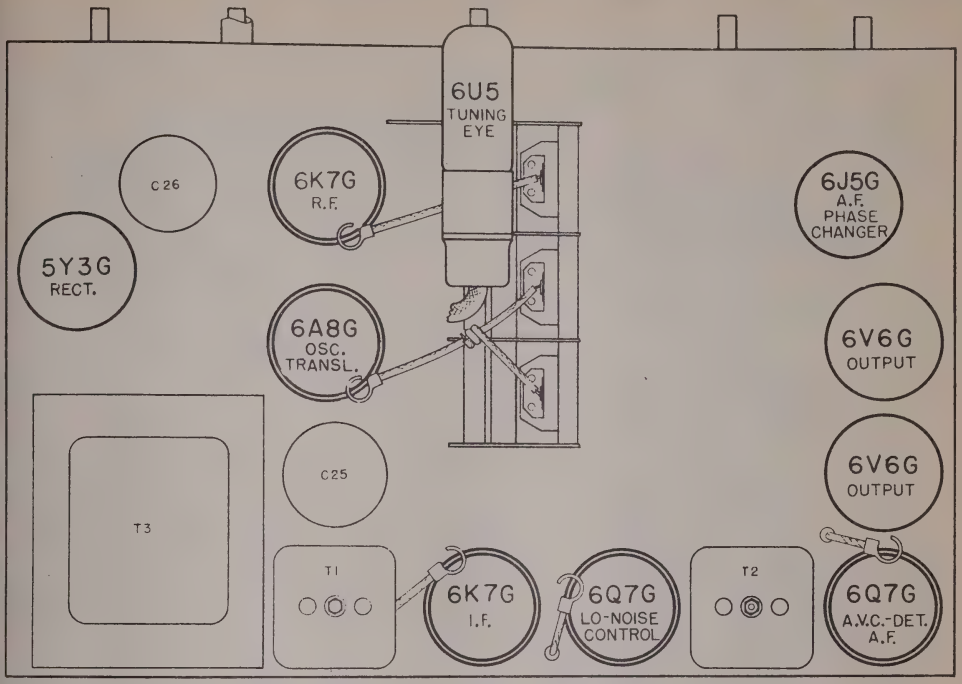
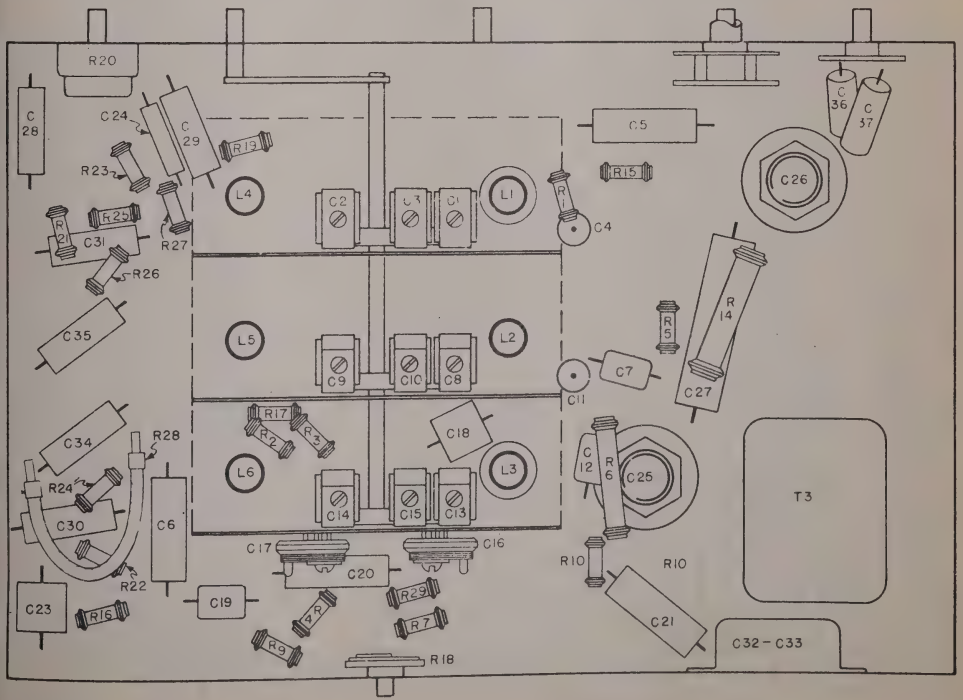
SEARS, ROEBUCK & CO.

Chassis 101.483



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

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ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . . Across speaker voice coil
Output meter reading to indicate .5 watts output . . . . . 1.31 volts
Approximate average sensitivity in microvolts for .5 watts output . . . . . See chart below
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Connection of generator ground lead . . . . . To chassis
Generator modulation . . . . . 30%, 400 cycles
Position of volume control . . . . . Fully clockwise
Position of tone control . . . . . Fully clockwise
Position of selectivity control . . . . . Sharp
Position of Lo-Noise control . . . . . Normal
Position of dial pointer with variable fully closed . . . . . To fall on last calibration mark at 550 kc end of AMERICAN band.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"INT"	1.8 mc	465 kc	.1 mfd.	6A8G Grid	T2,T1	IF	5300
"AM"	1500 kc	1500 kc	.0002 mfd.	Ant. Term.	C13,C8, C1	Oscillator, Transl., RF	35
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C16	Padder	20
"INT"	5 mc	5 mc	400 ohms	Ant. Term.	C14	Oscillator	-
"INT"	5 mc (rock)	5 mc	400 ohms	Ant. Term.	C9,C3	Translator, RF	3
"INT"	2 mc (rock)	2 mc	400 ohms	Ant. Term.	C17	Padder	8
"FOR"	15 mc	15 mc	400 ohms	Ant. Term.	C15	Oscillator	-
"FOR"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C10,C3	Translator, RF	10

IMPORTANT ALIGNMENT NOTES

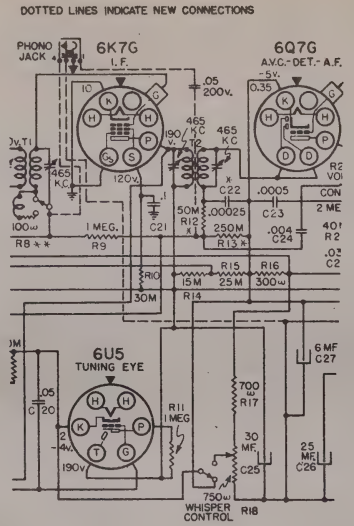
Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

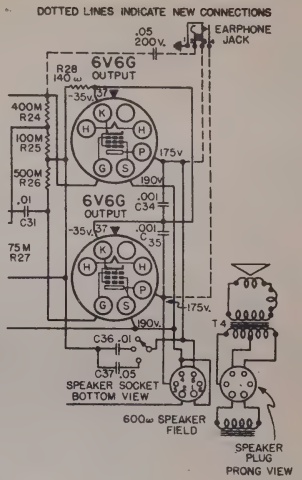
Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the AVC action of the set from interfering with accurate alignment.

The shield plate that covers the coil assembly should be left in place while making the alignment adjustments. The trimmer screws are accessible through the holes in the shield.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy antenna used for alignment of any other band.

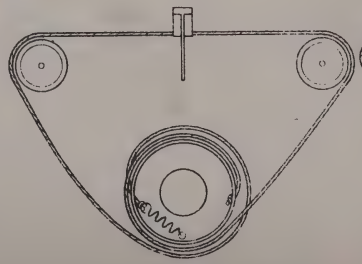
No connection should be made to the doublet terminal on the antenna connection block.



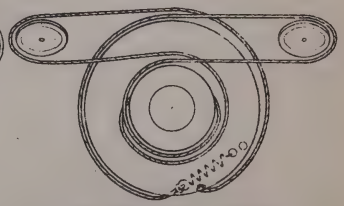


DIAL POINTER AND CONDENSER DRIVE HOOK-UP:

The drive hook-up for the dial pointer and the variable condenser is shown in the illustration.



POINTER DRIVE HOOKUP



CONDENSER DRIVE HOOKUP

WAVE TRAPS:

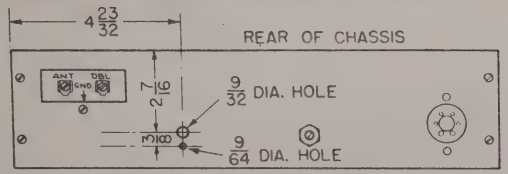
Two wave-traps are available and can be ordered directly from Colonial Radio Corporation, 254 Rano Street, Buffalo, N.Y., using Purchase Order Blank form F5284. The retail selling price is $1.20.

Part #1013117417 wave-trap is designed to eliminate code interference from ship transmitters, airports or air beacon stations, in locations where the receiver is near such transmitters. This trap operates in the vicinity of 465 kc.

Part #1013117416 wave-trap is designed to eliminate whistles and cross modulation troubles that occur when the receiver is located comparatively near some powerful broadcast station.

It is possible to use both traps simultaneously if conditions make this necessary.

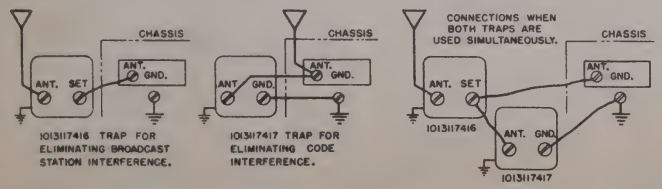
The trap can be mounted within the chassis by drilling the holes shown in the following illustration. It will be necessary to remove the bracket from the trap in order to mount it in the chassis. An alternative method of mounting is to screw the trap to the chassis mounting shelf by means of wood screws through the bracket. If the trap is not mounted on the chassis, it is important to connect a wire from under the head of one of the wood screws to the chassis so that the wave-trap shield becomes grounded to the chassis.



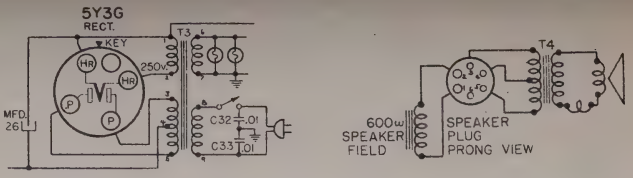
If a conventional antenna is being used with the receiver, the traps are to be connected as described in the next two paragraphs and the illustration that follows them.

The part #1013117417 trap, for code interference elimination, has two terminals marked, "ANT" and "GND". Connect a wire between the "ANT" terminal of the trap and the "ANT" terminal of the chassis. Connect a wire between the "GND" terminal of the trap and the "GND" terminal of the chassis. The antenna and ground connections to the receiver remain as they were, the trap being connected across them. The trap should be adjusted to minimum response from the interfering station.

Part #1013117416 trap, for broadcast station interference elimination, has two terminals marked, "ANT" and "SET". Disconnect the antenna leadin from the receiver and connect it to the "ANT" terminal of the trap. Connect a wire from the "SET" terminal of the trap to the "ANT" terminal of the chassis. The ground connection to the chassis remains as it was. The trap then is in series between the antenna and the receiver. The trap should be tuned to eliminate the interfering station. The sensitivity of the receiver will be reduced in the region of the frequency to which the trap is tuned.



If a doublet antenna is installed with the receiver, the antenna terminal of the 1013117417 trap must be connected to the antenna lug of the broadcast band antenna coil primary inside the chassis. The 1013117416 trap must be connected between the antenna lug of the broadcast antenna coil primary and the wave switch. Remove the lead between the antenna lug of the primary and the wave switch. Connect the antenna terminal of the trap to the wave switch lug. Connect the set terminal of the trap to the antenna coil lug. See next illustration.

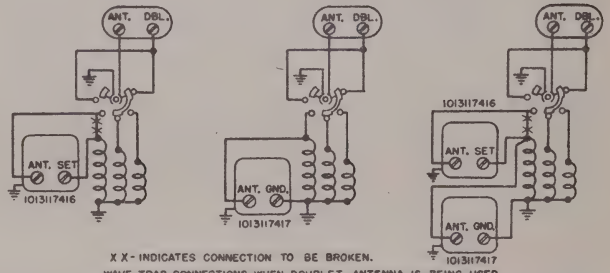


POWER TRANSFORMER COLOR CODE

1,2-Red	5-Blue
3-Red	6,7-Black
4-Slate	8-Black
9-Green	

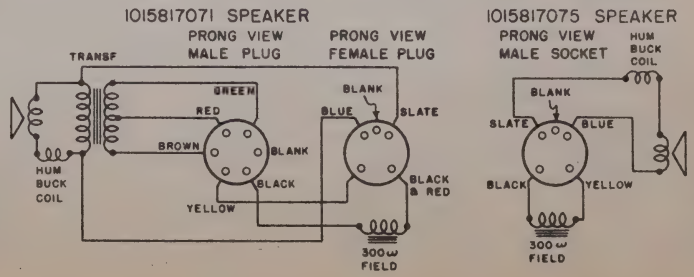
SPEAKER PLUG COLOR CODE

1-Black	4-Red
2-Yellow	5-Green
3-Brown	6-Blank



CONNECTIONS OF TWIN SPEAKERS:

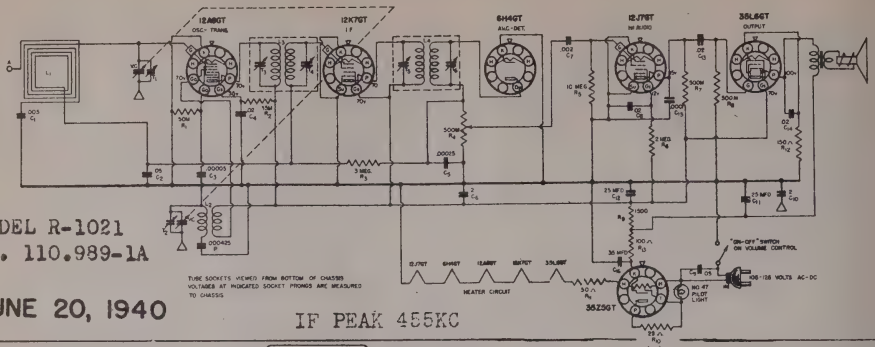
Some of these receivers use twin speakers; part #1015817071 (with transformer) and 1015817075 (without transformer). The connections are shown in the following illustration. 1015817075 speakers that have the letter "D" stamped on them or in which the black field lead comes out nearest the plug have the field coil connections reversed at the plug as compared with the diagram.



MODEL 4714 Power Shifter
Chassis 139.156

SEARS, ROEBUCK & CO.

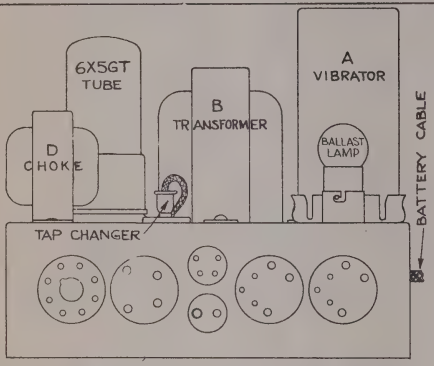
MODEL R-1021
Ch. 110.989-

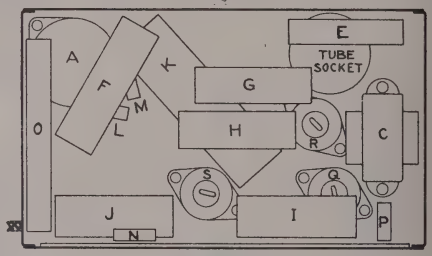


MODEL R-1021
Ch. 110.989-1A

JUNE 20, 1940

IF PEAK 455KC





LOCATION OF PARTS IN CHASSIS

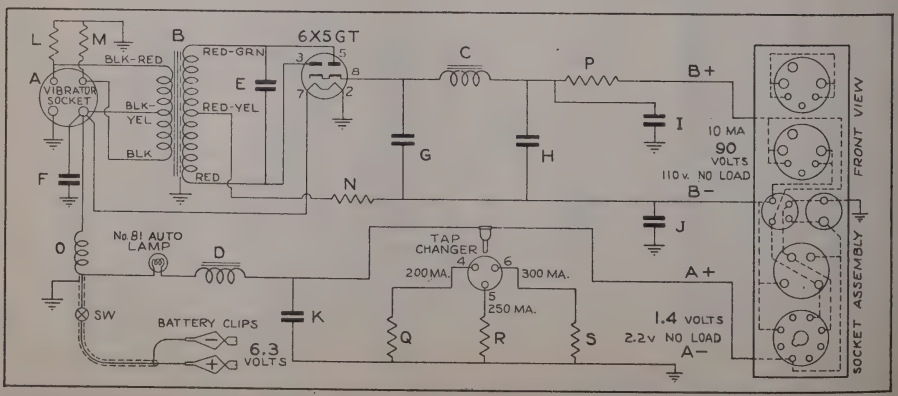
MODEL 4714 Power Shifter
Chassis 139.156
February 9, 1942

"B" SUPPLY FAILS

The vibrator of the "B" supply is loaded very lightly and pitting of the points will not occur over a long period of time. Testing for vibrator failure may be made simple by the substitution method. The 6X5GT tube should be checked in a standard tube tester. The transformer may be tested by measuring A. C. voltage across each side of the secondary by removing the tube. The bi-pass condensers should be tested for breakdown.

"A" SUPPLY FAILS

Low "A" voltage may be due to a few minor reasons. The storage battery should be checked first for a terminal voltage of 6 volts. The pin plug position of the tap changer on top the chassis must be in position 4 for a 4 tube radio, and likewise for position 5 and 6. The auto lamp acting as a voltage regulator ballast will burn dimly without a load on the Powr-Shiftr, and the greater the load the brighter this lamp will be. Inside the chassis are three 5 ohm rheostats for factory adjusting the voltage with the correct load at each tap. Rheostat Q is set at 3.5 ohms, R at 4.0 ohms, and S at 4.67 ohms. A small screwdriver may be used for changing this calibration when desired.



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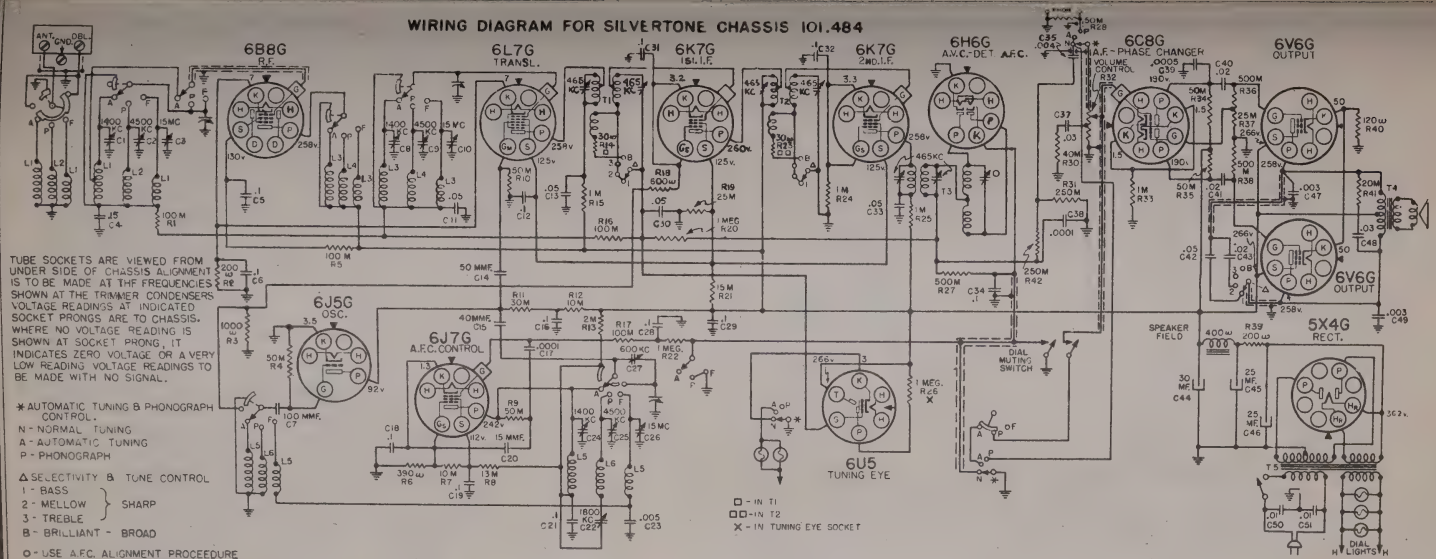
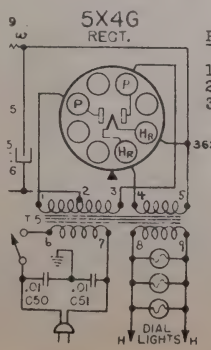
WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.484


6B8G R.F.
6L7G TRANSL.
6K7G 1st I.F.
6K7G 2nd I.F.
6H6G A.V.C.-DET. A.F.C.
6C8G A.F.-PHASE CHANGER
6V6G OUTPUT
6J5G OSC.
6J7G A.F.C. CONTROL
6U5 TUNING EYE
5X4G RECT.
DIAL MUTING SWITCH
SPEAKER FIELD
DIAL LIGHTS
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING VOLTAGE READINGS TO BE MADE WITH NO SIGNAL.
* AUTOMATIC TUNING & PHONOGRAPH CONTROL.
N - NORMAL TUNING
A - AUTOMATIC TUNING
P - PHONOGRAPH
Δ SELECTIVITY & TONE CONTROL
1 - BASS
2 - MELLOW } SHARP
3 - TREBLE
B - BRILLIANT - BROAD
O - USE A.F.C. ALIGNMENT PROCEEDURE GIVEN IN SERVICE MANUAL.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
ALL VOLTAGES INDICATED ARE MEASURED WITH WAVE SWITCH IN AMERICAN POSITION.
□ - IN T1
□□ - IN T2
X - IN TUNING EYE SOCKET

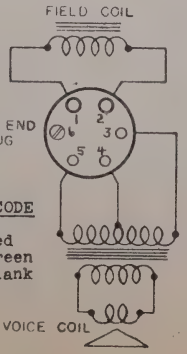
INTERMEDIATE FREQUENCY . . 465 kc

POWER SUPPLY:
All models available. 105-125 volts, 50-60 cycle, 150 watts
All models available . . 105-125 volts, 25 cycle, 150 watts



POWER TRANSFORMER COLOR CODE

1. Blue	4-5. Red
2. Slate	6. Black
3. Red	7. Green
8-9. Black	



SPEAKER PLUG COLOR CODE

1. Black	4. Red
2. Yellow	5. Green
3. Brown	6. Blank

LOUD SPEAKER:

Type	Dynamic
Size	12"
Field coil resistance	400 ohms
App. field coil voltage drop	65 volts

FREQUENCY RANGES:

American Band	540-1660 kc
Intermediate Band	1650-5600 kc
Foreign Band	5.4-18.2 mc

POWER OUTPUT:

Type	Push-Pull (Beam Tubes)
Undistorted	8 watts
Maximum	13 watts

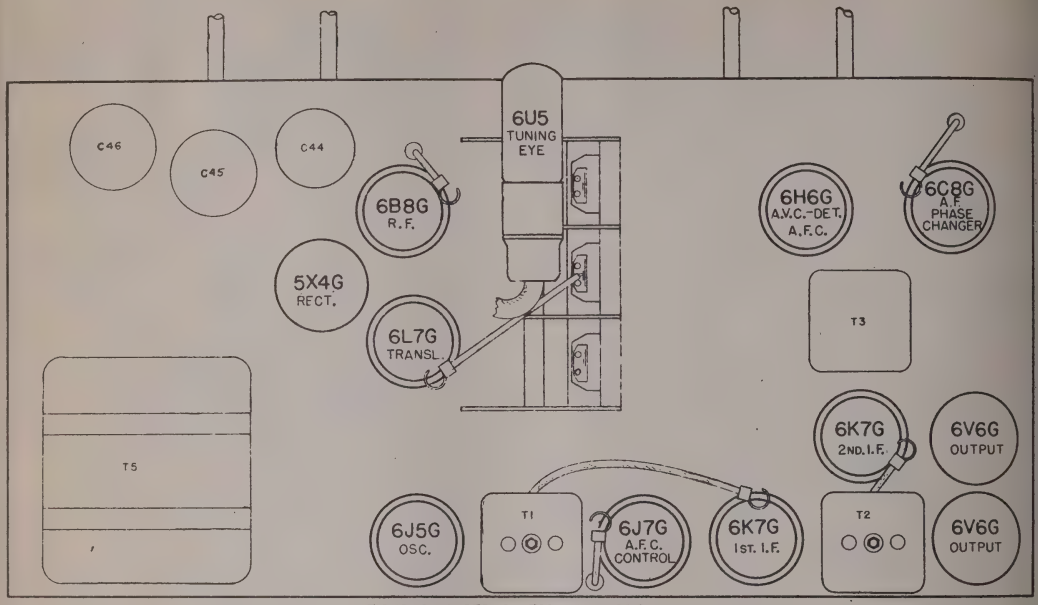
ALIGNMENT FREQUENCIES:

	Oscil. Trimmer	Ant-Transl. Trimmer	Oscil. Padder
Band "AM"	1500 kc	1500 kc	600 kc
Band "INT"	5 mc	5 mc	2 mc
Band "FOR"	18 mc	15 mc	Fixed

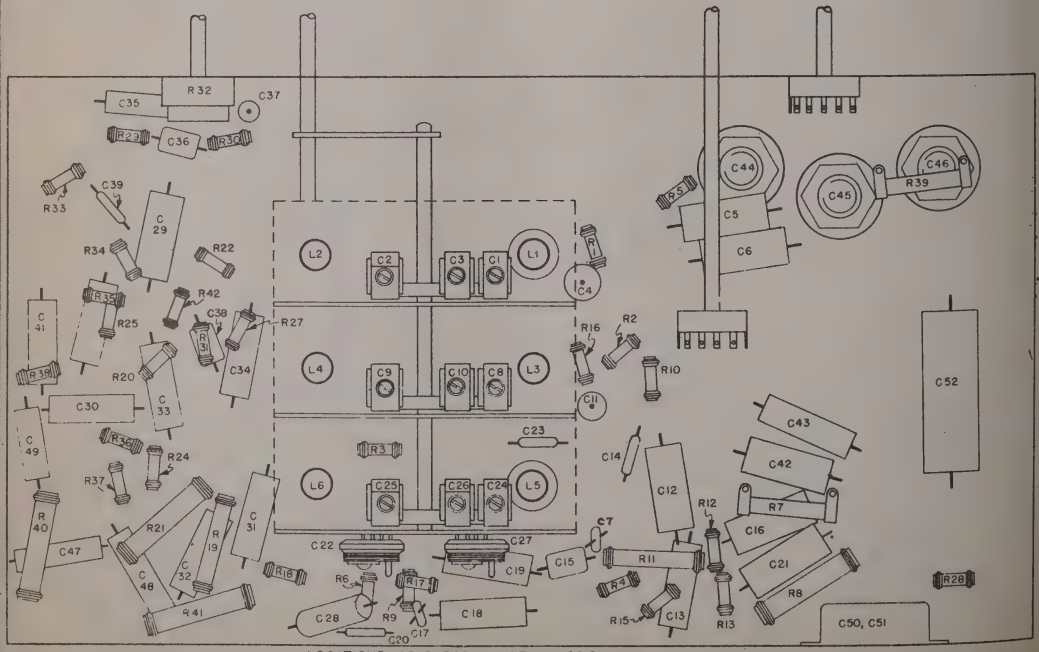
OCTOBER 6, 1937

MODELS 4687, 4787
Chassis 101.484

SEARS, ROEBUCK & CO.



LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

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ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections	Across speaker voice coil
Output meter reading to indicate .5 watts output	1.84 volts
Approximate average sensitivity in microvolts for .5 watts output	See chart below
Dummy antenna value to be in series with generator output	See chart below
Connection of generator output lead	See chart below
Connection of generator ground lead	To chassis
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully clockwise
Position of Tone Control	"TREBLE"
Position of Radio - Phono Knob	"REGULAR"
Position of Dial Pointer with variable fully closed	To fall 3/32" to the left of the last mark at the 550 kc end of the AMERICAN band scale.

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"INT"	1.7 mc	455 kc	.1 mfd.	6L7G Grid	T3*,T2,T1	IF	-
"AM"	1500 kc	1500 kc	.0002 mfd.	Ant. Term.	C34,C8,C1	Oscillator, Transl.,RF	30
"AM"	600 kc (rock)	600 kc	.0002 mfd.	Ant. Term.	C27	Padder	40
"INT"	5 mc	5 mc	400 ohms	Ant. Term.	C25	Oscillator	-
"INT"	5 mc (rock)	5 mc	400 ohms	Ant. Term.	C9,C2	Transl.,RF	8
"INT"	2 mc (rock)	2 mc	400 ohms	Ant. Term.	C23	Padder	30
"FOR"	18 mc	18 mc	400 ohms	Ant. Term.	C26	Oscillator	8
"FOR"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C10,C3	Transl., RF	10

IMPORTANT ALIGNMENT NOTES

* Two bottom adjusting screws only. After this alignment has been made and with the IF signal sufficiently strong to show at least one volt on the output meter, adjust the third (top) trimmer screw to the point giving the lowest of the meter reading. This top screw is the AFC discriminator adjustment.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the AVC action of the set from interfering with accurate alignment.

The shield plate that covers the coil assembly should be left in place while making the alignment adjustments. The trimmer screws are accessible through the holes in the shield.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy antenna used for alignment of any other band.

No connection should be made to the doublet terminal on the antenna connection block.

AUTOMATIC FREQUENCY CONTROL ADJUSTMENT

1. Tune in a 1000 kc station to give maximum output meter reading. The station chosen must be of medium strength, one just capable of giving satisfactory reception without background noise. Do not use a strong station. (Or use a 1000 kc signal generator adjusted to give 200 microvolts output and with its modulation switched off.) Connection of the signal is to be made to the antenna terminal of the receiver through a .0002 mfd. condenser. The Tone Control of the receiver must be in the "TREBLE" position and the Volume Control must be all the way on.

2. Connect a 465 kc unmodulated IF signal to the 6L7G translator grid through a 15 mmf. condenser.

3. Carefully turn the variable condenser until "zero beat" note is had. (Tone Control must be in "TREBLE" position.)

4. Turn the Tone Control knob to the "BRILLIANT" position and adjust the discriminator screw for "zero beat" note. (The discriminator adjustment is the top screw of T3.) The correct setting should be obtained at about the center of the trimmer range and the setting will be found to be quite critical.

5. Turn the Tone Control knob back to "TREBLE". The receiver should give "zero beat" note in both "TREBLE" and "BRILLIANT" positions if the discriminator adjustment is properly made. If it does not, carefully repeat the adjustments.

6. The AFC can be checked for "pull-in" in the following manner. Remove the signal generator connection from the 6L7G grid. Connect a 1000 kc generator (with modulation switched on) to the antenna terminal of the receiver, through a .0002 mfd. condenser. Adjust the generator to give 5000 microvolts output and turn the right hand knob of the receiver to "DIAL". Reduce the Volume Control setting of the receiver to give 1-1/2 volts reading on the output meter. Note the exact frequency setting of the signal generator at this output meter reading. Increase the signal generator frequency until the output meter reads one volt and note the frequency setting of the signal generator. Then decrease the signal generator frequency below 1000 kc until the output meter again reads one volt and note the frequency of the generator at this reading of the output meter. If the AFC is operating properly, the signal generator can be shifted approximately 15 kc either side of 1000 kc before the output meter reading is reduced from 1.5 volts to 1 volt.

SUBJECT: REVISION OF "AUTOMATIC FREQUENCY CONTROL ADJUSTMENT"

1. Tune in a 1000 kc station to give maximum output meter reading. The station chosen must be of medium strength, one just capable of giving satisfactory reception without background noise. Do not use a strong station. (Or use a 1000 kc signal generator adjusted to give 200 microvolts output and with its modulation switched off.) Connection of the signal is to be made to the antenna terminal of the receiver through a .0002 mfd. condenser. The Tone Control of the receiver must be in the "TREBLE" position, and the right hand knob in the "REGULAR" position.

2. Connect a 465 kc unmodulated IF signal to the 6L7G translator grid through a 15 mmf. condenser.

3. Carefully turn the variable condenser until "zero beat" note is had. (Tone Control must be in "TREBLE" position, and right hand knob in "REGULAR" position.)

4. Turn the right hand knob to the "DIAL" position and adjust the discriminator screw for "zero beat" note. (The discriminator adjustment is the top screw of T3.) The correct setting should be obtained at about the center of the trimmer range and the setting will be found to be quite critical.

5. Turn the right hand knob back to "REGULAR". The receiver should give "zero beat" note in both "REGULAR" and "DIAL" positions if the discriminator adjustment is properly made. If it does not, carefully repeat the adjustments.

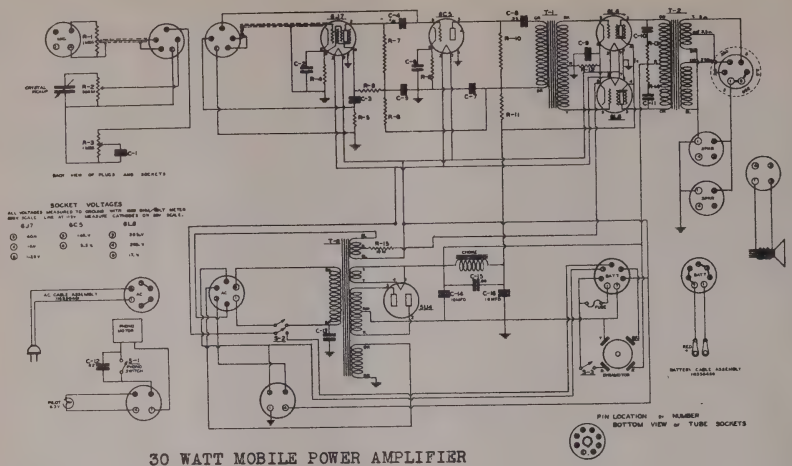
6. The AFC can be checked for "pull-in" in the following manner. Remove the signal generator connection from the 6L7G grid. Connect a 1000 kc generator (with modulation switched on) to the antenna terminal of the receiver, through a .0002 mfd. condenser. Adjust the generator to give 5000 microvolts output and turn the right hand knob of the receiver to "DIAL". Reduce the Volume Control setting of the receiver to give 1-1/2 volts reading on the output meter. Note the exact frequency setting of the signal generator at this output meter reading. Increase the signal generator frequency until the output meter reads one volt and note the frequency setting of the signal generator. Then decrease the signal generator frequency below 1000 kc until the output meter again reads one volt and note the frequency of the generator at this reading of the output meter. If the AFC is operating properly, the signal generator can be shifted approximately 15 kc either side of 1000 kc before the output meter reading is reduced from 1.5 volts to 1 volt.

MAY 18, 1939

MODEL 5732
Ch. 116.SA2232

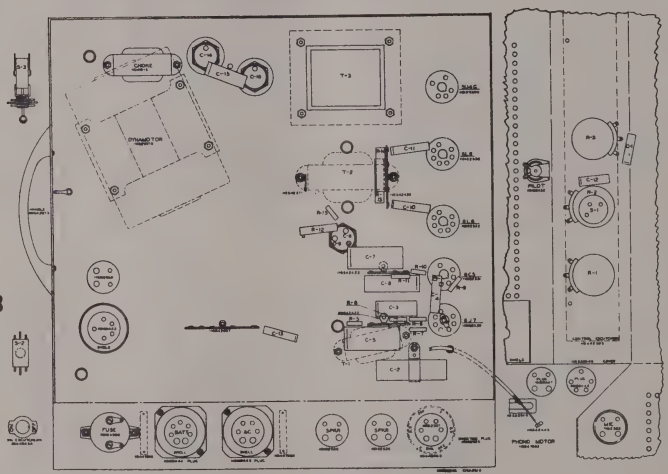
SEARS, ROEBUCK & CO.

WIRING DIAGRAM - SILVERTONE MOBILE POWER AMPLIFIER NO. 116.SA2232



30 WATT MOBILE POWER AMPLIFIER

MARCH 14, 1938



Parts Values

C5, C7	.5MF	R6	2 Meg
C8	.25MF	R7, R8	300M ohm
C3	.1MF	R5	100M ohm
C15	.06MF	R10, R11	30M ohm
C4, C10, C11, C13	.01MF	R4	5000 ohm
C1	.001MF	R9	2500 ohm
C12	.02MF	R15	10M ohm
C2	25MF	R13, R14	15M ohm
C6, C9	Dual 25MF each	R12	125 ohm
C14, C16	10MF	T1	P.P. Input Transformer
R1	Mike control	T2	Output Transformer
R2	Phono Control with Switch	T3	Power Transformer
R3	Tone Control		

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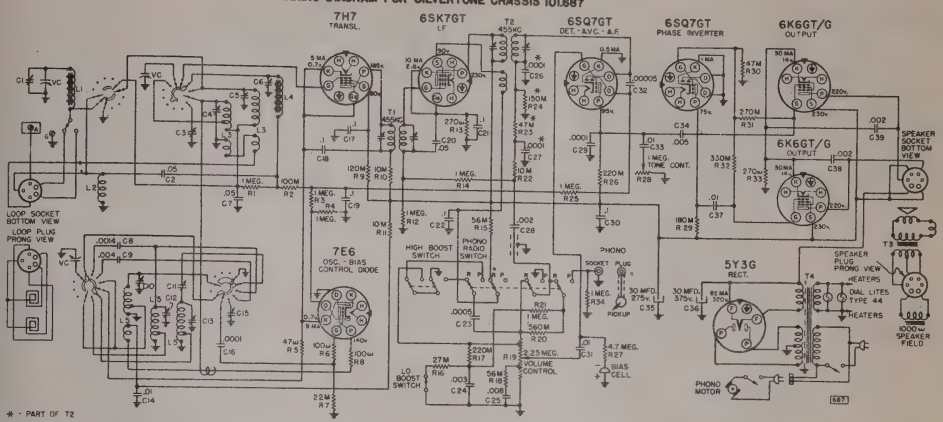
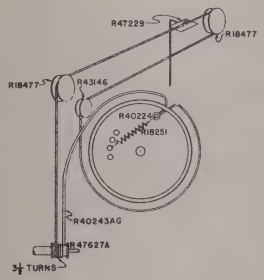
SEARS, ROEBUCK & CO.

MODEL 5502
Ch. 101.687

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.687





OPERATING FEATURES:
Automatic Volume Control
Push Button Tuning (5 buttons)
Push Button and Continuously variable Tone Controls
Phono-Radio Push Button

APRIL 3, 1942

POWER SUPPLY:
All models available. . . . . 105-125 volt, 60 cylces AC: 100 watts
All models available . . . . . 105-125 volt, 50 cycles AC: 100 watts

FREQUENCY RANGES:		ALIGNMENT FREQUENCIES: Oscillator Trimmer	Antenna-Trarsl. Trimmer	Padder
Band "A"	540-1700 kc	1750 kc	1410 kc	600 kc
Band "B" Police	1.75-5.5 mc	5900 kc	4500 kc	Fixed
Band "C"	6-18 mc	18.3 mc	15 mc	Fixed
Band "D"	9.4-9.8 mc	9.6 mc	9.6 mc	Fixed

INTERMEDIATE FREQUENCY . . . . . 455 kc

POWER OUTPUT:
Type. . . . . Push Pull Pentode
Undistorted . . . . . 3.5 watts
Maximum . . . . . 7 watts

LOUDSPEAKER:
Type . . . . . Dynamic
Size . . . . . 12 inch
Field coil resistance . . . . 1000 ohms
Approx. field coil voltage drop. . 90 v.

PUSH BUTTON TUNING MECHANISM:

The adjustment for each push button is locked or unlocked by tightening or loosening the slotted screwhead made accessible when the push button knob is pulled off of its plunger. Stations are set up by unlocking the mechanism, tuning in the station, pushing in the plunger (being careful not to detune the station), and securely locking the adjustment.

MODEL 5502
Ch. 101.687

SEARS ROEBUCK CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

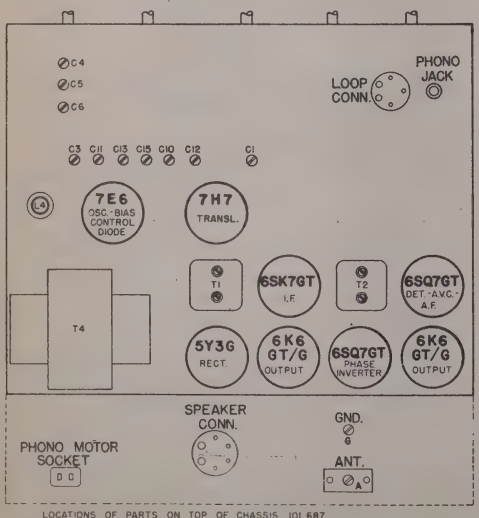
Output meter connections . . . . . Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts . . . . . 1.5 volts
Approximate microvolts input to indicate 500 milliwatts output . . . . . See chart below
Generator ground lead connection . . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator Modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully on
Position of Tone Control . . . . . HI
Position of pointer with tuner fully open. . . . . On mark below 540 kc calibration mark

BAND SWITCH POSITION	POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROX. MICRO-VOLTS
A	Closed	455 kc	.1 mfd.	Trans.Grid	T2 - T1	IF	---
A	Open	1750 kc	.0002 mfd.	Ant.	C1	Osc.	---
A	1410 kc	1410 kc	.0002 mfd.	Ant.	C2	Ant.	25
A	1410 kc	1410 kc	.0002 mfd.	Ant.	C3	Trans.	---
A	600 (Rock)	600 kc	.0002 mfd.	Ant.	C4	Pad.	125
B	Open	5900 kc	400 ohms	Ant.	C5	Osc.	---
B	4500 kc	4500 kc	400 ohms	Ant.	C6	Trans.	35
C	Open	18.3 mc	400 ohms	Ant.	C7	Osc.	---
C	15 mc (Rock)	15.0 mc	400 ohms	Ant.	C8	Trans.	25
D	9.6 mc	9.6 mc	400 ohms	Ant.	C9	Osc.	---
D	9.6 mc (Rock)	9.6 mc	400 ohms	Ant.	C10	Trans.	30

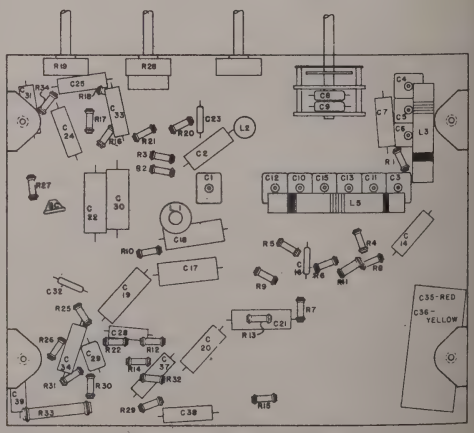
IMPORTANT ALIGNMENT NOTES

The alignment must be done in the order given.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the reciever from interfering with accurate alignment.



LOCATIONS OF PARTS ON TOP OF CHASSIS 101 687


LOCATIONS OF PARTS UNDER CHASSIS 101.687

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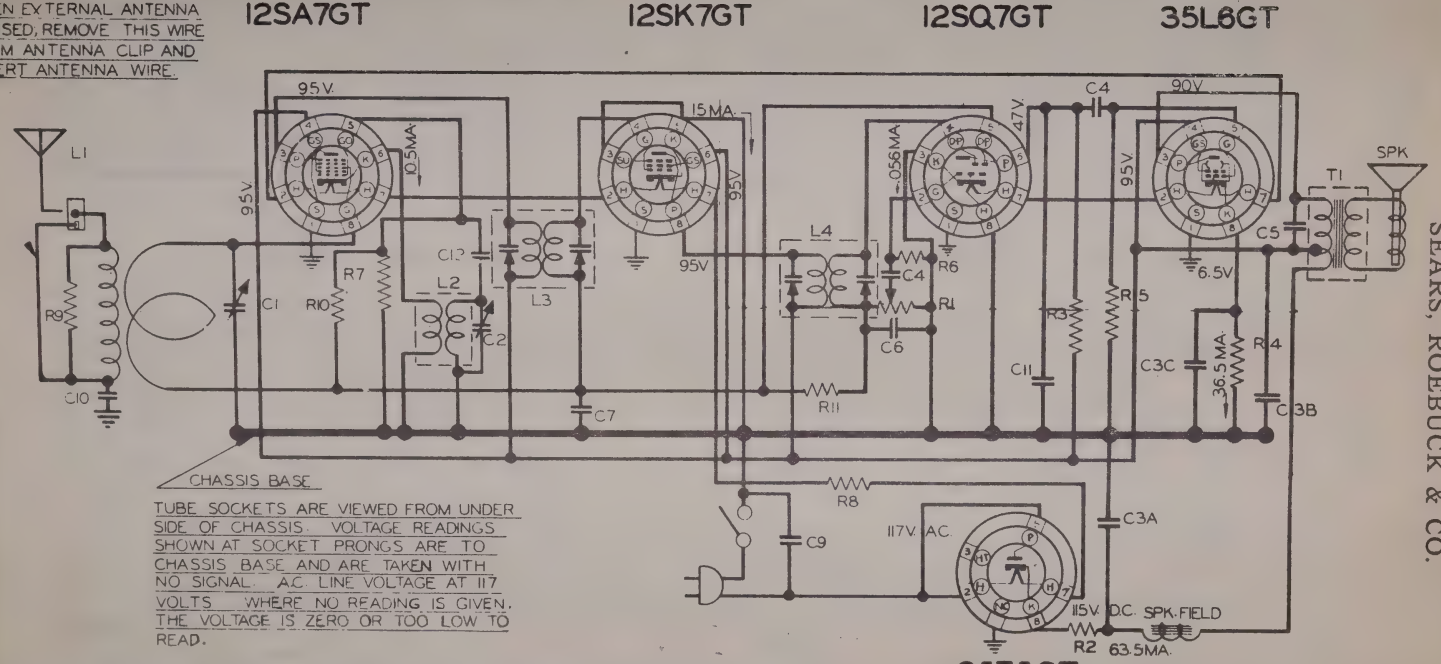
FOR ORIGINAL DATA SEE CHASSIS 132.810
IN VOLUME X111



SUBJECT: ADDITION OF SUFFIX -1 TO CHASSIS IDENTIFICATION NUMBER 132.810. CIRCUIT DIAGRAM & PARTS LIST CHANGES, FOR ALL MODELS.

The 1 megohm AVC isolating resistor was increased to 3 megohm (R11) to improve isolation. Certain constructional changes were made in the Oscillator Coil. The Electrolytic Condenser was changed from a 20-10 mfd. 150 V., 20 mfd. 25 V., to a 40-20 mfd. 150 V., 20 mfd. 25 V.

The tube and component layout was changed somewhat to permit more uniform manufacturing. These changes are shown in Fig. 1 and Fig. 2. Figure 1 represents the original (132.810) layout. Fig. 2 represents the supplementary (132.810-1) layout.

The model numbers for the "Walnut" and "Onyx" models have been changed to "7000" and "7002" respectively.

FIVE TUBE, AC-DC, SUPERHETERODYNE

MODELS 7000, 3211, 7002

FACTORY IDENTIFICATION NO. 132.810-1

JUNE 2, 1941

SEARS, ROEBUCK & CO.

MODELS 3211, 7000, 7002
Chassis 132.810-1

MODELS 3211, 7000, 7002
Chassis 132.810-1

SEARS, ROEBUCK & CO.

MODELS 3711, 7001, 7003
Chassis 132.811-1

FIG. 1
LOCATION OF PARTS ON TOP OF CHASSIS
132.811

FIG. 2
LOCATION OF PARTS ON TOP OF CHASSIS
132.811-1

LOCATION OF PARTS UNDER CHASSIS
132.811-1
FIG. 3

FIG. 1
LOCATION OF PARTS ON TOP OF CHASSIS
132.810

FIG. 2
LOCATION OF PARTS ON TOP OF CHASSIS
132.810-1

LOCATION OF PARTS UNDER CHASSIS
132.810-1
FIG. 3

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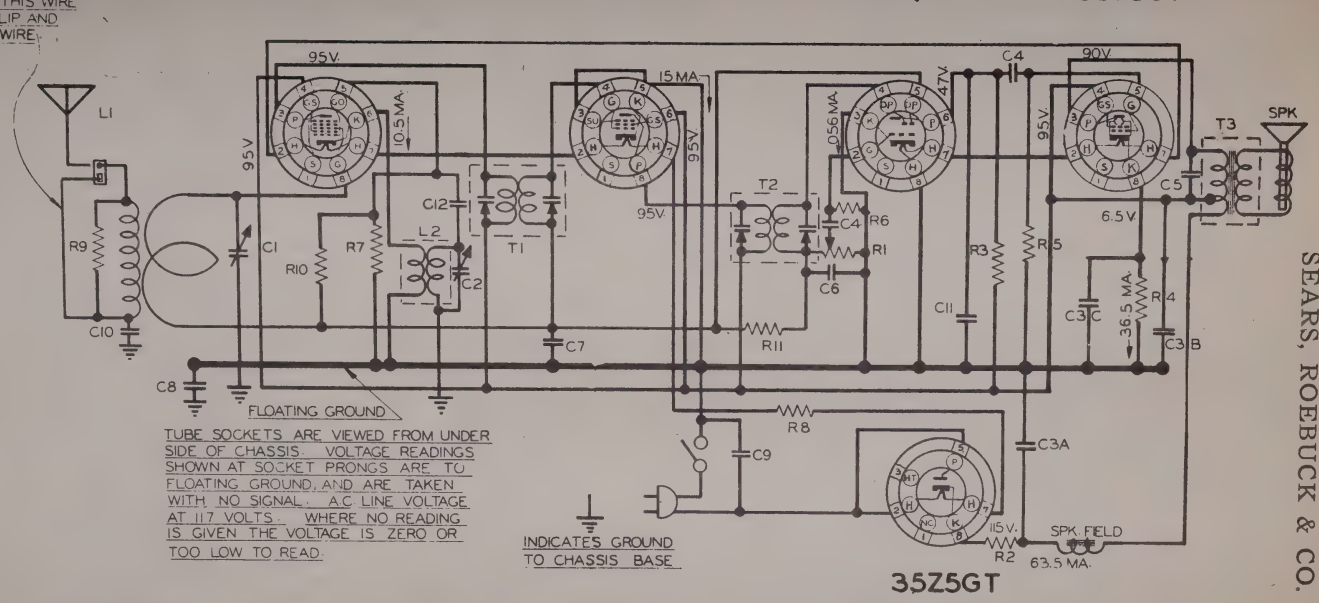


FOR ORIGINAL DATA SEE
CHASSIS 132.811 IN VOL. X111

132.811-1

SUBJECT: ADDITION OF SUFFIX -1 TO CHASSIS IDENTIFICATION NUMBER 132.811. CIRCUIT DIAGRAM AND PARTS LIST CHANGES, FOR ALL MODELS.

JUNE 2, 1941

The 1 megohm AVC isolating resistor was increased to 3 megohm to improve isolation.

Certain constructional changes were made in the Oscillator Coil. The tube and component layout was changed somewhat to permit more uniform manufacturing. These changes are shown in Fig. 1, and Fig. 2. Figure 1 represents the original (132.811) layout. Figure 2 represents the supplementary (132.811-1) layout.

The model numbers for the "Walnut" and "Onyx" models have been changed to "7001" and "7003" respectively.

FIVE TUBE, AC-DC, SUPERHETERODYNE

MODELS 7001, 3711, 7003

FACTORY IDENTIFICATION NO. 132.811-1

SEARS, ROEBUCK & CO.

SEARS PAGE 14-21
MODELS 3711, 7001, 7003
Chassis 132.811-1

MODEL 7049
Ch. 101.672

SEARS, ROEBUCK & CO.

IMPORTANT ALIGNMENT NOTES

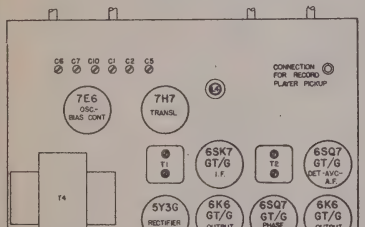
The Alignment must be done in the order given.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

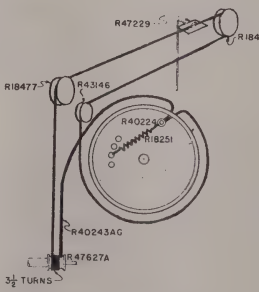
PRELIMINARY:

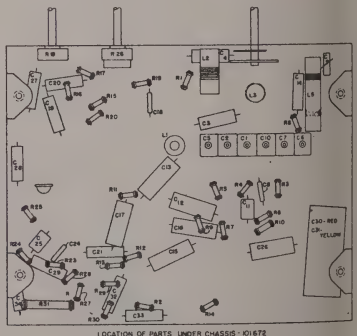
Output Meter Connections . . . . . Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts . . . . . 1.5 watts
Approximate microvolts input to indicate 500 milliwatts output . . . . . See chart below
Generator ground lead connection . . . . . Receiver chassis
Dummy Antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator Modulation. . . . . 30%, 400 cycles
Position of Volume Control. . . . . .Fully on
Position of Tone Control . . . . . HI
Position of pointer with tuner fully closed . . . . . Last line below 540 calibration mark

WAVE BAND SWITCH POSITION	POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
A	Closed	455 KC	.1 mfd.	7H7 Transl. grid	T2, T1	IF	---
A	Open	1750 KC	.0002 mfd.	Ant. Terminal	C6	Oscillator	---
A	1410	1410 KC	.0002 mfd.	Ant. Terminal	C5, C2	Ant. Transl.	25
A	600 (rock)	600 KC	.0002 mfd.	Ant. Terminal	C7	Padder	100
B	Open	18.3 MC	400 ohms	Ant. Terminal	C10	SW Oscillator	---
B	15 (rock)	15 MC	400 ohms	Ant. Terminal	C1	Transl.	20

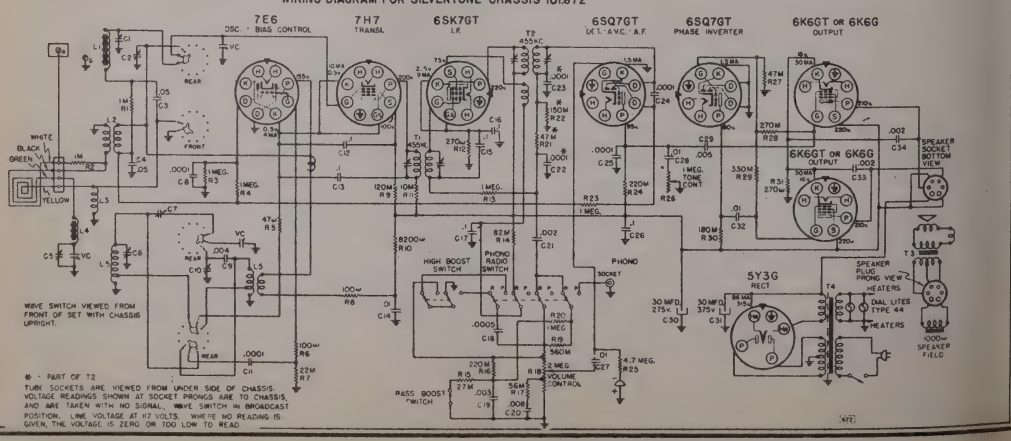


LOCATION OF PARTS ON TOP OF CHASSIS 101.672




LOCATION OF PARTS UNDER CHASSIS 101.672

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.672


7E6 OSC. - BIAS CONTROL
7H7 TRANSL
6SK7GT I.F.
6SQ7GT DET.-AVC.-A.F.
6SQ7GT PHASE INVERTER
6K6GT OR 6K6G OUTPUT
6K6GT OR 6K6G
5Y3G RECT
WHITE
BLACK
GREEN
YELLOW
WAVE SWITCH VIEWED FROM FRONT OF SET WITH CHASSIS UPRIGHT.
HIGH BOOST SWITCH
PHONO RADIO SWITCH
PHONO SOCKET
BASS BOOST SWITCH
VOLUME CONTROL
SPEAKER PLUG PRONG VIEW
SPEAKER SOCKET BOTTOM VIEW
SPEAKER FIELD
DIAL LITES TYPE 44
HEATERS
* - PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

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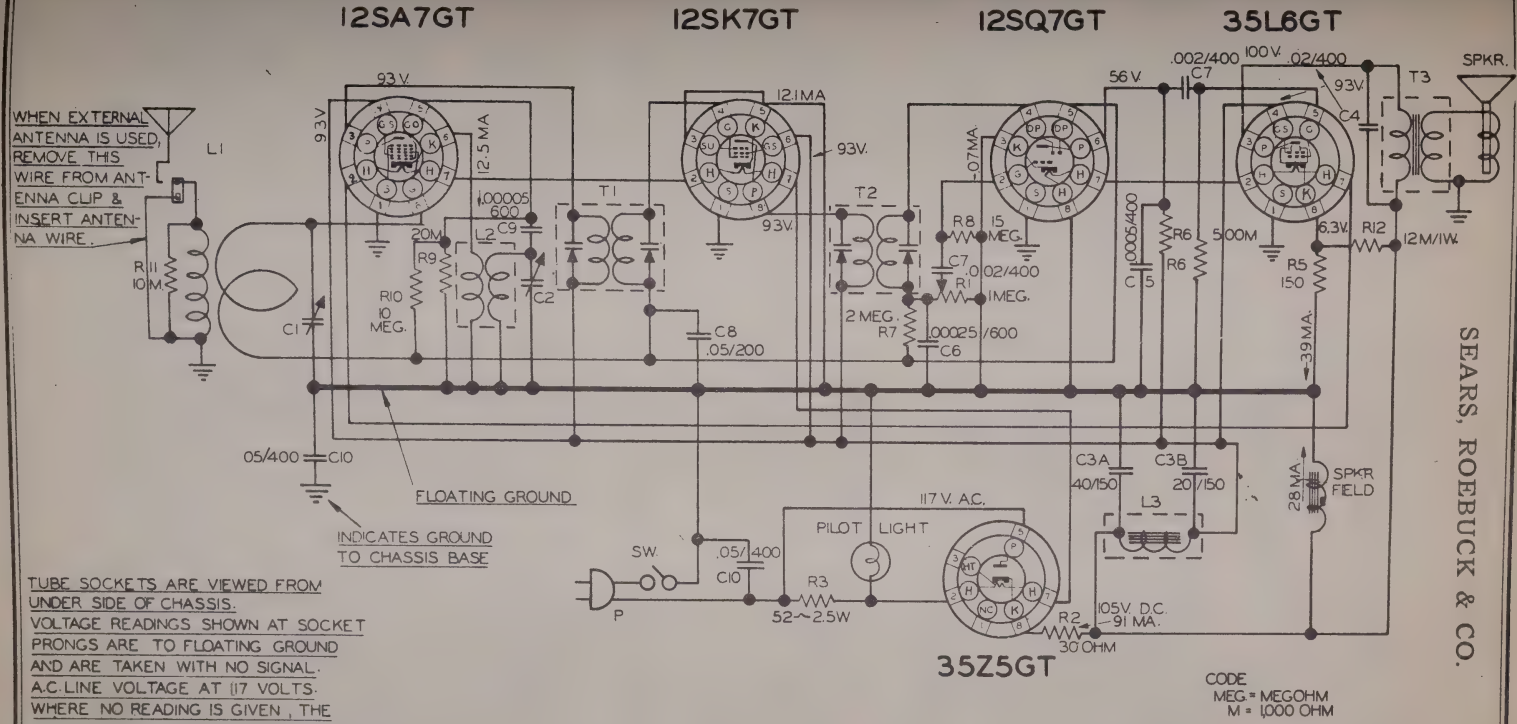


TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO FLOATING GROUND AND ARE TAKEN WITH NO SIGNAL.
A.C. LINE VOLTAGE AT 117 VOLTS.
WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ

CODE
MEG. = MEGOHM
M = 1,000 OHM

POWER SUPPLY:
All models available . . . . . 105-125 volts, AC-DC, 35 watts

FREQUENCY RANGE: 540-1600 kc. ALIGNMENT FREQUENCIES. . . . Osc. - 1400 kc.
Transl. - 1400 kc.

INTERMEDIATE FREQUENCY: . . . . . 455 kc.

POWER OUTPUT:
Type: Beam tube
Undistorted: 1.0 watts
Maximum: 2.6 watts

LOUD SPEAKER:
Type: E M
Size: 4 inch

APRIL 30, 1942

132.814

SEARS, ROEBUCK & CO.

MODELS 7020, 7022
Chassis 132.814

MODELS 7020, 7022
Chassis 132.814

SEARS, ROEBUCK & CO.

FIVE TUBE, AC-DC, SUPERHETERODYNE

MODELS 7020, 7022

FACTORY IDENTIFICATION NO. 132.814

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . . 0.38 volts
Dummy antenna value to be in series with generator output . . . . .See chart below
Connection of generator output lead . . . . . .See chart below
Connection of generator ground lead . . . . . .See chart below
Generator Modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully clockwise
Position of Dial Pointer with Variable fully closed. . . . . .See note below

POSITION OF Variable	FREQUENCY GENERATOR	DUMMY ANTENNA	GENERATOR CONNECTION (high)	GENERATOR CONNECTION (low)	TRIMMERS ADJUSTED (In order shown)	TRIMMER FUNCTION	Uv. Input to Haz. Std. Loop to give ½ watt output.
Open	455 kc.	.1 mfd.	12SA7GT grid	Cond. frame	T2, T1	IF	-------
1400 kc.	1400 kc.	.00005 mfd.	Ant. clip	Chassis	C2, C1	Osc-Trans	1600 uv.
600 kc.	600 kc.	.00005 mfd.	Ant. clip	Chassis	Check Point	-----	1000 uv.

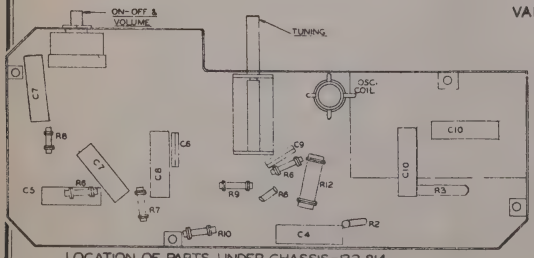
IMPORTANT ALIGNMENT NOTES

With the variable condenser closed the pointer should point vertically upward. When properly set with the variable condenser closed the pointer will point just to the right of the "54" calibration mark.

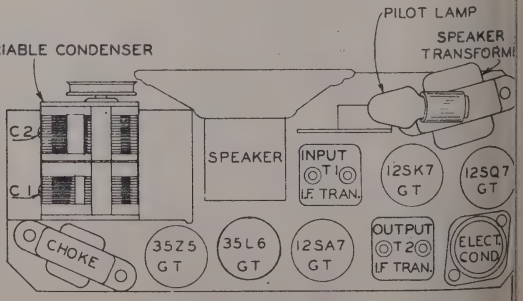
The alignment procedure should be repeated stage by stage, in the original order for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

THE LOOP ANTENNA:

The loop antenna is directional so that reception may be improved or interference lessened by turning the set to a particular position. In locations where the signal strength is too low to give satisfactory reception from the loop antenna, an outside antenna may be connected to the Fahnstock clip on the loop right hand side underneath the receiver. In order to attain maximum performance of the loop, the primary is shorted with a wire under the Fahnstock clip. When an outside antenna is used this wire must be removed from the clip before the antenna is connected.



LOCATION OF PARTS UNDER CHASSIS-132.814



LOCATION OF PARTS ON TOP OF CHASSIS

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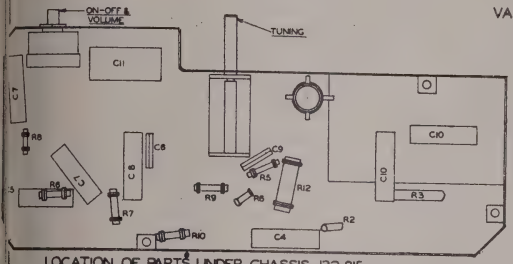
SEARS, ROEBUCK & CO.

MODELS 7021, 7023
Chassis 132.815

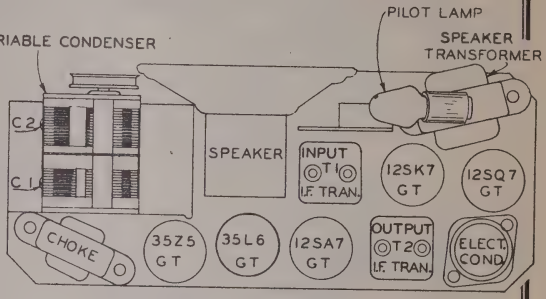
FIVE TUBE, AC-DC, SUPERHETERODYNE

MODELS 7021, 7023

FACTORY IDENTIFICATION NO. 132.815



LOCATION OF PARTS UNDER CHASSIS-132.815



LOCATION OF PARTS ON TOP OF CHASSIS

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts. . . . . 0.38 volts
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Connection of generator ground lead . . . . . See chart below
Generator Modulation . . . . . 30%, 400 cycles
Position of Volume Control. . . . . Fully clockwise
Position of Dial Pointer with Variable fully closed . . . . . See note below

POSITION OF Variable	FREQUENCY GENERATOR	DUMMY ANTENNA	GENERATOR CONNECTION (high)	GENERATOR CONNECTION (low)	TRIMMERS ADJUSTED (In order shown)	TRIMMER FUNCTION	Uv. Input to Haz. Std. Loop to give ½ watt Output.
Open	455 kc.	.1 mfd.	12SA7GT grid	Minus "B"	T2, T1	IF	- - - - -
1400 kc.	1400 kc.	.00005 mfd.	Ant. clip	Chassis	C2, C1	Osc-Trans	1600 uv.
600 kc.	600 kc.	.00005 mfd.	Ant. clip	Chassis	Check point	----	1000 uv.

IMPORTANT ALIGNMENT NOTES

With the variable condenser closed the pointer should point vertically upward. When properly set with the variable condenser closed the pointer will point just to the right of the "54" calibration mark.

The alignment procedure should be repeated stage by stage, in the original order for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

THE LOOP ANTENNA:

The loop antenna is directional so that reception may be improved or interference lessened by turning the set to a particular position. In locations where the signal strength is too low to give satisfactory reception from the loop antenna, an outside antenna may be connected to the Fahnstock clip on the loop right hand side underneath the receiver. In order to attain maximum performance of the loop, the primary is shorted with a wire under the Fahnstock clip. When an outside antenna is used this wire must be removed from the clip before the antenna is connected.

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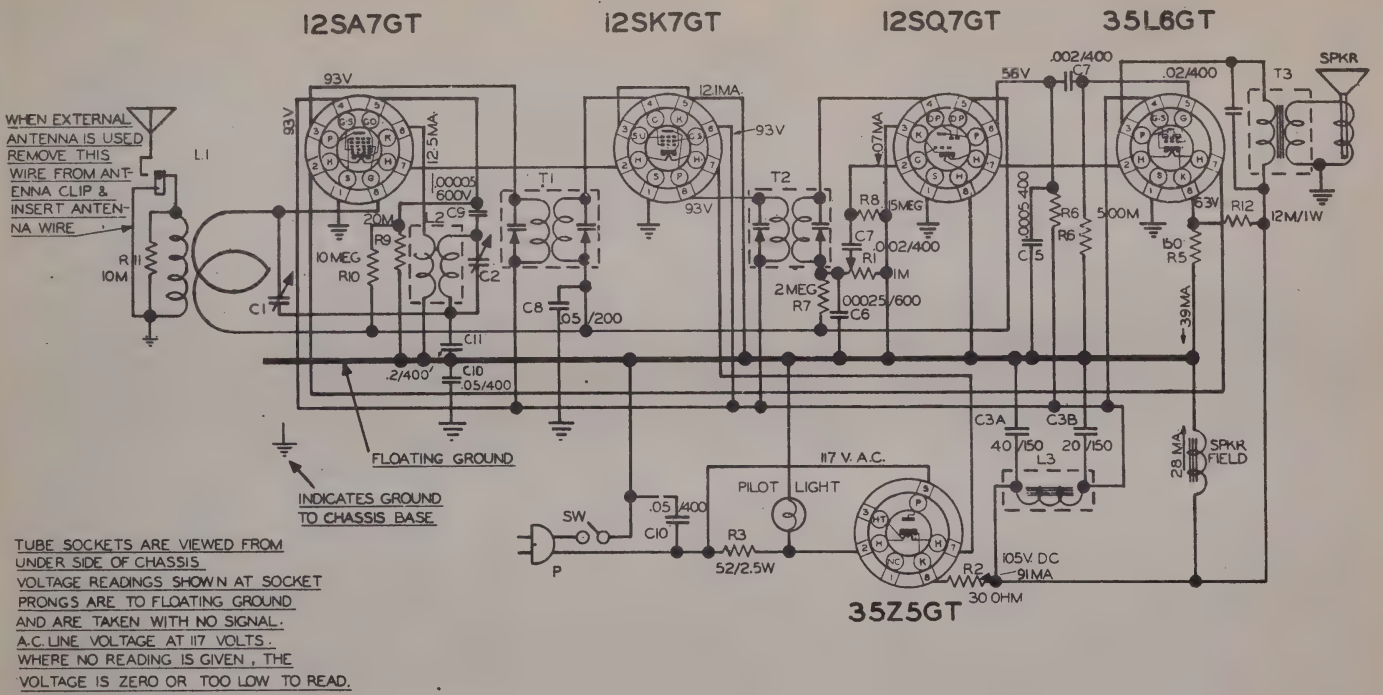


TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS
VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO FLOATING GROUND AND ARE TAKEN WITH NO SIGNAL.
A.C. LINE VOLTAGE AT 117 VOLTS.
WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

ELECTRICAL SPECIFICATIONS

TUBES AND FUNCTIONS:
12SA7GT . . . Oscillator-Translator
12SK7GT . . . . . .IF
35Z5GT . . . . .Rectifier
12SQ7GT . . . . . .Detector-AVC-AF
35L6GT . . . . . .Output

POWER SUPPLY:
All models available . . . . . .105-125 volts, AC-DC, 35 watts

FREQUENCY RANGE: 540-1600 kc.

ALIGNMENT FREQUENCIES. . Osc. - 1400 kc.
Transl. -1400 kc.

INTERMEDIATE FREQUENCY: . . . . . 455 kc.

POWER OUTPUT:
Type: Beam Tube
Undistorted: 1.0 watts
Maximum: 2.6 watts

LOUD SPEAKER:
Type: E.M.
Size: 4 inch

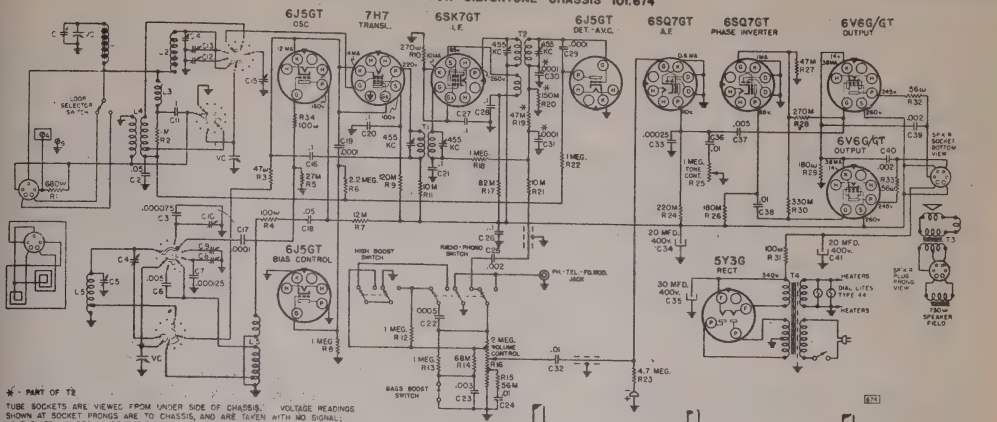
APRIL 30, 1942

132.815

SEARS, ROEBUCK & CO.

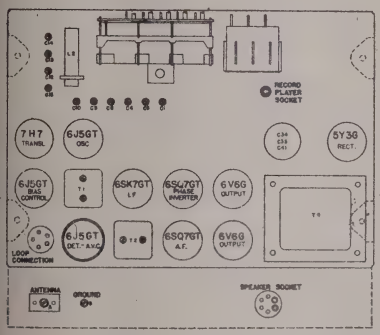
MODELS 7050
Ch. 101.674

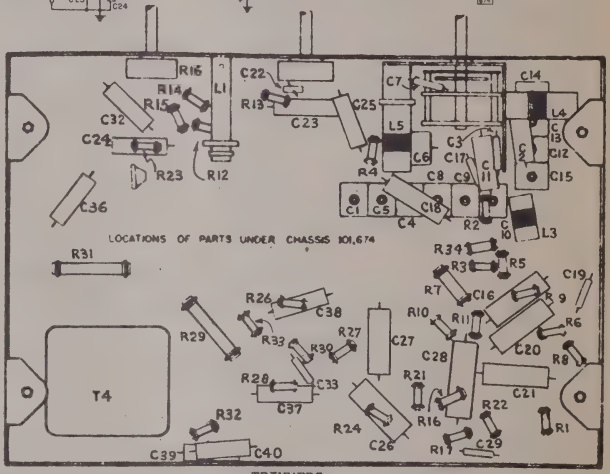
WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.674



* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.





WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	Closed	455 kc	.1 mfd.	7H7 Grid	T2, T1	IF	--
"A"	Fully Open	1720 kc	.00005 mfd.	Ant. Term.	C5	Oscillator	--
"A"	1410 kc	1410 kc	.00005 mfd.	Ant. Term.	C1, C14	Loop,Transl	15
"A"	600 kc (rock)	600 kc	.00005 mfd.	Ant. Term.	C4	Padder	30
"B"	Fully Open	18.3 mc	400 ohms	Ant. Term.	C9*	Oscillator	--
"B"	16 mc (rock)	16 mc	400 ohms	Ant. Term.	C12	Translator	25
"C"	9.6 mc	9.6 mc	400 ohms	Ant. Term.	C8*	Oscillator	--
"C"	9.6 mc (rock)	9.6 mc	400 ohms	Ant. Term.	C13	Translator	25
"D"	11.7 mc	11.7 mc	400 ohms	Ant. Term.	C10*	Oscillator	--
"D"	11.7 mc (rock)	11.7 mc	400 ohms	Ant. Term.	C15	Translator	25

IMPORTANT ALIGNMENT NOTES

* If two peaks can be had, the correct one is with the trimmer screw further out; the other peak is the image.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

When aligning the receiver be sure that the Loop Button is in the OUT position as this connects the loop which has the outside antenna coupling turn.

MODEL 7051
Ch. 101.684

SEARS, ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

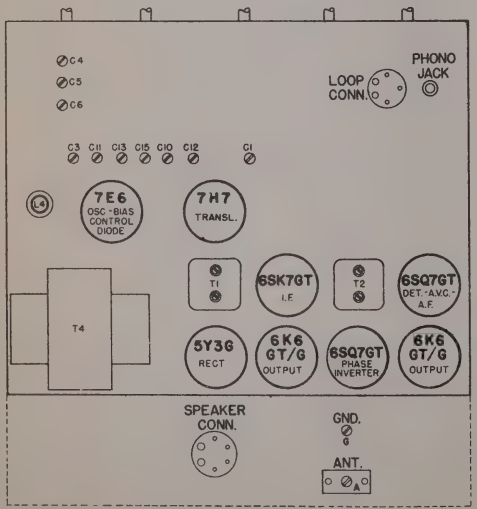
Output meter connections . . . . . Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts. . . . . 1.5 volts
Approximate microvolts input to indicate 500 milliwatts output. . . . . See chart below
Generator ground lead connection . . . . . Receiver chassis
Dummy antenna value to be in series with generator output. . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator Modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully on
Position of Tone Control . . . . . HI
Position of pointer with tuner fully open. . . . . On mark below 540 kc calibration mark

BAND SWITCH POSITION	POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROX. MICRO-VOLTS
A	Closed	455 kc	.1 mfd.	Trans.Grid	T2 - T1	IF	--
A	Open	1750 kc	.0002 mfd.	Ant.	C1	Osc.	--
A	1410 kc	1410 kc	.0002 mfd.	Ant.	C2	Ant.	25
A	1410 kc	1410 kc	.0002 mfd.	Ant.	C3	Trans.	--
A	600 (Rock)	600 kc	.0002 mfd.	Ant.	C4	Pad.	125
B	Open	5900 kc	400 ohms	Ant.	C5	Osc.	--
B	4500 kc	4500 kc	400 ohms	Ant.	C6	Trans.	35
C	open	18.3 mc	400 ohms	Ant.	C7	Osc.	--
C	15 mc (Rock)	15.0 mc	400 ohms	Ant.	C8	Trans.	25
D	9.6 mc	9.6 mc	400 ohms	Ant.	C9	Osc.	--
D	9.6 mc (Rock)	9.6 mc	400 ohms	Ant.	C10	Trans.	30

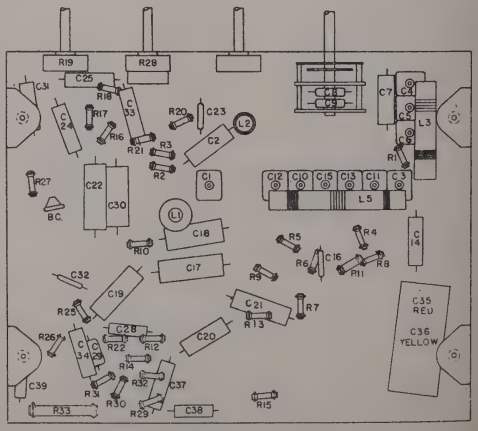
IMPORTANT ALIGNMENT NOTES

The alignment must be done in the order given.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.



LOCATIONS OF PARTS ON TOP OF CHASSIS 101.684

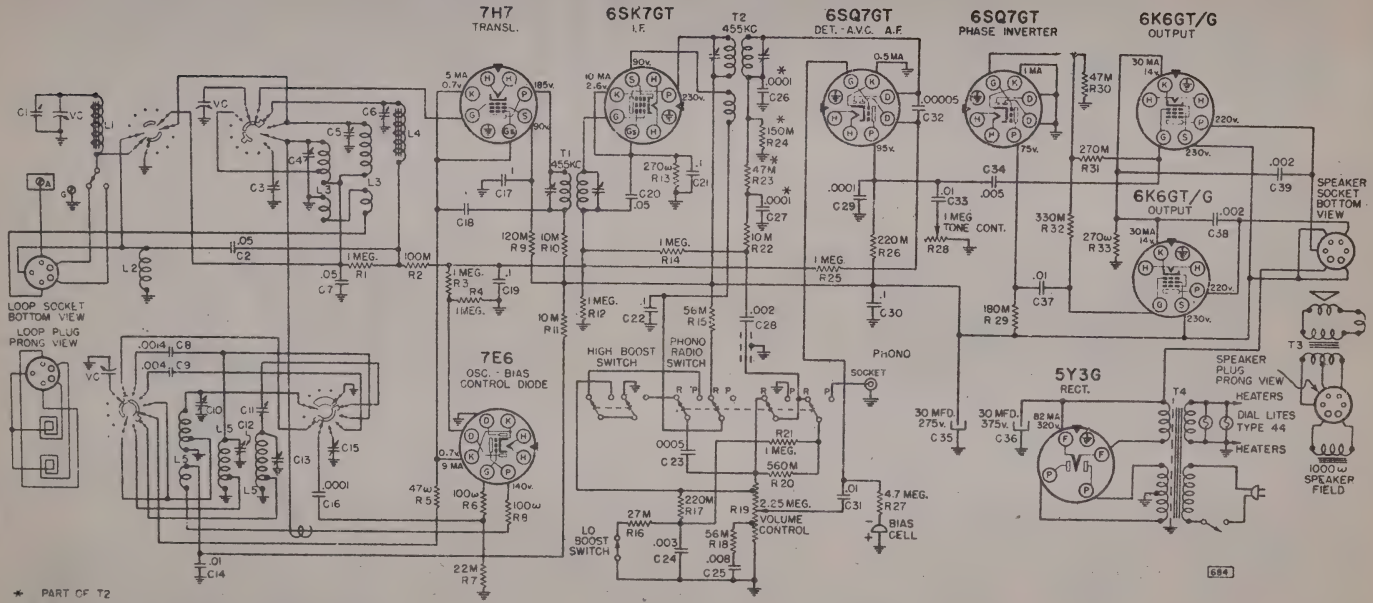


LOCATIONS OF PARTS UNDER CHASSIS 101 684

©John F. Rider

John F. Rider

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.684



* PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

POWER OUTPUT:

Type	Push Pull Pentode
Undistorted	3.5 watts
Maximum	7 watts

LOUDSPEAKER:

Type	Dynamic
Size	12 inch
Field coil resistance	1000 ohms
Approx. field coil voltage drop	80 v.

INTERMEDIATE FREQUENCY

455 kc

APRIL 3, 1942

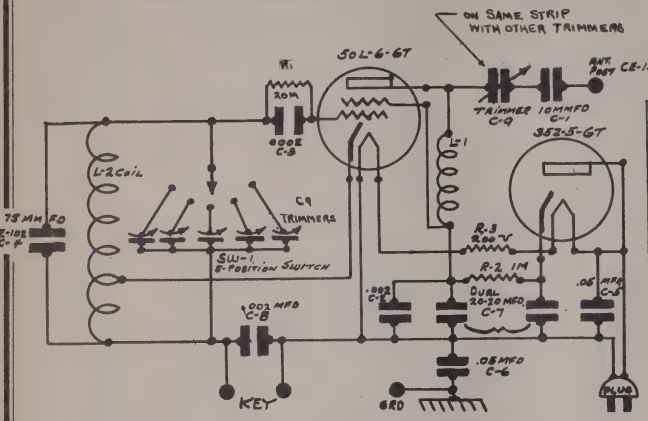
MODEL 100
Ch. 152.100

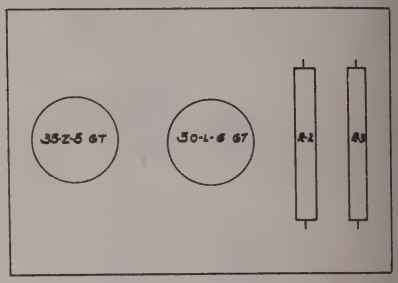
SEARS, ROEBUCK & CO.

MODEL 7069
Ch. 101.658-1

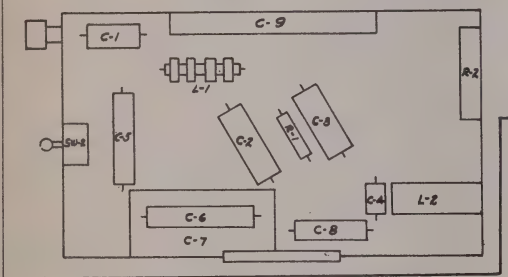
The Model 100 is a five channel miniature C.W. Transmitter enclosed in an enameled steel case and mounted on a wood base board with a Speed X 300 telegraph key. The unit was built to our specifications for code and operating procedure practice.

The unit uses a Electron coupled Hartley oscillator circuit with a five position switch for selecting one of the five tank trimmer condensers. The trimmer condenser adjusting screws are conveniently accessable thru five holes along the lower left hand side of the chassis. The antenna coupling condenser is similarly located and adjusted. A 75 umfd silver ceramic negative coefficient condenser is connected directly across the tuned tank circuit on all five channels to insure frequency stability. The output frequency channels are adjustable from 3.0 to 3.5 megacycles. Cathode circuit keying is employed.





TOP OF CHASSIS



C. W. CODE PRACTICE OSCILLATOR

MODEL #100

MODEL 7069

FACTORY IDENTIFICATION NO. 101.658-1

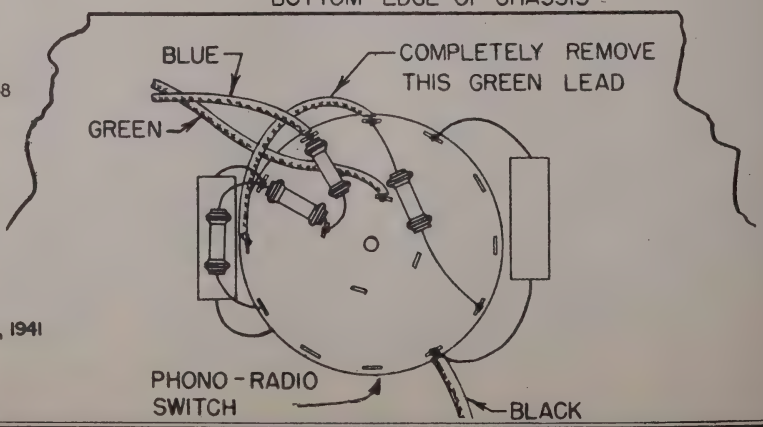
TEN TUBE, FOUR BAND SUPERHETERODYNE, WITH PUSH BUTTON TUNING

COMBINED WITH AUTOMATIC RECORD CHANGER

IMPROVEMENT OF PHONOGRAPH OPERATION:

Chasses identified by 101.658 can be improved with the respect to phonograph operation by cutting the green wire on the phono radio switch as shown in the illustration below. Chasses which have had this change made in production are identified by suffix number -1 or a subsequent number.

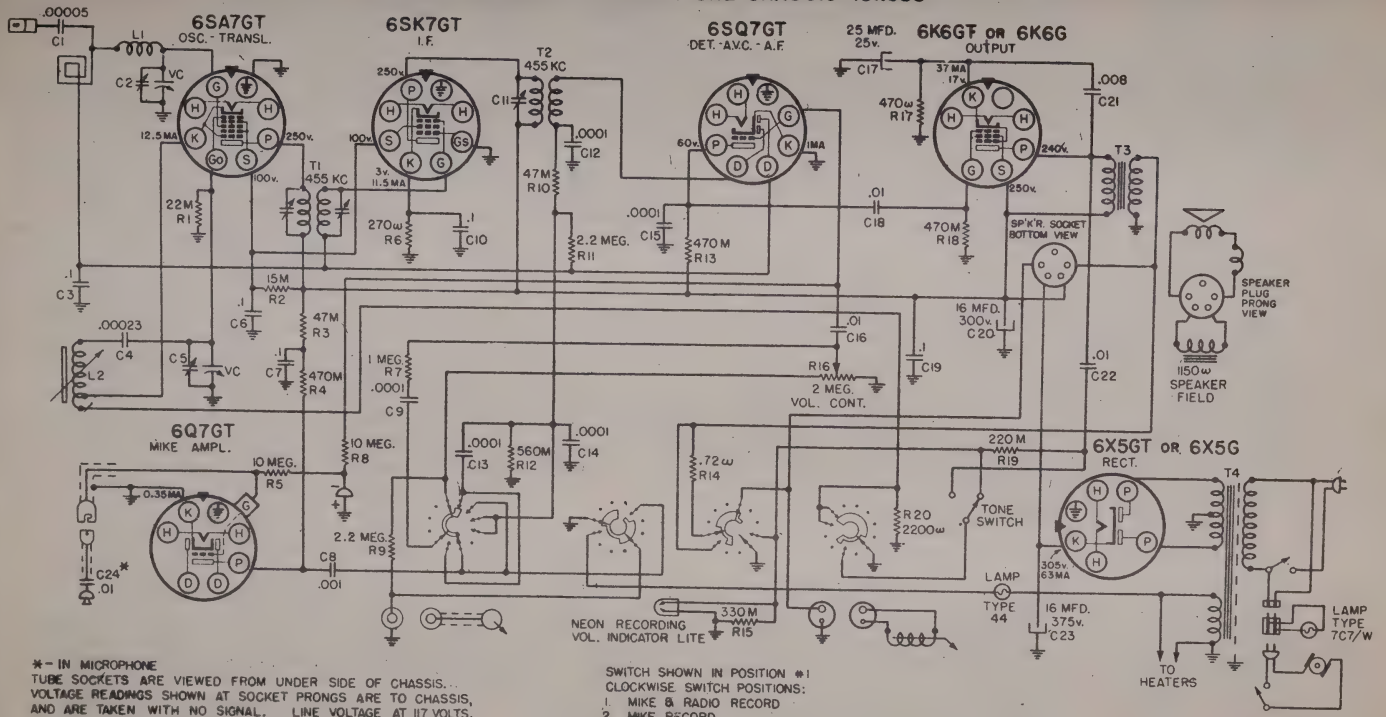
FOR ORIGINAL DATA SEE CHASSIS 101.658 IN VOL. XIII



NOVEMBER 18, 1941

©John F. Rider

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.680



*- IN MICROPHONE

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

SWITCH SHOWN IN POSITION #1
CLOCKWISE SWITCH POSITIONS:

1. MIKE & RADIO RECORD
2. MIKE RECORD
3. RADIO RECORD
4. RADIO PLAY
5. PHONO PLAY
6. MIKE
7. MIKE & RADIO

INTERMEDIATE FREQUENCY . . . . . 455 kc

POWER OUTPUT:

Type	Pentode
Undistorted	2.5 watts
Maximum	5 watts

LOUDSPEAKER:

Type	Dynamic
Size	8 inch
Field coil resistance	1150 ohms
Approx. field coil voltage drop	55 v.

APRIL 24, 1942

SEARS, ROEBUCK & CO.

MODEL 7066
Ch. 101.680

MODEL 7066
Ch. 101.680

SEARS ROEBUCK CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

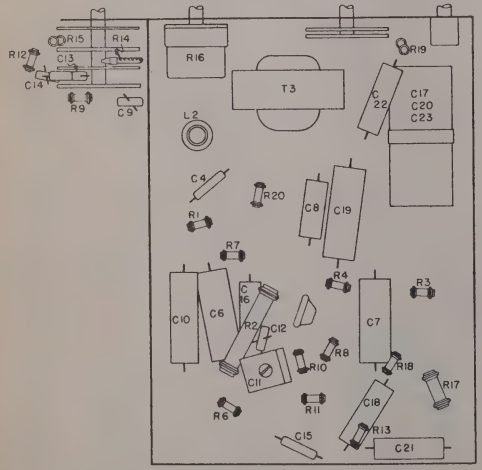
Output meter connection	Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts	1.25 volts
Approximate microvolts input for 500 milliwatts output	See chart below
Dummy antenna value to be in series with generator output	See chart below
Connection of generator output lead	See chart below
Connection of generator ground lead	Receiver chassis
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully clockwise
Position of Tone Control	Counter-clockwise (HI)
Position of Dial Pointer with variable fully closed	On mark below 540 kc calibration mark

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	455 kc	.1 mfd.	6SA7 Grid	C 11	IF	---
Fully open	1620 kc	.00005 mfd.	Ant. Clip	C 1	Oscillator	---
1410 kc	1410 kc	.00005 mfd.	Ant. Clip	C 2	Translator	125
600 kc (rock)	600 kc	.00005 mfd.	Ant. Clip	L 2	Padder	425

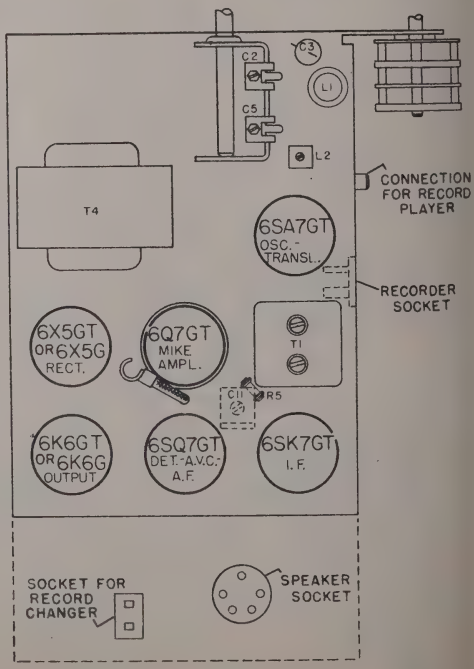
IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.



LOCATIONS OF PARTS UNDER CHASSIS 101.680

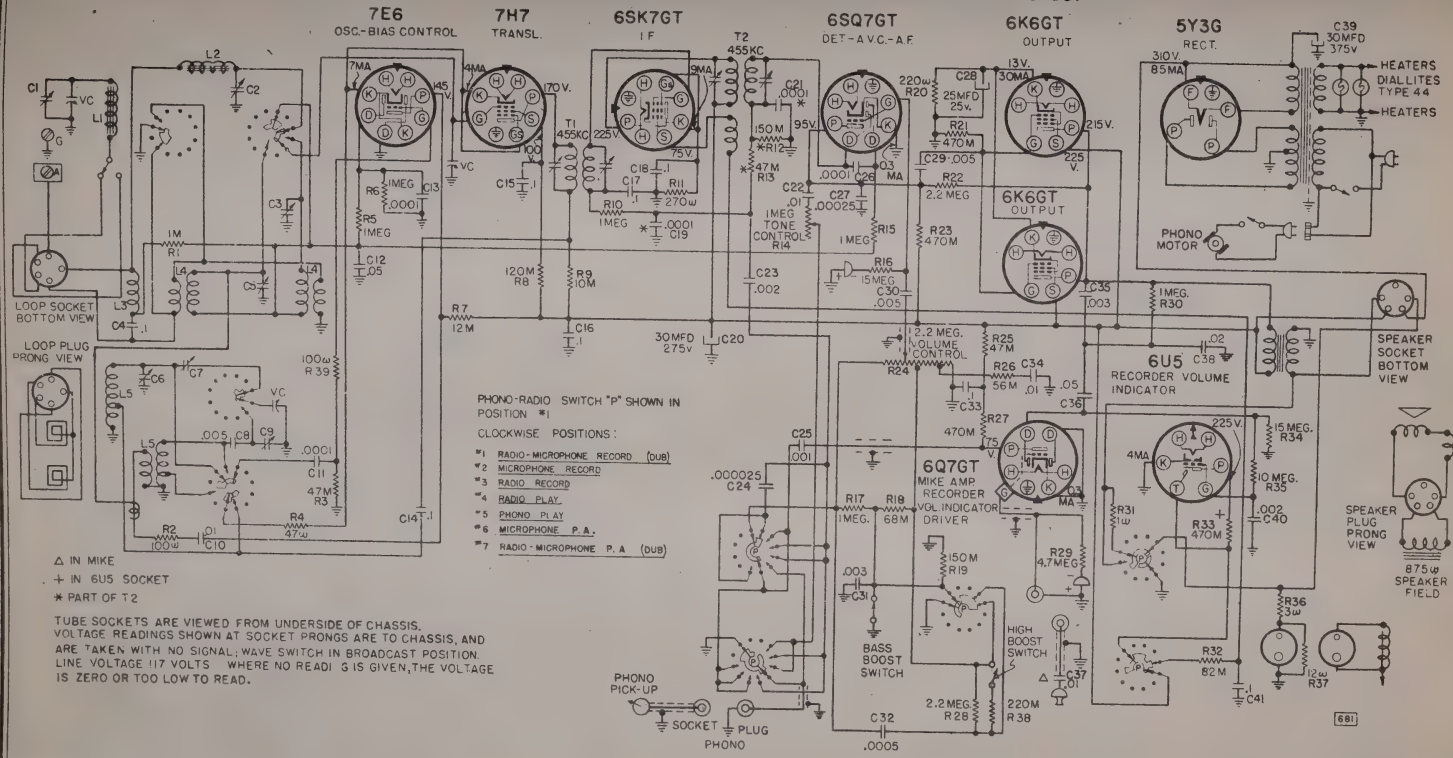


LOCATIONS OF PARTS ON TOP OF CHASSIS - 101.680

©John F. Rider

John F. Rider

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.681



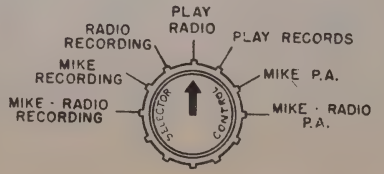
APRIL 3, 1942

INTERMEDIATE FREQUENCY

455 kc

PUSH BUTTON TUNING MECHANISM:

The adjustment for each push button is locked or unlocked by tightening or loosening the slotted screwhead made access - ible when the push button knob is pulled off of its plunger. Stations are set up by unlocking the mechanism, tuning in the station, pushing in the plunger (being careful not to detune the station), and securely locking the adjustment.

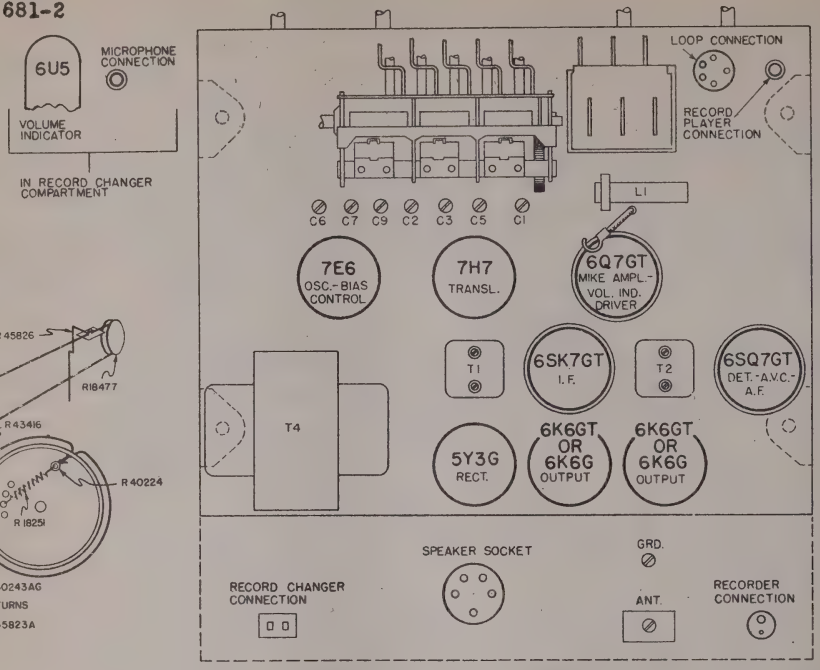


SEARS ROEBUCK CO.

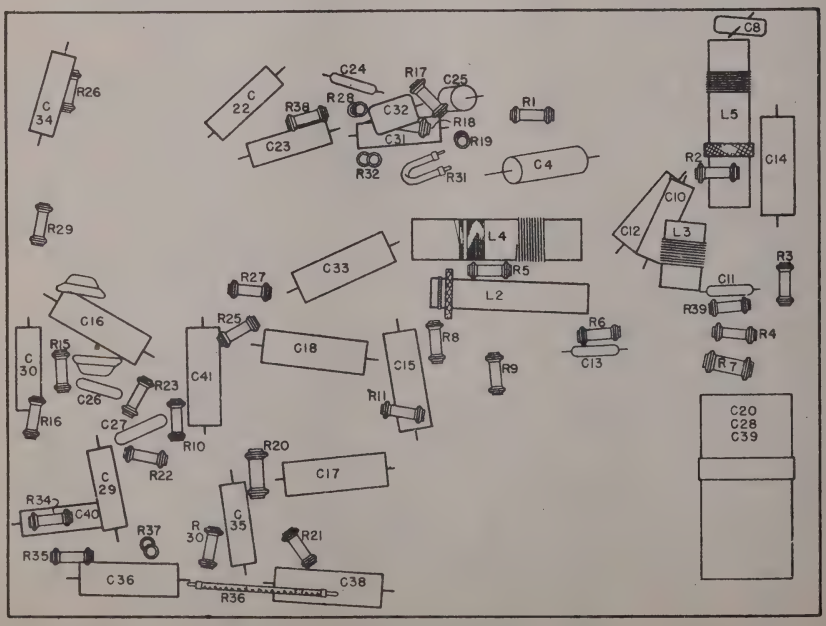
MODELS 7068, 7138
Ch. 101.681

MODELS 7068, 7168
Ch. 101.681, .
Ch. 101.681-2

SEARS, ROEBUCK & CO.



LOCATIONS OF PARTS ON TOP OF CHASSIS 101.681, -2



LOCATION OF PARTS UNDER CHASSIS - 101.681

©John F. Rider

SEARS ROEBUCK CO.

ALIGNMENT PROCEDURE

MODELS 7068, 7168
Ch. 101.681,
Ch. 101.681-2

PRELIMINARY:

Output meter connection	Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts	1.8 volts
Approximate microvolts input to indicate 500 milliwatts output	See chart below
Generator ground lead connection	Receiver chassis
Dummy antenna value to be in series with generator output	See chart below
Connection of generator output lead	See chart below
Generator Modulation	30%, 400 cycles
Position of Volume Control	Fully on
Position of Tone Control	HI
Position of pointer with tuner fully open	On scribed line on top of pointer guide rail

BAND SWITCH POSITION	POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
A	Closed	455 Kc	.1 mfd.	7H7 Transl. grid	T2, T1	IF	--
A	Open	1720 Kc	.00005 mfd.	Ant. Terminal	C6	Oscillator	--
A	1410	1410 Kc	.00005 mfd.	Ant. Terminal	C1, C3	Ant. Transla.	30
A	600 (rock)	600 Kc	.00005 mfd.	Ant. Terminal	C7,	Padder	125
POL	2.4	2.4 Mc	400 ohms	Ant. Terminal	C2	Transla.	35
B	Open	18.3 Mc	400 ohms	Ant. Terminal	C9	Oscillator	--
B	15 (rock)	15 Mc	400 ohms	Ant. Terminal	C5	Transla.	20

IMPORTANT ALIGNMENT NOTES

* If two peaks can be had, the correct one is with the trimmer screw further out; the other peak is the image.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

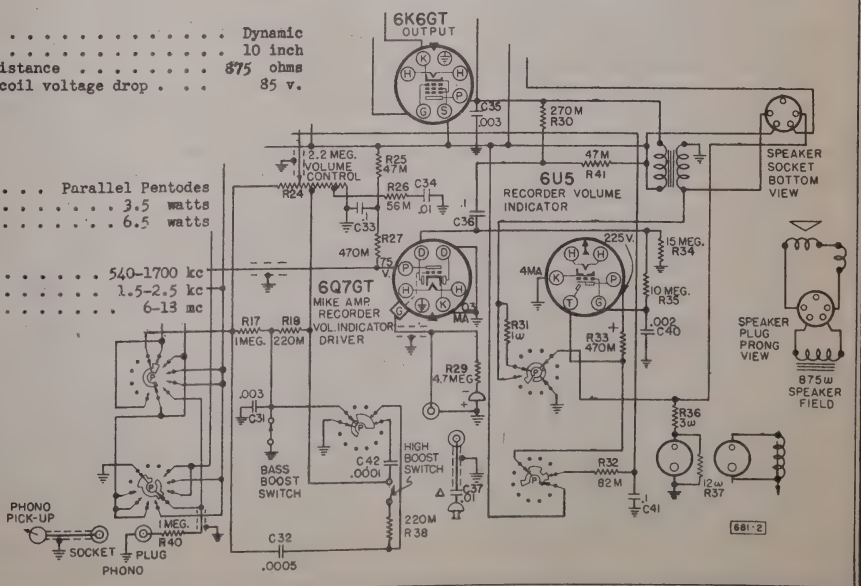
When aligning the receiver be sure that the Loop Button is in the OUT position as this connects the loop which has the outside antenna coupling turn.

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.681-2

LOUDSPEAKER:
Type . . . . . Dynamic
Size . . . . . 10 inch
Field coil resistance . . . . . 875 ohms
Approx. field coil voltage drop . . . 85 v.

POWER OUTPUT:
Type . . . . . Parallel Pentodes
Undistorted . . . . . 3.5 watts
Maximum . . . . . 6.5 watts

FREQUENCY RANGES:
Band "A". . . . . 540-1700 kc
Band "POLICE" . . . . . 1.5-2.5 kc
Band "B". . . . . 6-13 mc



MODEL 7079
Ch. 101.620-3

SEARS ROEBUCK CO.

MODEL 7081
Ch. 101.636

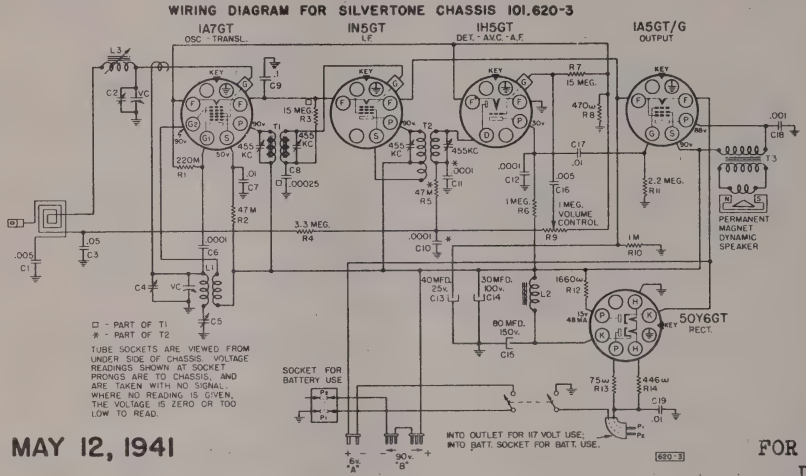
MODEL 7079

FIVE TUBE, BATTERY AC-DC POWERED PORTABLE SUPERHETERODYNE

SUBJECT: ADDITION OF SUFFIX NUMBER -3 TO CHASSIS IDENTIFICATION NUMBER 101.620:

Chassis identified as 101.620-3 are the same as 101.620-2 except that the loop is wound directly on the cabinet frame and covered by the cabinet covering. The loop is of low impedance requiring the addition of an antenna loading coil. Filament circuit revisions are also incorporated.

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.620-3



□ - PART OF T1
* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

MAY 12, 1941

FOR ORIGINAL DATA SEE INDEX

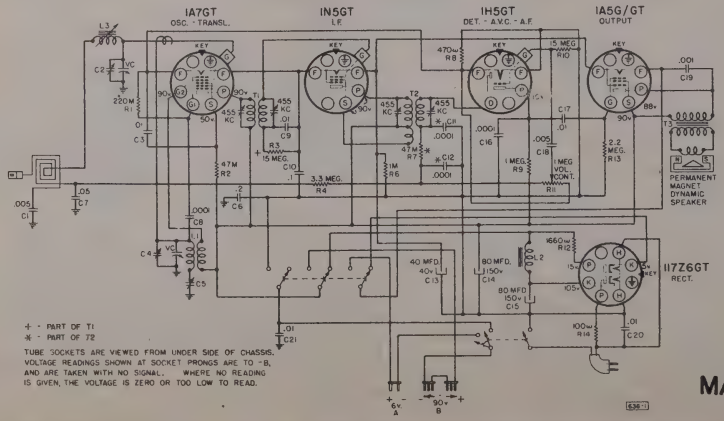
MODEL 7081

FIVE TUBE, BATTERY OR AC-DC POWERED PORTABLE SUPERHETERODYNE

SUBJECT: ADDITION OF SUFFIX NUMBER -1 TO CHASSIS IDENTIFICATION NUMBER 101.636:

Chassis identified as 101.636-1 are the same as 101.636 except that the loop is wound directly on the cabinet frame and covered by the cabinet covering. The loop is of low impedance requiring the addition of an antenna loading coil. The ranges has been extended to cover 540 Kc.

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.636-1



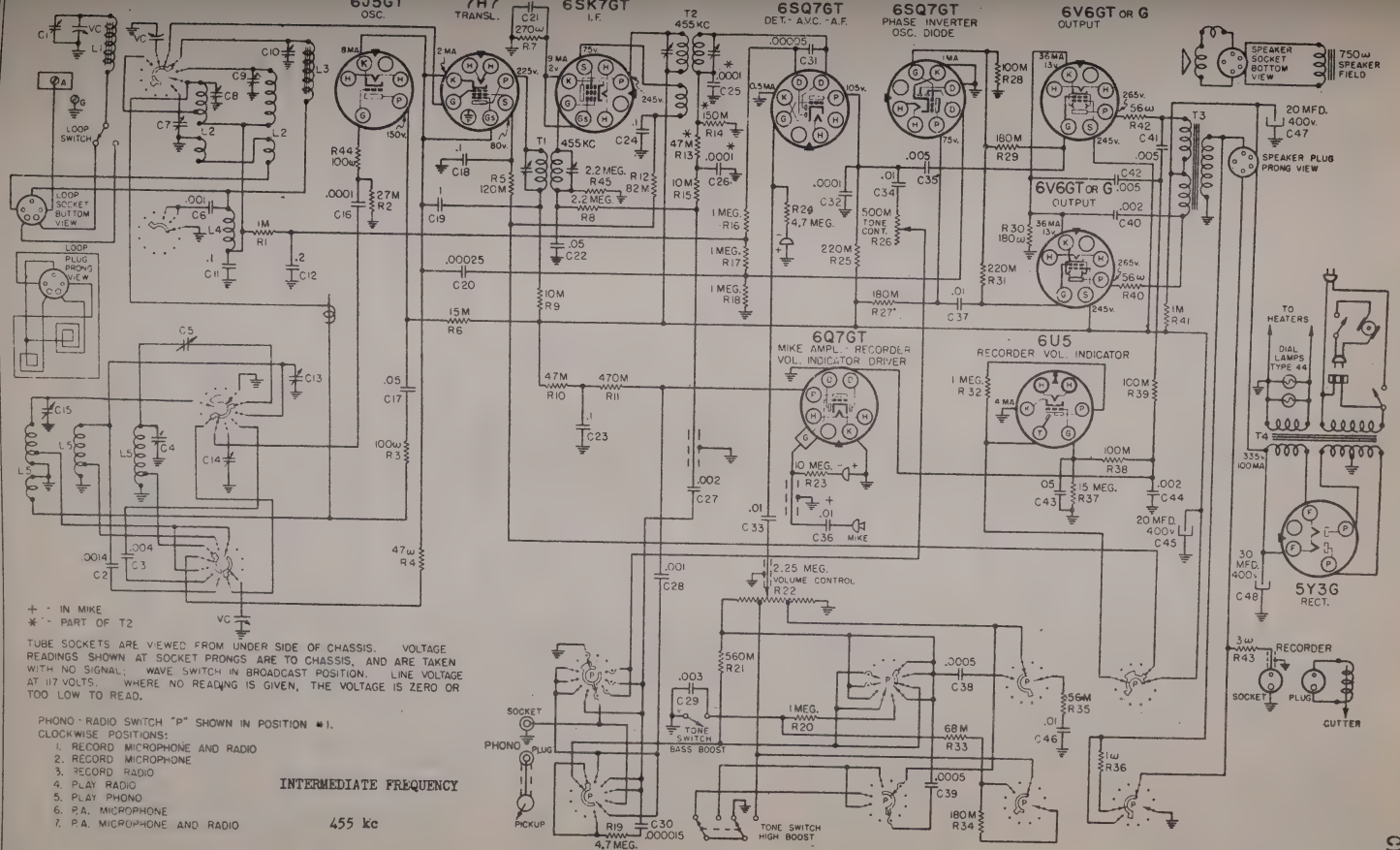
+ - PART OF T1
* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO -B, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

MAY 12, 1941

©John F. Rider

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.682



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

PHONO - RADIO SWITCH "P" SHOWN IN POSITION #1.
CLOCKWISE POSITIONS:

1. RECORD MICROPHONE AND RADIO
2. RECORD MICROPHONE
3. RECORD RADIO
4. PLAY RADIO
5. PLAY PHONO
6. P.A. MICROPHONE
7. P.A. MICROPHONE AND RADIO

INTERMEDIATE FREQUENCY

455 kc

MAY 4, 1942

POWER OUTPUT:

Type	Push-Pull beam
Undistorted	7.5 watts
Maximum	11 watts

LOUDSPEAKER:

Type	Dynamic
Size	12 inch
Approx. field coil res.	750 ohms
Approx. field coil voltage drop.	70 v.

FREQUENCY RANGES:

Band "A"	540-1700 kc
Band "B"	1.8-5 mc
Band "C"	5.5-18 mc
Band "D"	9.4-9.8 mc

SEARS ROEBUCK CO.

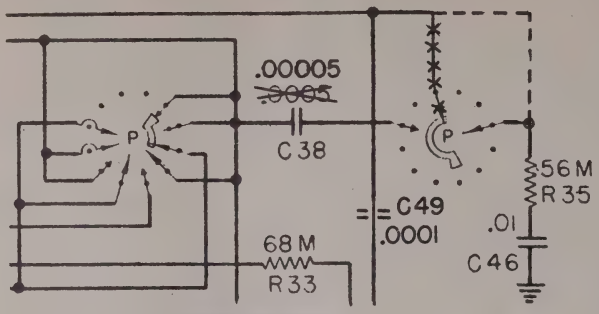
MODEL 7070
Ch. 101.682

MODEL 7070
Ch. 101.682,
Ch. 101.682-1

SEARS ROEBUCK CO.

DIFFERENCE BETWEEN 101.682 AND 101.682-1:

Model 682-1 is the same as model 682 except for circuit changes made to improve the tone quality of home recordings. These changes involve the addition of a .0001 mfd. condenser C49, and a change in value for C38 from .0005 mfd. to .00005 mfd. Wiring changes, shown by dotted lines in the following schematic section, also have been made.



ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across loudspeaker voice coil
Output meter reading to indicate 500 milliwatts . . . . . 1.8 volts
Approximate microvolts input for 500 milliwatts output. . . . . See chart below
Generator ground lead connection . . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Position of Volume Control. . . . . Fully clockwise
Position of Dial Pointer with variable fully opened . . . . . On first mark to right of 1700 kc calibration mark

WAVE BAND SWITCH POSITION	POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
"A"	Closed	455 kc	.1 mfd.	7H7 Grid	T2, T1	IF	—
"A"	Fully open	1720 kc	.00005 mfd.	Ant. Term.	C4	Oscillator	—
"A"	1410 kc	1410 kc	.00005 mfd.	Ant. Term.	C1, C10	Loop,Transl	25
"A"	600 kc (rock)	600 kc	.00005 mfd.	Ant. Term.	C5	Padder	100
"B"	Fully open	5.2 mc	400 ohms	Ant. Term.	C13*	Oscillator	—
"B"	4.5 mc (rock)	4.5 mc	400 ohms	Ant. Term.	C9	Translator	35
"C"	Fully open	18.3 mc	400 ohms	Ant. Term.	C15*	Oscillator	—
"C"	15 mc (rock)	15 mc	400 ohms	Ant. Term.	C8	Translator	15
"D"	9.6 mc	9.6 mc	400 ohms	Ant. Term.	C14*	Oscillator	—
"D"	9.6 mc (rock)	9.6 mc	400 ohms	Ant. Term.	C7	Translator	25

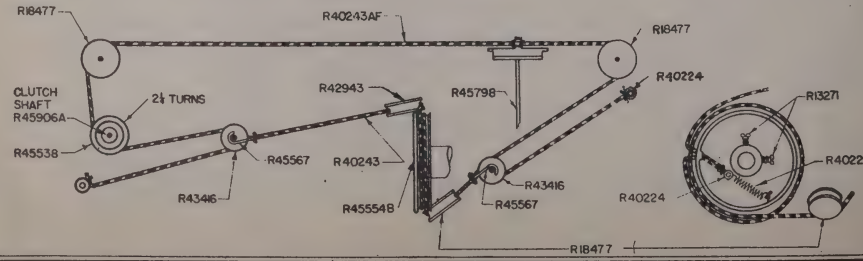
IMPORTANT ALIGNMENT NOTES

* If two peaks can be had, the correct one is with the trimmer screw further out; the other peak is the image.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

When aligning the receiver be sure that the Loop Button is in the OUT position as this connects the loop which has the outside antenna coupling turn.



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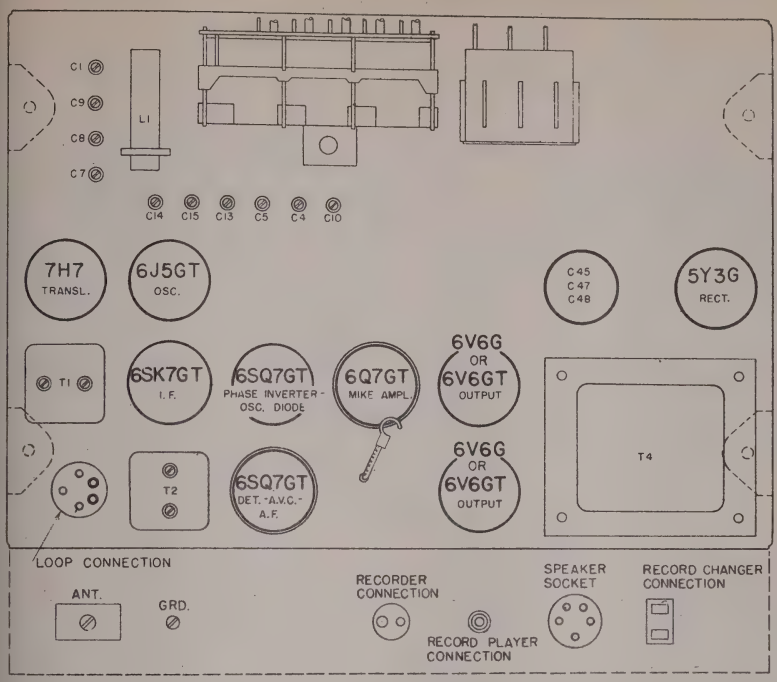
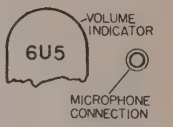
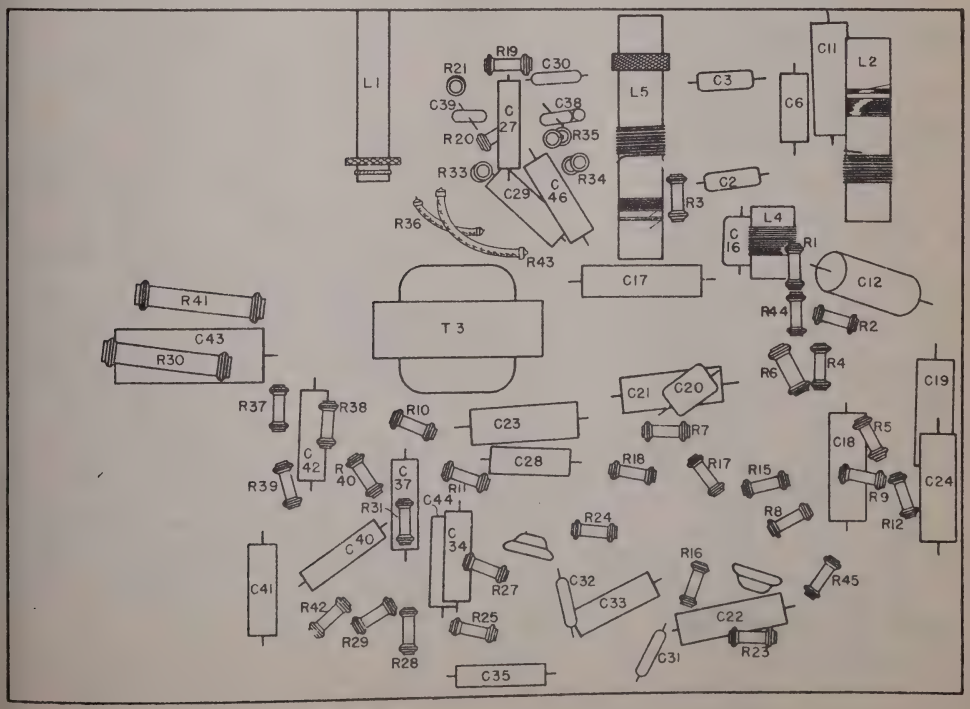
SEARS ROEBUCK CO.

MODEL 7070
Ch. 101.682
Ch. 101.682-1





(IN RECORD CHANGER COMPARTMENT)



LOCATION OF PARTS UNDER CHASSIS - 101.682

© John F. Rider

MODEL 7093
Ch. 101.666

SEARS ROEBUCK CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

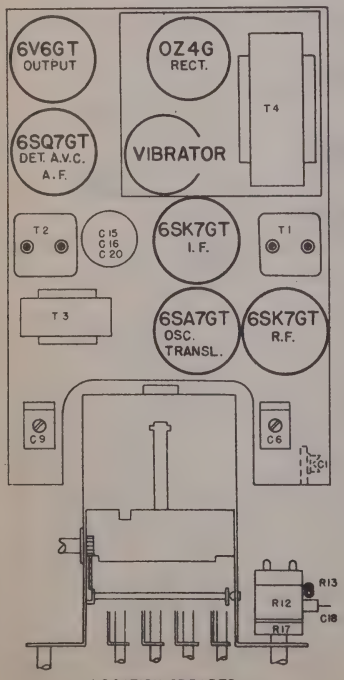
Output meter connections . . . . . Across loud speaker voice coil
Output meter reading to indicate 1 watt. . . . . 1.4 volts
Connection of signal generator ground lead . . . . . Receiver chassis
Connection of signal generator output lead . . . . . .See chart below
Approximate microvolts input for 1 watt output . . . . . .See chart below
Dummy antenna value to be in series with generator output. . . . . .See chart below
Position of Volume Control . . . . . Fully on
Position of Tone Control . . . . . .Brilliant

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Low Freq.Limit	260 Kc	.1 mfd.	Transl.Grid	T2, T1	IF	-
Hi Freq.Limit	1610 Kc	.00005 mfd.	Ant. Conn.	C9,C6,C1	Osc.,RF.,Ant.	10

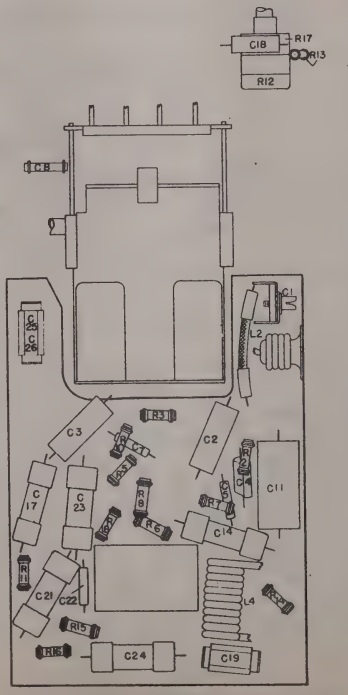
IMPORTANT ALIGNMENT NOTES

The receiver must be in its case during alignment.

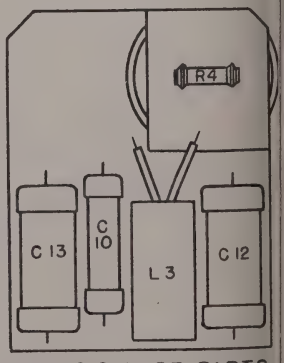
Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.



LOCATION OF PARTS
BOTTOM COVER REMOVED

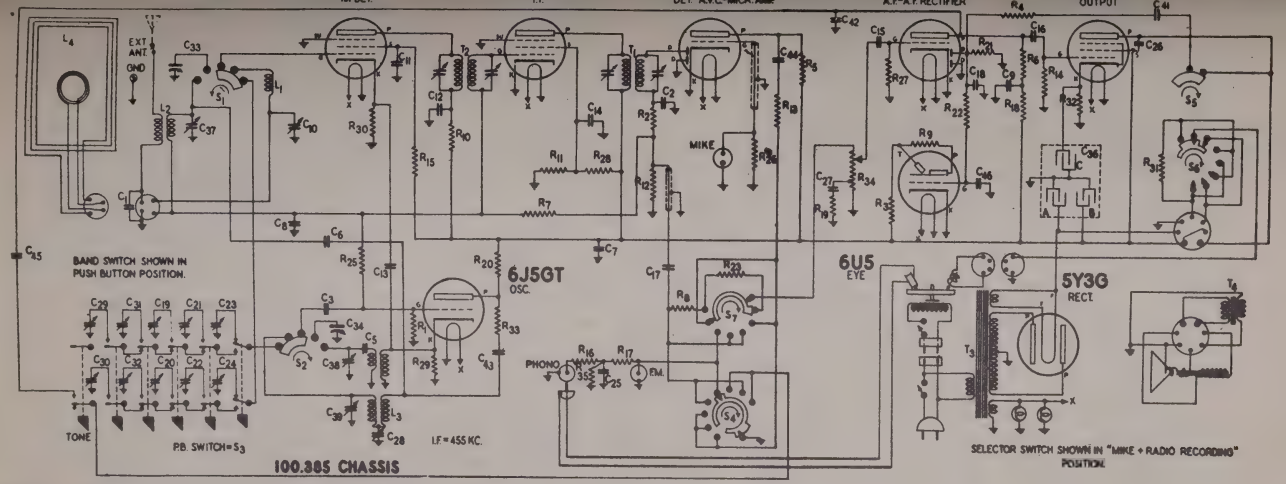


LOCATION OF PARTS UNDER CHASSIS-101-666



LOCATION OF PARTS
UNDER POWER SUPPLY
101.666

©John F. Rider



SEARS ROEBUCK CO.

MODEL 7072
Ch. 100.385

SEARS PAGE 14-41

FREQUENCY RANGES

(A) Broadcast	535 to 1725 KC
(B) Short Wave	5.6 to 18.1 MC

INTERMEDIATE FREQUENCY. . . . . .455 KC

POWER OUTPUT

Type	Pentode
Undistorted	2.8 Watts
Maximum	5 Watts

ALIGNMENT FREQUENCIES

1400 KC., 600 KC
16 MC

LOUD SPEAKER

Type	Electro dynamic
Size	10 inch
Field resistance (cold)	900 Ohms

DIAGRAM NUMBER	DESCRIPTION
C1 - C2	Condenser, mica-110 mmfd.
C3	Condenser, mica-51 mmfd..
C5	Condenser, mica- .0042 mfd
C6	Condenser, wire-3 mmfd. .
C7	Condenser, .1 mfd. 600 V.
C8 - C9	Condenser, .05 mfd. 600 V.
C10	Condenser, loop trimmer .
C11 - C17	Condenser, .01 mfd. 600 V.
C18	Condenser, .008 mfd. 600 V.
C19 - C22	Condenser, push button trimmers (Med.Freq.)
C23 - C24	Condenser, push button trimmers (High Freq.)
C26	Condenser, .002 mfd. 600 V.
C27	Condenser, .04 mfd. 600 V.
C28	Condenser, padder . . . .
C29 - C32	Condenser, push button trimmer (Low Freq.)
C33 - C34	Condenser, variable tuning
C36	Condenser, electrolytic A= 20 mfd., 400 V. B= 15 mfd., 400 V. C= 20 mfd., 25 V.
C37-C38-C39	Condenser, 3 section trimmer
C41	Condenser, 105 mfd. 600 V.
C42	Condenser, mica 110 mmfd.
C43	Condenser, .01 mfd. 600 V.
C44	Condenser, .02 mfd. 600 V.
C45	Condenser, .004 mfd. 600 V.
C46	Condenser, .002 mfd. 600 V.

R1 - R4	Resistor, carbon-47,000 ohms 1/4 watt
R5 - R6	Resistor, carbon-220,000 ohms 1/4 watt
R7-R8-R9	Resistor, carbon-1 megohm, 1/4 watt .
R10	Resistor, carbon-4700 ohms, 1/4 watt.
R11	Resistor, carbon-33,000 ohms, 1/2 watt
R12-R13-R14	Resistor, carbon-470,000 ohms, 1/4 watt
R15 - R18	Resistor, carbon-100,000 ohms, 1/4 watt
R19	Resistor, carbon-10,000 ohms, 1/4 watt.
R20	Resistor, carbon-10,000 ohms, 1 watt.
R21 - R22	Resistor, carbon-2.2 megohm, 1/4 watt
R23	Resistor, carbon-5.5 megohm, 1/4 watt
R24	Resistor, carbon-180 ohms, 1/4 watt .
R25-R26-R27	Resistor, carbon-10 megohm, 1/4 watt.
R28	Resistor, carbon-22,000 ohms, 1 watt.
R29	Resistor, carbon-560 ohms, 1/4 watt .
R30	Resistor, carbon-680 ohms, 1/4 watt .
R31	Resistor, 20 ohms, 1 watt W.W. . . .
R32	Resistor, 500 ohms, 1 watt W.W. . . .
R33	Resistor, carbon-180 ohms, 1/4 watt .
R34	Volume control - 1 meg. with switch .
	Resistor, carbon-47,000 ohms, 1/4 watt

AUGUST 21 1942

RECORD CHANGER

SEE RIDER'S BOOK
"AUTO. RECORD CHANGERS AND RECORDERS"

The service notes for the 100.201 record changer will apply to the record changing mechanism of the 100.202 record changer which is used on this receiver model.

MODEL 7072
Ch. 100.385

SEARS ROEBUCK CO.

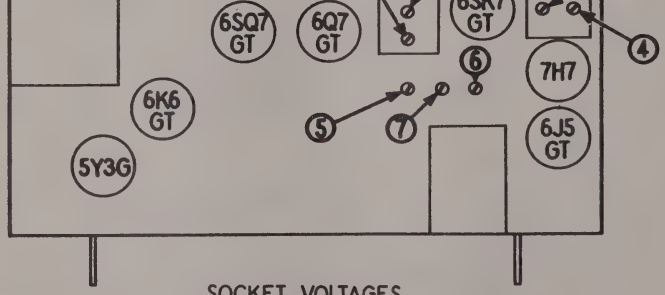
ALIGNMENT PROCEDURE

Before starting the alignment procedure check to see if the pointer is set to the last mark on the 550 KC. end of the dial scale with the gang condenser in full mesh.

Output meter connection---Across speaker voice coil
Output meter reading to indicate 500 milliwatts---1.32 volts
Dummy antenna value to be in series with generator output---See chart below
Connection of generator output lead---See chart below
Connection of generator ground lead---To chassis
Generator modulation---30%, 400 cycles
Approximate signal input to loop for standard output---600 μv.
Position of Volume Control---Fully clockwise
Position of Tone Button---"Out" position
Position of Dial Pointer with gang fully closed---On mark to left of 550 KC. calibration mark

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Lug on Rear section of Gang Cond.	455 KC	Broadcast	Any Point where it does not affect the signal	1-2 3-4	2nd I.F. 1st. I.F.	Adjust for Maximum Output. Then repeat adjustment.
400 Ohm Carbon Resistor	Terminal marked "Antenna"	16 MC	Short Wave	16 MC	5	Short Wave Oscillator	Adjust for Maximum output. Check to see if proper Peak was obtained by tuning in image at approx. 15.1 MC. If image does not appear, realign at 16 MC, with trimmer screw farther out. Recheck image.
400 Ohm Carbon Resistor	Terminal marked "Antenna"	16 MC	Short Wave	Tune to 16 MC Gen. Sig.	6	Short Wave Antenna	Adjust for Maximum Output. Try to increase output by detuning trimmer and retuning receiver dial until Maximum Output is obtained.
Standard Loop placed 24" from Rec. Loop	Aligning Loop	1400 KC	Broadcast	1400 KC	7	Broadcast Oscillator	Adjust for maximum output.
Standard Loop placed 24" from Rec. Loop	Aligning Loop	1400 KC	Broadcast	Tune to 1400 KC Gen. Sig.	8*	Broadcast Antenna	Adjust for maximum output.
Standard Loop placed 24" from Rec. Loop	Aligning Loop	600 KC	Broadcast	Tune to 600 KC Gen. Sig.	9*	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to increase output by detuning trimmer and retuning receiver dial until Maximum Output is obtained.

*NOTE: ADJUSTMENTS NO. 8 AND NO. 9 SHOULD BE MADE WITH THE SET IN THE CABINET AND WITH LOOP LEADS AND LOOP IN FINAL POSITION. A 50 mmfd. mica condenser in series to the antenna terminal may be used in place of the aligning loop.



SOCKET VOLTAGES

1. VOLTAGES MEASURED WITH SELECTOR SWITCH IN THE POSITION SHOWN IN THE SCHEMATIC DIAGRAM - NO SIGNAL INPUT.
2. VOLUME CONTROL ON FULL

TUBE	FUNCTION	H	K	G	S	SU	P	T	D_1	D_2
7H7	1st. Det.	6.3 A.C.	2.5	NOTE A	110	0	220			
6J5GT	Osc.	6.3	0	-5	-	-	150			
6SK7GT	I.F.	6.3	0	NOTE A	70	0	240			
6Q7GT	2nd. Det. - A.V.C. Micr. Amp.	6.3	0	0	-	-	NOTE B		0	0
6SQ7GT	A.F.-A.F. Rectifier	6.3	0	0	-	-	NOTE B		0	0
6K6GT	Output	6.3	16.5	0	240	-	225			
6U5	Eye	6.3	0	0	-	-	NOTE B	210		
5Y3G	Rectifier	5.0	-	-	-	-	350 A.C.			

NOTE A: The bias on these grids is controlled by the oscillator grid voltage.

NOTE B: These voltages cannot be measured by means of ordinary meters because of the high circuit resistances involved.

USE A VOLTMETER OF 1000 OHMS PER VOLT.

©John F. Rider

SEARS ROEBUCK CO.

MODEL 7075
Ch. 109.383

DATE
AUG. 5, 1941

IF PEAK
455KC

MODEL 7075, Ch. 109.383

SEARS ROEBUCK CO.

ALIGNMENT PROCEDURE

MODEL 7077, Ch. 109.409

Output meter connection.....Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts..... .42 volts
Average sensitivity in microvolts for 50 milliwatts output.....See chart below
Connection of generator output lead.....See chart below
Connection of generator ground lead.....To chassis
Dummy antenna value to be in series with generator output.....See chart below
Generator modulation.....30%, 400 cycles
Position of Volume Control.....Fully clockwise

POSITION OF VARIABLE	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS	STANDARD HAZELTINE LOOP APPROX. MICROVOLTS PER METER
Open	455 kc	.1 mfd.	1A7GT Grid	T2 T1	I.F.	100	----
Open	1610	50 mmf.	Ant. Term.	C12b	Oscillator	---	----
1400	1400	50 mmf.	Ant. Term.	C1	Loop	120	300
1000	1000	50 mmf.	Ant. Term.	---	----	200	400
600	600	50 mmf.	Ant. Term.	---	----	600	600

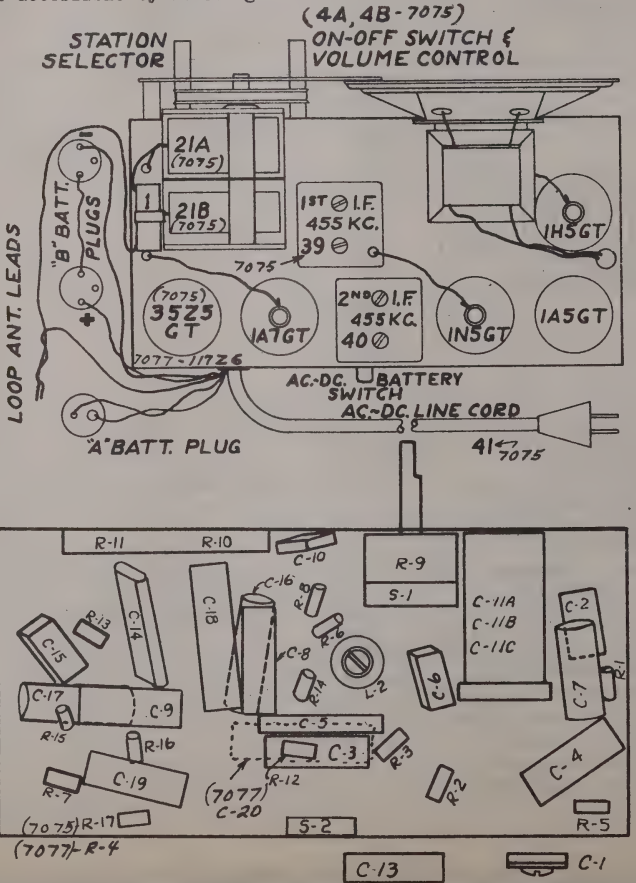
The alignment procedure should be repeated stage by stage in the original order for greatest accuracy.

Always keep the output from the generator at the lowest level possible so that the AVC action will be ineffective.

The location of all the alignment adjustments is shown on the Top View of the chassis.

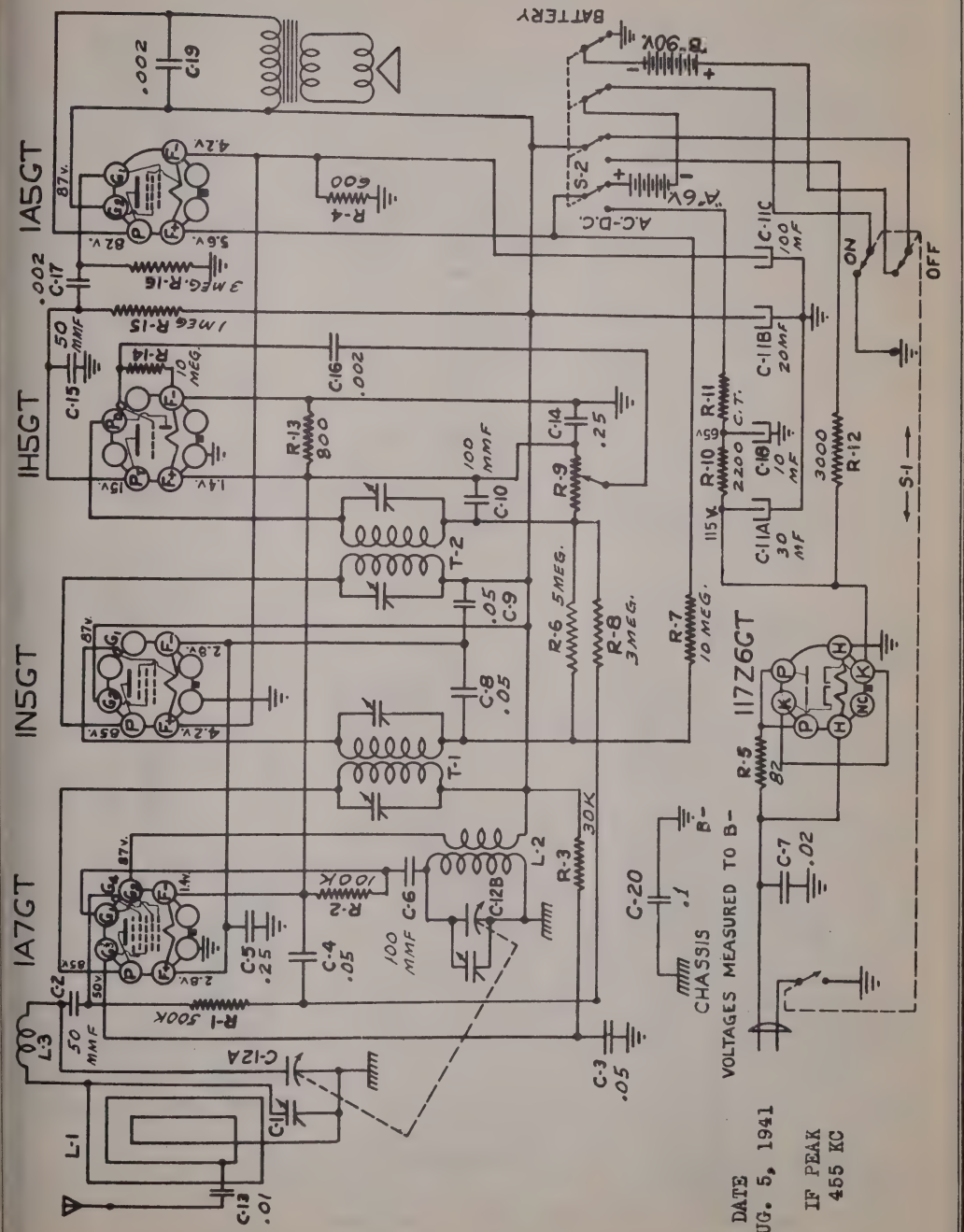
The chassis is removed from the case in order to align the I.F. and oscillator, but the loop antenna must be left connected.

The chassis and the batteries must be in place in the cabinet during loop alignment. The loop trimmer is accessible by removing the back cover.



SEARS ROEBUCK CO.

MODEL 7077
Ch. 109.409



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MODEL 7091
Ch. 101.665

SEARS, ROEBUCK & CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

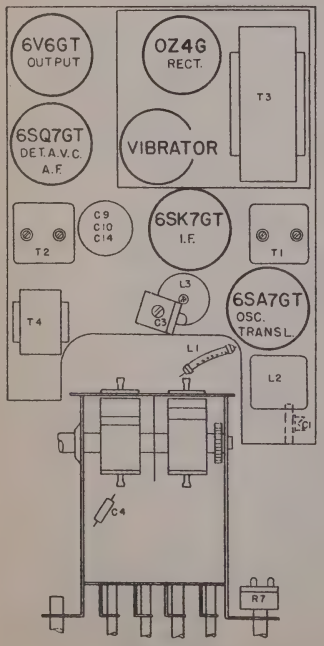
Output meter connections . . . . . Across loud speaker voice coil
Output meter reading to indicate 1 watt. . . . . 1.73 volts
Connection of signal generator ground lead . . . . . Receiver chassis
Connection of signal generator output lead . . . . . .See chart below
Approximate microvolts input for 1 watt output . . . . . .See chart below
Dummy antenna value to be in series with generator output. . . . . .See chart below
Position of Volume Control . . . . . Fully on
Position of Dial Pointer with Tuner open . . . . . Last mark to right of 1400 Kc calibration mark.

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Low Freq.Limit	455 Kc	.1 mfd.	Transl.Grid	T2, T1	IF	-
Open	1610 Kc	.00005 mfd.	Antenna.Conn.	C3	Oscillator	-
1410	1410 Kc	.00005 mfd.	Antenna Conn.	C1	Antenna	10
600 (rock)	600 Kc	.00005 mfd.	Antenna Conn.	L3	Padder	35

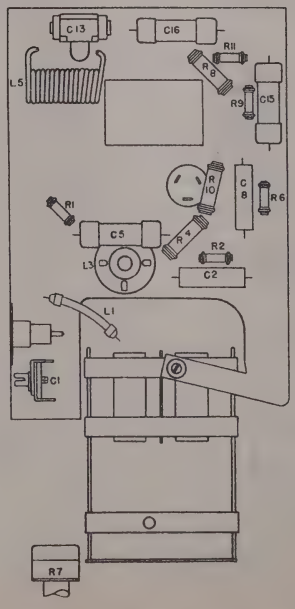
IMPORTANT ALIGNMENT NOTES

The receiver must be in its case during alignment.

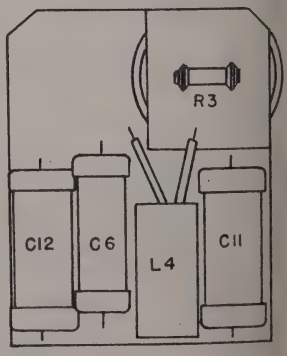
Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.



LOCATION OF PARTS
BOTTOM COVER REMOVED



LOCATION OF PARTS UNDER CHASSIS 101.665



LOCATION OF PARTS UNDER
POWER SUPPLY 101.665

©John F. Rider

MODEL 7093
Ch. 101.666

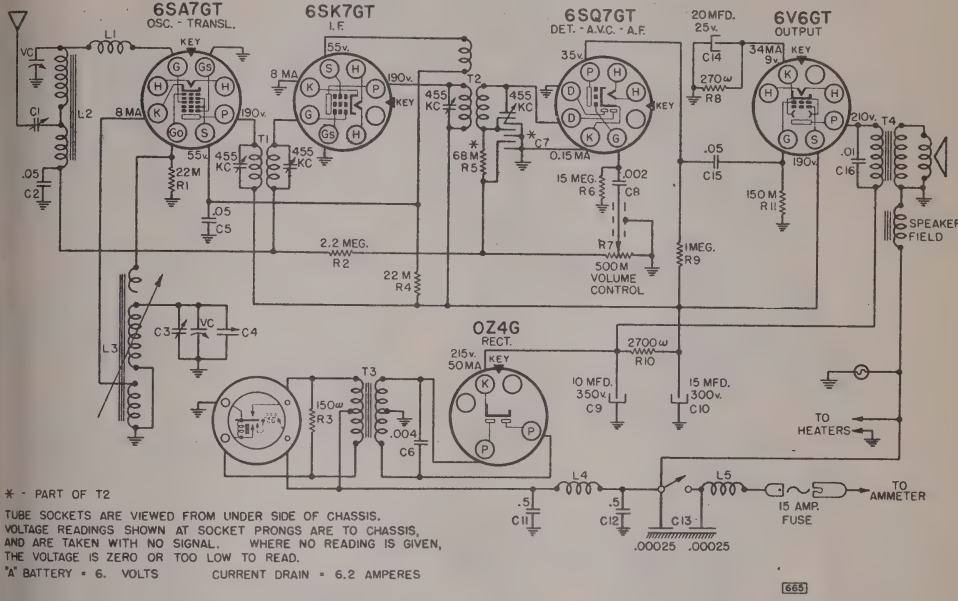
SEARS, ROEBUCK & CO.

MODEL 7091
Ch. 101.665

Power Output:-
Type..... Pentode
Undistorted... 3 watts
Maximum ..... 5 watts

Power Supply ... 6V; 6.2 amps.
Date June 2, 1941
IF Peak .... 455 KC

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.665



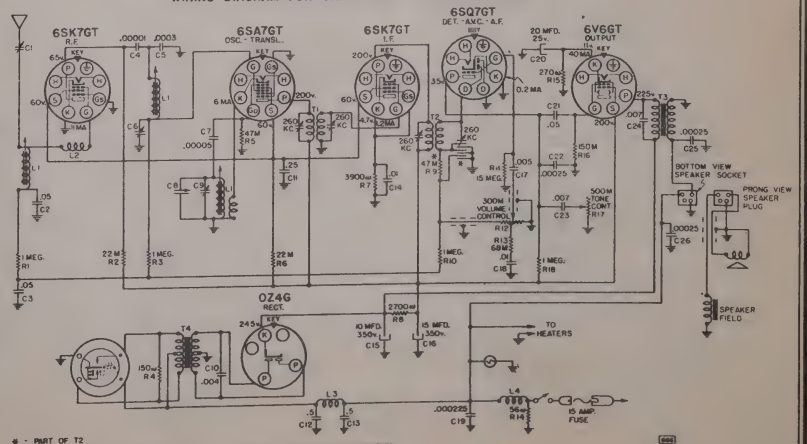
* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
"A" BATTERY = 6. VOLTS CURRENT DRAIN = 6.2 AMPERES

665

MATCHING THE ANTENNA:-
An adjusting screw, accessible to a screw driver thru a hole in the left side of the case, is provided to match the receiver to the car antenna. Tune in a very weak station at about 1400 KC, with the volume control fully on. Then turn the adjusting screw to the point affording the maximum volume.

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.666



Power Output:-
Type - Pentode
Undistorted 3.5 W
Maximum - 5 W

Power Supply:-
6 V. - 6.5 amps.

IF Peak 260 KC

Date
June 6, 1941

* - PART OF T2

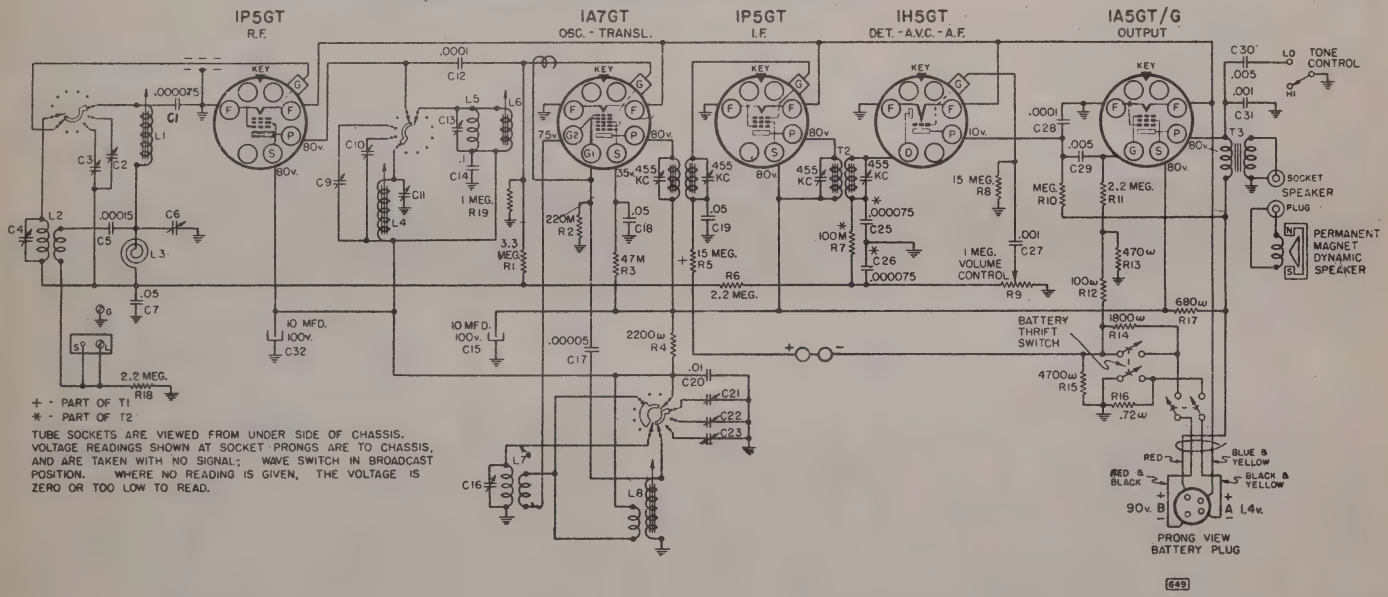
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
"A" BATTERY = 6. VOLTS CURRENT DRAIN = 6.5 AMPERES

666

SEARS ROEBUCK CO.

©John F. Rider

WIRING DIAGRAM FOR SILVERTONE CHASSIS NO. 101.649



\+ - PART OF T1
* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

POWER SUPPLY:

5172 A-B block (1.5V. "A", 90V. "B")
or
5200 or 5202 ..... 2V. Storage "A"
2 - 5150 ..... 45V. "B" Battery
5305 . Adaptor necessary with 2 volt Storage "A"
"A" Drain ..... 0.25 Amperes.
"B" Drain 0.0025

POWER OUTPUT:

Type ..... Pentodes
Undistorted 0.095 watts
Maximum .. 0.195 watts

LOUDSPEAKER:

Type ..... PM Dynamic.
Size ..... 6 inch

INTERMEDIATE FREQUENCY

455 KC

DATE June 27. 1941

)DELS 7108,
1. 101.648;
.58, Ch. 101.648-1

SEARS ROEBUCK CO.

MODELS 6306-3G,
Ch.101.667-A;
7094, Ch. 101.667

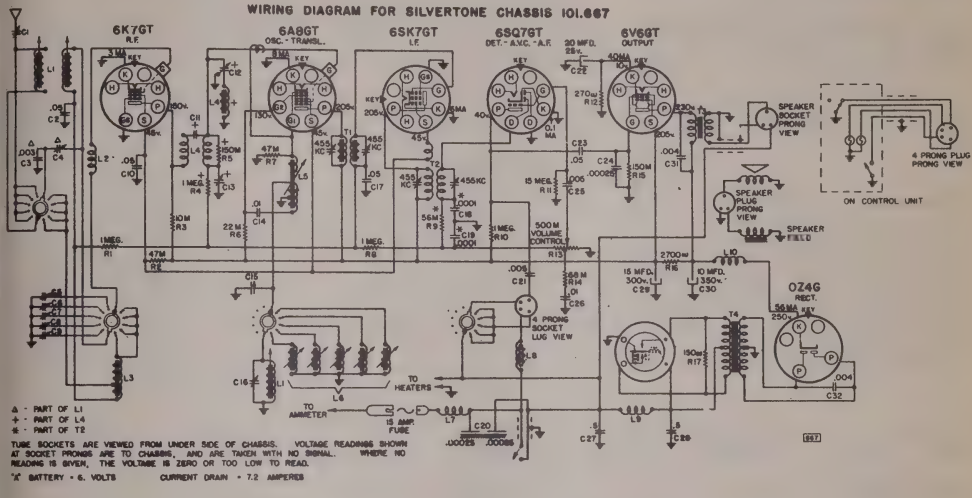
Models 7094 and 6306-3G

Power Supply:-
6 volt; 6.9 amps
Loud Speaker - Dynamic 7"
IF PEAK 455 KC

Power Output:-
Type ..... Pentode
Undistorted .....3.75 watts
Maximum .....5.65 watts

Date June 6, 1941

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.667


6K7GT R.F.
6A8GT OSC.-TRANSL.
6SK7GT I.F.
6SQ7GT DET.-A.V.C.-A.F.
6V6GT OUTPUT
0Z4G RECT.
SPEAKER SOCKET PRONG VIEW
SPEAKER PLUG PRONG VIEW
4 PRONG PLUG PRONG VIEW
ON CONTROL UNIT
SPEAKER FIELD
500M VOLUME CONTROL R13
4 PRONG SOCKET LUG VIEW
TO HEATERS
TO AMMETER
15 AMP. FUSE
Δ - PART OF L1
+ - PART OF L4
* - PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
"A" BATTERY - 6. VOLTS CURRENT DRAIN - 7.2 AMPERES

Models 7108 and 7158

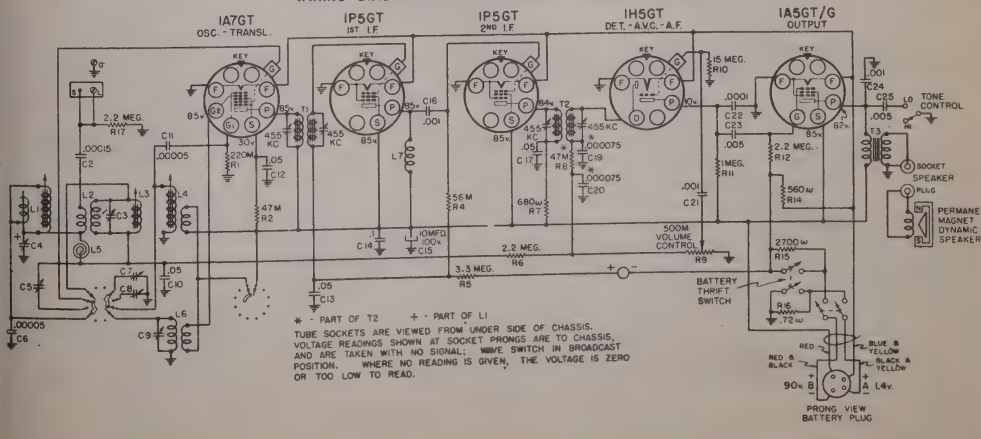
Power Supply:-
5176 .....A-B block (1.5V. "A", 90V. "B")
or
5200 or 5202 ..... 2V. Storage "A"
2 - 5150 ..... 45V. "B" Battery
5305 ..... adaptor necessary
with 2V. Storage "A"

IF PEAK 455 KC

"A" drain ..... .25 amps
"B" drain .... .0095 "
Life ..... 7 to 8 months
Power Output:-
Type ..... Pentode
Undistorted .085 watts
Maximum .... .17 watts

Date June 2, 1941

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.648


1A7GT OSC.-TRANSL.
1P5GT 1ST I.F.
1P5GT 2ND I.F.
1H5GT DET.-A.V.C.-A.F.
1A5GT/G OUTPUT
TONE CONTROL
SOCKET SPEAKER
PLUG
PERMANENT MAGNET DYNAMIC SPEAKER
500M VOLUME CONTROL R9
BATTERY THRIFT SWITCH
PRONG VIEW BATTERY PLUG
* - PART OF T2 + - PART OF L1
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

MODELS 6306-3G,
Ch. 101.667-A;
7094, Ch. 101.667

SEARS, ROEBUCK & CO.

PUSH BUTTON TUNING MECHANISM

To set up the mechanism, insert the call letter tabs in their proper frequency order in the call letter drum. The drum is accessible by removing the snap-in button at the top of the push button unit before mounting the unit. One of the positions is for manual tuning. When this position is reached, the manual tuning dial will become illuminated and the receiver can be tuned manually.

Stations are set up by removing the front grille of the receiver, exposing the station tuning screws. The adjusting screws are labeled. The OSC. screw must be adjusted first; then the ANT. screw. Then repeat the two adjustments.

TO SYNCHRONIZE THE MECHANISM, PUSH THE TUNING BUTTON UNTIL THE MANUAL TUNING DIAL BECOMES ILLUMINATED. REMOVE THE PUSH BUTTON CABLE FROM ITS SOCKET IN THE SIDE OF THE RECEIVER CASE AND THEN PUSH THE BUTTON UNTIL THE "DIAL" TAB COMES INTO VIEW. THEN REINSERT THE CABLE PLUG.

Under certain conditions the mechanism may fall out of synchronism if the button is not pushed all the way in and completely released when operating it. The user should be instructed accordingly.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . . Across loud speaker voice coil
Output meter reading to indicate 1 watt. . . . . 1.4 volts
Connection of signal generator ground lead . . . . . Receiver chassis
Connection of signal generator output lead . . . . . See chart below
Approximate microvolts input for 1 watt output . . . . . See chart below
Dummy antenna value to be in series with generator output. . . . . See chart below
Position of Volume Control. . . . . Fully on
Position of Tone Control. . . . . Brilliant

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Low Freq.Limit	455 Kc	.1 mfd.	Transl.Grid	T2, T1	IF	-
Low Freq.Limit	455 Kc	.1 mfd.	Transl.Grid	C12*	IF Wave Trap	-
Hi Freq.Limit	1610 Kc	.00005 mfd.	Ant. Conn.	C16	Oscillator	-
Hi Freq.Limit	2520 Kc.	.00005 mfd.	Ant. Conn.	C13*	Image Rejector	-
Hi Freq.Limit	1610 Kc.	.00005 mfd.	Ant. Conn.	C16	Oscillator	-
Hi Freq.Limit	1610 Kc.	.00005 mfd.	Ant. Conn.	C1	Antenna	-
Hi Freq.Limit	1610 Kc.	.00005 mfd.	Ant. Conn.	C4	R.F.	10
600 Kc (rock)	600 Kc.	.00005 mfd.	Ant. Conn.	L5	Padder	10

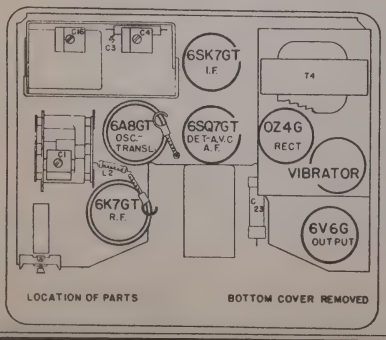
IMPORTANT ALIGNMENT NOTES

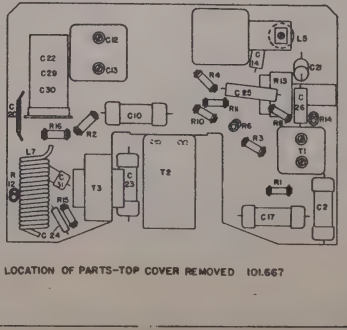
The receiver must be in its case during alignment.

* The signal generator should be adjusted for high output and the trimmer should be adjusted for minimum response.

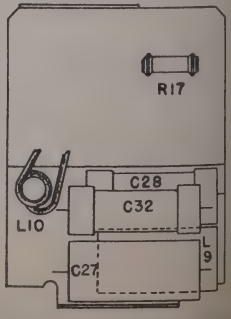
The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment, except as noted by (*) above.





PARTS UNDER POWER SUPPLY 101.667



©John F. Rider

PRELIMINARY:

SEARS ROEBUCK CO.

MODELS 7108,
Ch. 101.648;
7158, Ch. 101.648-1

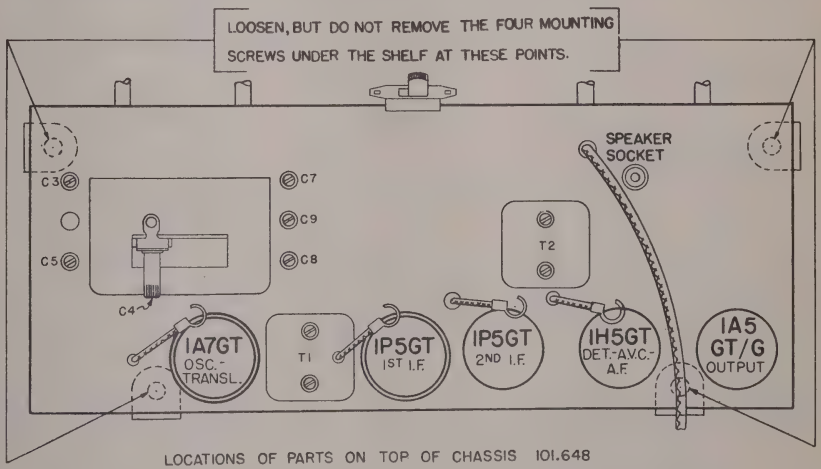
Output meter connection . . . . . Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts. . . . . 0.3 volts
Approximate microvolts input for 50 milliwatts output . . . . . See chart below
Generator ground lead connection. . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator modulation . . . . . 30%, 400 cycles
Position of Volume Control. . . . . Fully clockwise
Position of Tone Control. . . . . HI
Position of Dial Pointer with Tuner fully closed. . . . . To left of 540 Kc calibration mark .

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	455 Kc	.1 mfd.	1A7GT Translator Grid	T2, T1	IF	-
1700	1700 Kc	.00005 mfd.	Antenna Terminal	C7	Oscillator	-
1700	1700 Kc	.00005 mfd.	Antenna Terminal	C4	Translator	10
15.2	15.2 Mc	400 ohms	Antenna Terminal	C9,C3	Osc.-Trans.	10
11.8	11.8 Mc	400 ohms	Antenna Terminal	C8,C5	Osc.-Trans.	10

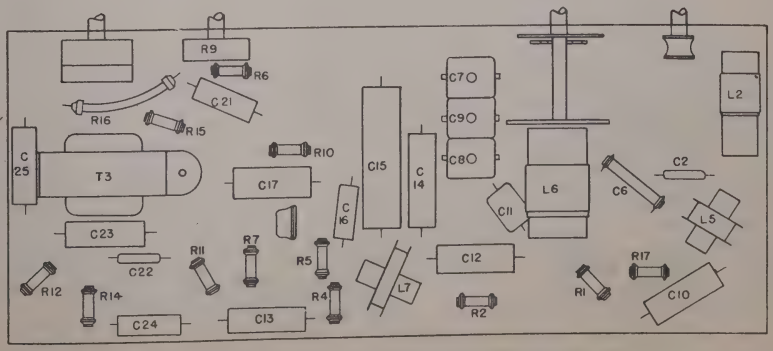
IMPORTANT ALIGNMENT NOTES

Make both the oscillator and translator antenna adjustment at 1700 KC on the BC band.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.



LOCATIONS OF PARTS ON TOP OF CHASSIS 101.648



LOCATION OF PARTS UNDER CHASSIS 101.648

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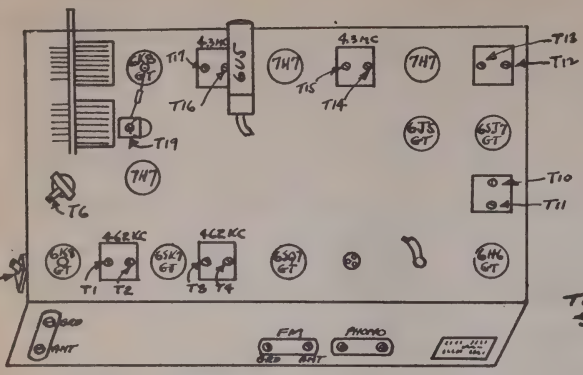
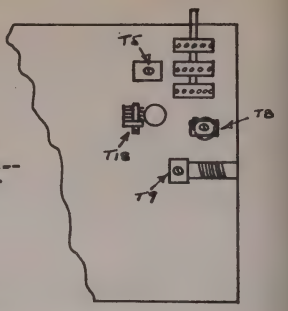
MODEL 7099
Ch. 164.158

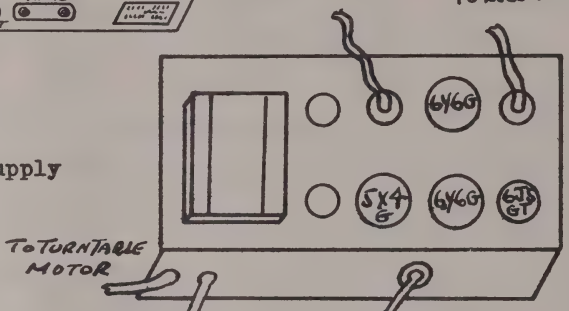
SEARS ROEBUCK CO.



Trimmer Locations
Top of Chassis



Trimmer Locations--
Bottom of Chassis



To WOOFER SPEAKER

To RECEIVER

To TURNTABLE MOTOR

To LINE PLUG

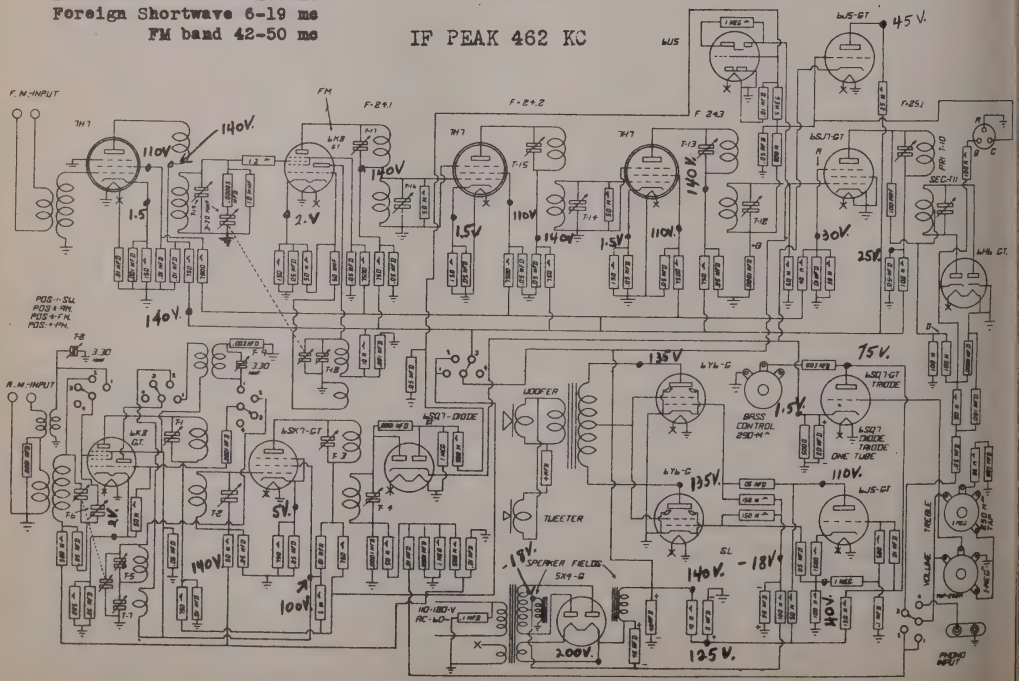
To TWEETER SPEAKER

Top of Power Supply Chassis

MAY 15, 1942

Broadcast band 540-1600kc
Foreign Shortwave 6-19 mc
FM band 42-50 mc

IF PEAK 462 KC



All voltage readings taken from ground with 10,000 Ohms Per Volt Meter

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POWER OUTPUT:	SPEAKER:
Type. . .2 - 6Y6G Beam Power Output	Type. . . . . .Electro-Dynamic
Undistorted . . . . . 8 watts	Size, 12 inch . . . .350 ohm field
Maximum . . . . . .9½ watts	5 inch . . . . 88 ohm field

6K8GT (for AM). . . . .Osc.-Transl.
6K8GT (for FM). . . . .Osc.-Transl.
6SK7GT. . . . . .IF Ampl.
6SQ7GT. . . . . .Det-AVC-Audio
3 - 7H7 . . . . . .RF&IF FM Ampl.
6SJ7GT. . . . . FM Limiter
6S6GT. . . . . FM Discriminator
6J5GT. . . . . FM Squelcher
6J5GT. . . . . Audio Inverter
2 - 6Y6G . . . . . Push Pull Output
5X4G . . . . . .Rectifier
6U5. . . . . Tuning Indicator

A M ALIGNMENT PROCEDURE

PRELIMINARY:

AM Output meter connection.	.Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts	1.2 volts
Average sensitivity in microvolts for 500 milliwatts output	See chart below
Connection of generator Output lead	See chart below
Connection of generator ground lead	.To chassis
Dummy antenna value to be in series with generator output	See chart below
Generator modulation.	30%, 400 cycles
Position of Volume Control.	Fully clockwise

BROADCAST BAND ALIGNMENT

Position of Variable	Generator Frequency	Dummy Antenna	Generator Connection	Trimmers adjusted in order shown	Trimmer Function	Approximate Microvolts
Closed	462 kc	.1 mfd	Grid of 6K8GT AM	T1, T2, T3, T4	I. F.	110
(Close the gang condenser and set the pointer at the end marker).						
Pointer at 1400 kc	1400	250 mfd	Ant. Term, AM	T5, T6	Oscillator and R F	25
Pointer at 600 kc	600 (Rock)	250 mfd	" " "	T7	Pad the low frequency end of broadcast band	25
Pointer at 1400 kc	1400	250 mfd	" " "	T5	Alignment of high frequency end of oscillator	25

SHORTWAVE BAND ALIGNMENT

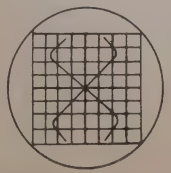
Pointer at 18 mc	18 mc	400 ohm	Ant. Term, Input	T8, T9	Shortwave, alignment of oscillator & antenna input	40 mv
Pointer at 7 mc	7 mc	400 ohm	" " "	If calibration checks SW side is aligned correctly	"	50 mv

F M DISCRIMINATOR ALIGNMENT
(Method A)

Frequency Modulated generator and an Oscillograph are necessary equipment

Closed	4.3 mc	.1	To grid of limiter marked A	There is a three prong socket located on the top of chassis, with plug. A is ground. Connect B to vertical input of Oscillograph.	

Horizontal input of Oscillograph to be connected with timing of FM Signal generator. Align Trimmers on coil F 251, T 10 is primary of discriminator and T 11 secondary, to form perfect symchreous crossover on Oscillegraph as diagrammed to left.



F.M. DISCRIMINATOR ALIGNMENT
(Method B)

Signal generator capable of supplying 1 volt output and a 10 to 20,000 ohm volt meter

Position of Variable	Generator Frequency	Dummy Antenna	Generator Connection	Trimmers adjusted in order shown	Trimmer Function	Approximate Microvolts
Closed	4.3 unmodulated	.1 mfd	Grid of 6SJ7 limiter	T10 maximum deflection. Test meter connected to Point D on circuit diagram thru 100,000 ohms.	Alignment of primary of discriminator.	1 volt
Closed	4.3 unmodulated	.1 mfd	Grid of 6SJ7 limiter	T11 align trimmer for Zero reading on meter with 10m to 20m ohms volt meter connected to point B on test socket	Alignment of secondary of discriminator	1 volt

To check discriminator alignment with generator still connected to grid of 6SJ7 limiter note readings on meter when generator is swung 100 kc above and below 4.3 megacycles. If readings are equal adjustments are perfect. If unequal, Trimmer 10 should be adjusted to give equal readings above and below 4.3 megacycles when generator is set above and below main IF frequencies.

I.F. ALIGNMENT OF FM BAND

Closed	4.3 unmodulated	To grid of 6K8GT FM	T12, T13, T14, T15, T16, T17. 10m to 20m ohm voltmeter to be connected to point C of test socket	Alignment of FM IFs	200 mv

R.F. ALIGNMENT OF FM BAND

48 mc	48 mc	100 ohms FM input	T18, T19	Alignment of Oscillator & RF stage.	Input 200 mc

To check alignment of RF FM section of receiver, set generator at 45 mc, maximum deflection indicated on tuning indicator of receiver. Connect meter to point B of test socket. This should give Zero Reading.

ALIGNMENT OF FM BAND MUST NOT BE MADE UNLESS A DEFECTIVE PART HAS BEEN REPLACED IN FM SECTION.

The alignment procedure should be repeated stage by stage in the original order for greatest accuracy.

On AM always keep the output from the generator at the lowest level possible so that the AVC section will be ineffective.

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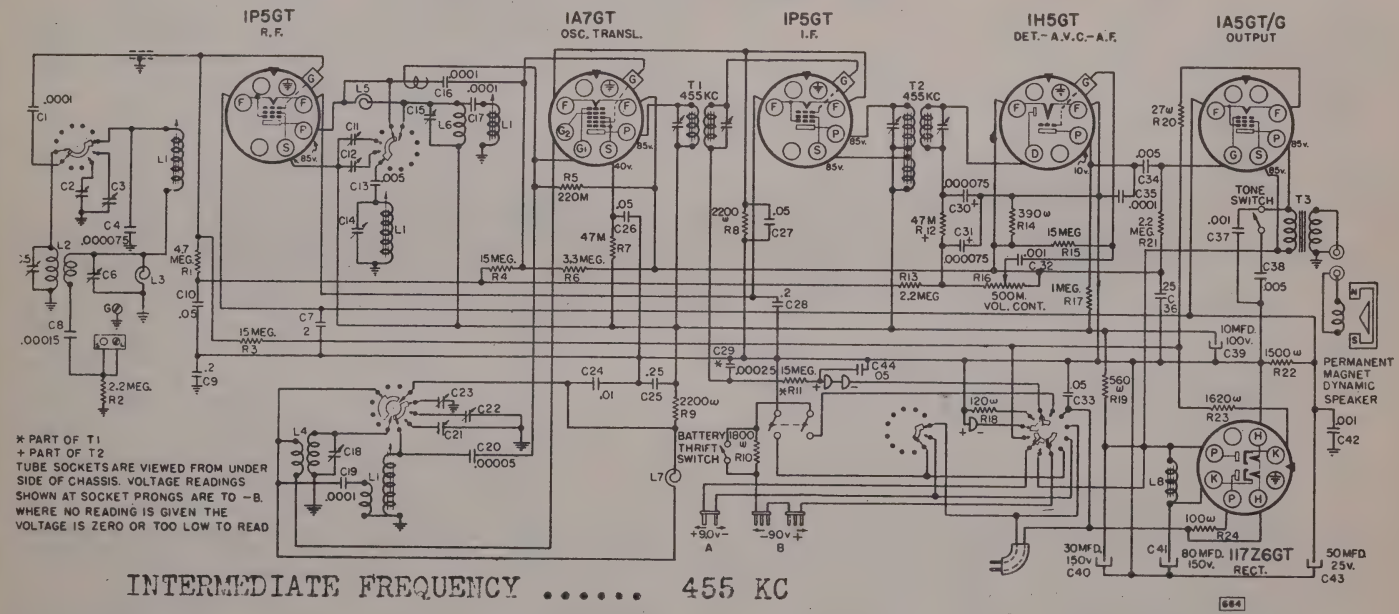
WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.664



INTERMEDIATE FREQUENCY ..... 455 KC

POWER SUPPLY:

5009 ..... A battery (9V.)
2 - 5150 ..... 45V. "B" Battery
105-125 V - AC or DC, 20 watts
"A" Drain ..... 0.05 Amperes
"B" Drain ..... 9.5 ma.

POWER OUTPUT

Type ..... Pentode
Undistorted .... 0.085 watts
Maximum ..... 0.17 watts

LOUDSPEAKER:

Type ..... PM Dynamic
Size ..... 6 inch

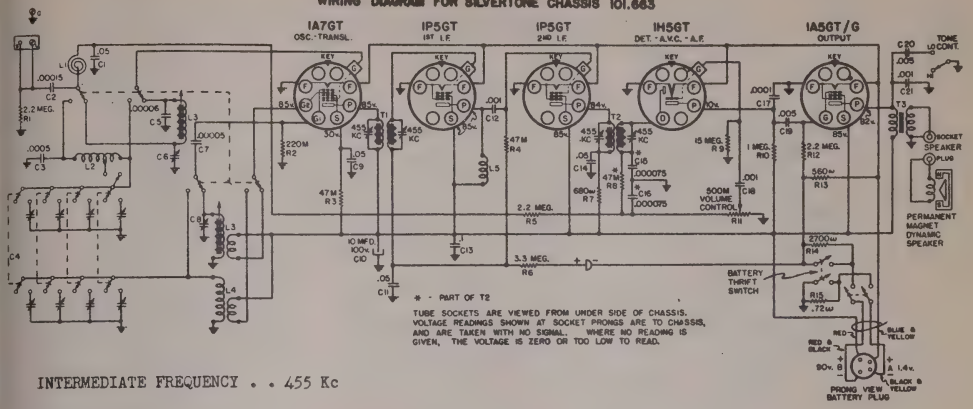
FREQUENCY RANGES:

Broadcast ..... 540-1700 KC
9 MC Spread Band .. 9.45-9.75 MC
11 MC Spread Band 11.62-11.95 MC
15 MC Spread Band 15.01-15.5 MC

SEARS ROEBUCK CO.

MODEL 7106
Ch. 101.663

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.663


1A7GT
OSC.-TRANSL.
1P5GT
1ST I.F.
1P5GT
2ND I.F.
1H5GT
DET.-A.V.C.-A.F.
1A5GT/G
OUTPUT
TONE CONT.
SOCKET SPEAKER PLUG
PERMANENT MAGNET DYNAMIC SPEAKER
BATTERY THRIFT SWITCH
PRONG VIEW BATTERY PLUG
* - PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

INTERMEDIATE FREQUENCY . . 455 Kc

PUSH BUTTON ADJUSTMENT AND RESETTING

Each of the push buttons should be set to the desired station in the following manner:

1. Push the manual button in and tune in the desired station manually.
2. Push the #1 button in. Turn the corresponding "ANT" screw all the way in and then unscrew it one-quarter turn.
3. Turn the "OSC" screw until the same station that was tuned in manually is heard with the least amount of background noise.
4. Readjust the "ANT" screw for greatest volume and clarity.
5. Repeat steps 1 to 4 for the remaining push buttons or when resetting for another station.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections	Across loudspeaker voice coil
Output meter reading to indicate 50 milliwatts	0.37 volts
Approximate microvolts input to indicate 50 milliwatts output	See chart below
Generator ground lead connection	Receiver chassis
Dummy antenna value to be in series with generator output	See chart below
Connection of generator output lead	See chart below
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully on
Position of Tone Control	HI
Position of pointer with tuner fully closed	To left of 540 kc calibration mark

POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
Closed	455 Kc	.1 mfd.	1A7GT Translator Grid	T2, T1	IF	-
1700	1700 Kc	.00005 mfd.	Antenna Terminal	C8	Oscillator	-
1725	1725 Kc	.00005 mfd.	Antenna Terminal	C6	Translator	15

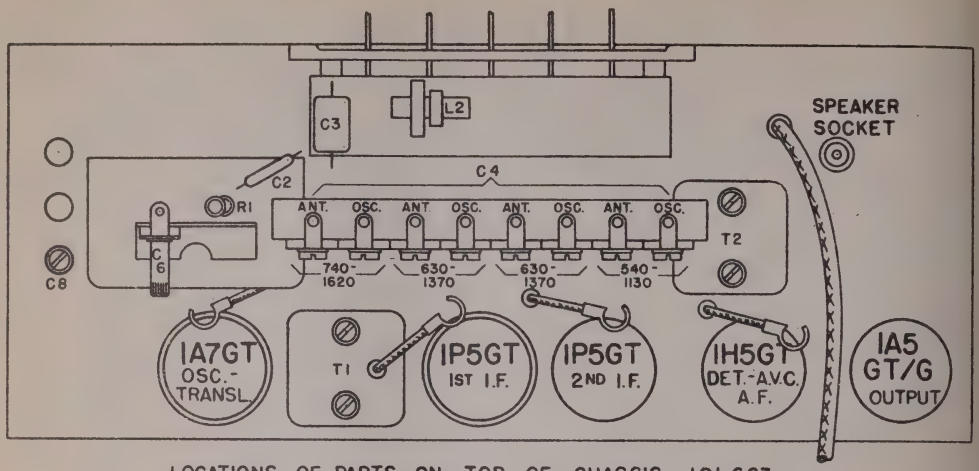
IMPORTANT ALIGNMENT NOTES

After setting the oscillator at 1700 kc do not change it when making the 1725 kc translator adjustment.

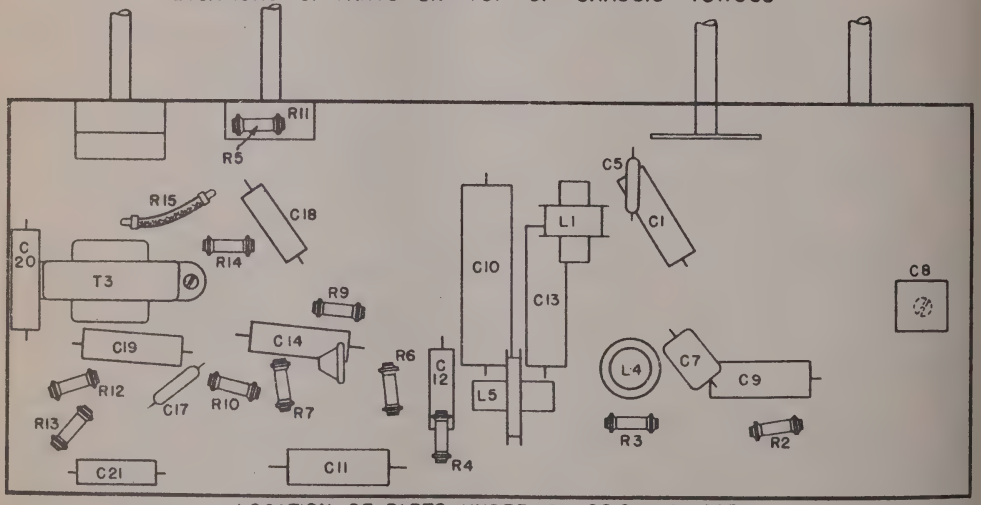
Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.

MODEL 7106
Ch. 101.663

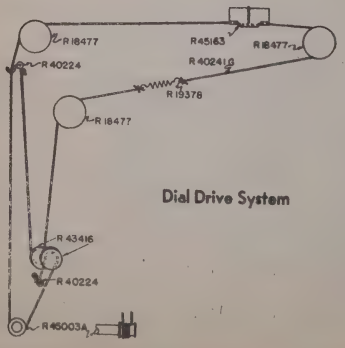
SEARS ROEBUCK CO.



LOCATIONS OF PARTS ON TOP OF CHASSIS 101.663



LOCATION OF PARTS UNDER CHASSIS - 101.663



Dial Drive System

FREQUENCY RANGE:
Broadcast . . . . . 540-1700 Kc

POWER OUTPUT:
Type . . . . . Pentode
Undistorted . . . . . .085 watts
Maximum . . . . . 0.17 watts

LOUD SPEAKER:
Type . . . . . PM Dynamic
Size . . . . . 6 inch

POWER SUPPLY:
"A" Drain . . . . . 0.25 amperes
"B" Drain . . . . . 0.0095 amperes
Life . . . . . 7 to 8 months

AUGUST 29, 1941

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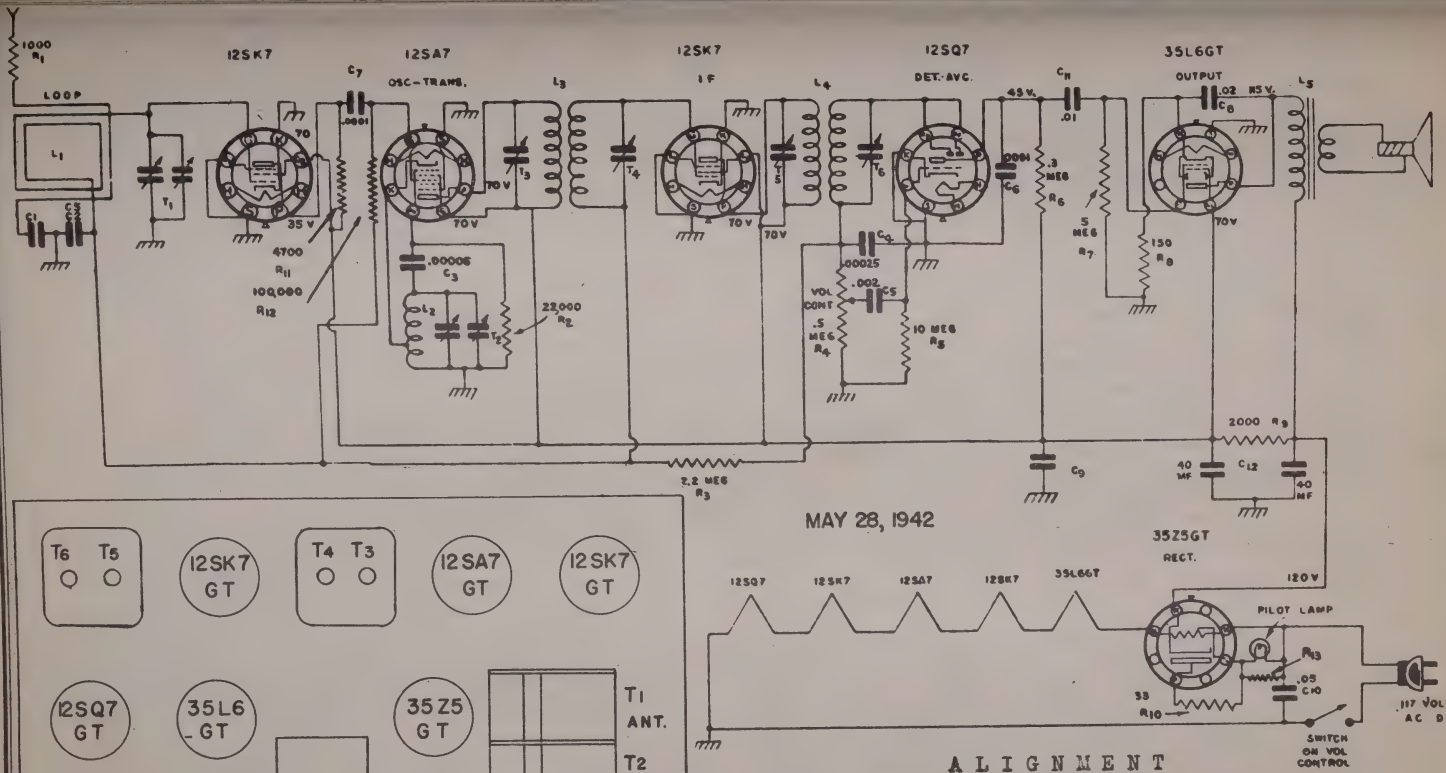


SEARS ROEBUCK CO.

MAY 28, 1942

ALIGNMENT

DIAL	GEN. FREQ.	CONNECTION	TRIMMERS
540 KC	455 KC	12SA7 Grid	T3, T4, T5, T6 (IF)
1500 KC	1500 KC	STD. Loop	T2, T1 (Osc.-RF)

FREQUENCY RANGE:

Broadcast . . . . 530 - 1730 K. C.

INTERMEDIATE FREQUENCY . . . 455 K. C.

POWER OUTPUT:

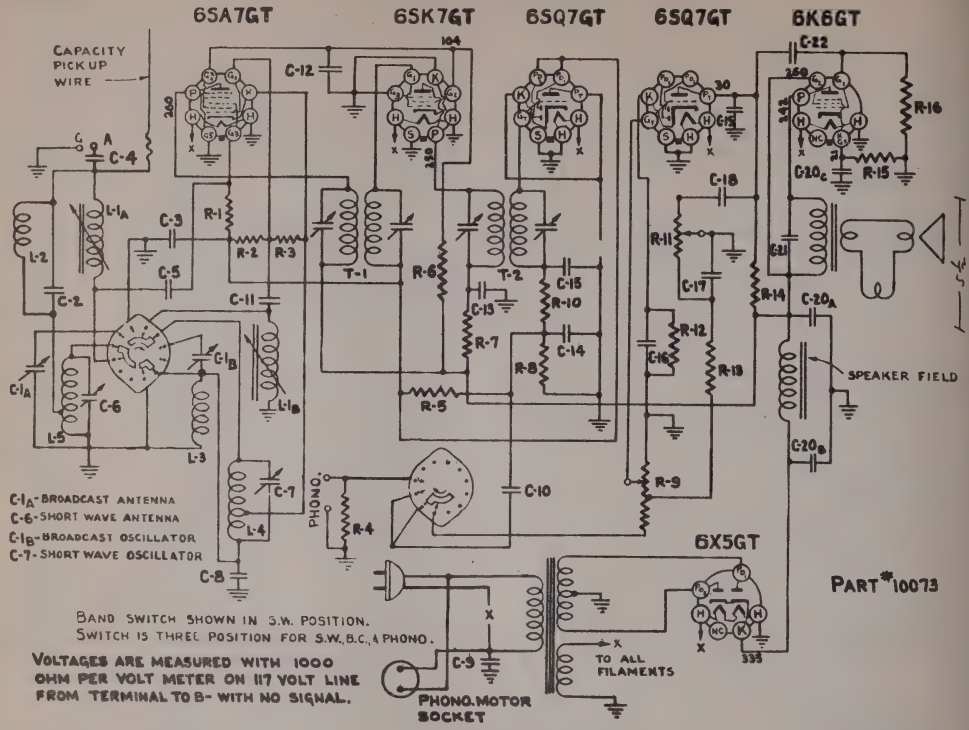
Type . . . . . Beam Tetrode
Undistorted . . . . . .8 Watts
Maximum . . . . . 1.4 Watts

LOUD SPEAKER:

Type . . . . . Dynamic
Size . . . . . 5 inch
Field . . . . . P- M.

MODEL 7165
Ch. 109.428

SEARS ROEBUCK CO.



SCHEMATIC LOCATION	PART NUMBER	DESCRIPTION CHASSIS PARTS		SELLING PRICE EACH
	D9662	Bracket--Indicator Background		.20
L-2	D9818	Coil--Antenna Choke		.75
L-3	D9458	Coil--Cathode Choke		.75
L-5	D9653	Coil--Short Wave Antenna		1.15
L-4	D9654	Coil--Short Wave Oscillator		1.00
	D2163	Cable--Drive		.10
R-9	D9655	Control--Volume and Switch		1.25
R-11	D9656	Control--Tone		1.00
C-20a,b,c	D9657	Condenser--Elect. b(15mf-400v.) a10mf.-330v.) c(10mf.-50v.)		1.50
C-16	D6002	Condenser--Elect. 5 mfd-25v.		.50
C-4	D5399	Condenser--Mica 20 mmf.		.25
C-5,11,14,15	D1285	Condenser--Mica 100 mmf.	IF PEAK	.25
C-2	D9627	Condenser--Mica 150 mmf.	455 KC	.25
C-19	D1286	Condenser--Mica 250 mmf.		.25
C-1a,b	D9719	Condenser--Dual Trimmer		.50
C-6,7	D9704	Condenser--Trimmer		.40
C-8	D9672	Condenser--Paper .0015 mfd.-400v.		.20
C-21	D824	Condenser--Paper .002 mfd.-600v.		.20
C-10,17,18	D2763	Condenser--Paper .005 mfd.-600v.		.20
C-22	D568	Condenser--Paper .01 mfd.-400v.		.20
C-3	D580	Condenser--Paper .05 mfd.-200v.		.20
C-9,13	D563	Condenser--Paper .05 mfd.-400v.		.20
C-12	D575	Paper .1 mfd.-400v.		.20
R-15	D9661	Resistor--1w-500 ohm		.20
R-7	D8965	Resistor--1/3 w-1M.		.15
R-12	D7125	Resistor--1/3w-5M.		.15
R-6	D10056	Resistor--3w-12M.		.15
R-3	D7121	Resistor--1/3w-20M.		.15
R-10,13	D8580	Resistor--1/3w-50M.		.15
R-4	D7123	Resistor--1/3w-400M.		.15
R-16,8,14	D6722	Resistor--1/3w-500M.		.15
R-1	D6723	Resistor--1/3w-1 meg.		.15
R-5	D7959	Resistor--1/3w-3 Meg.		.15
R-2	D8402	Resistor--1/3w-15 meg.		.15
L-1a, L-1b	D9663	Tuner--Permeability		2.50
	D9664	Transformer--Power		5.00
T-1	D9993	Transformer--1st I.F.		2.25
T-2	D9893	Transformer--2nd I.F.		2.25
T-3	D10055-1	Transformer--Output		2.00

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

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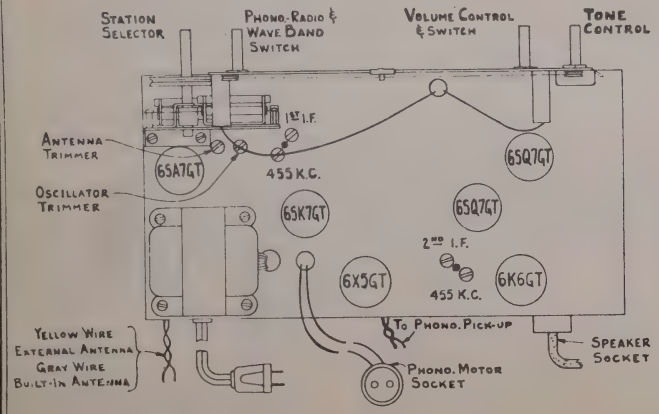
ALIGNMENT PROCEDURE

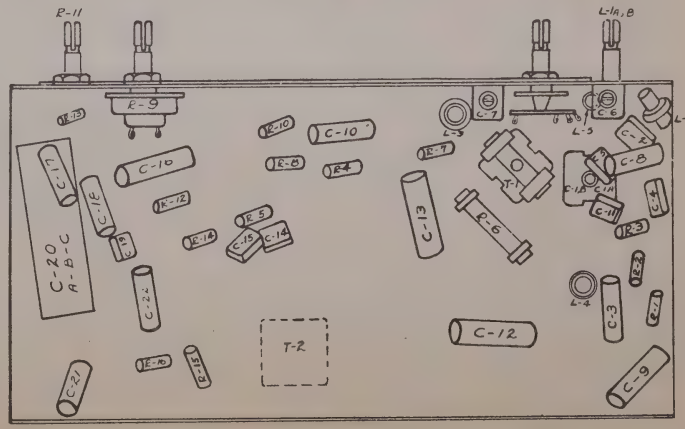
Output meter connection.....Across speaker voice coil
Phono Radio Switch.....Radio Position
Connection of generator ground lead.....To Chassis
Connection of generator output lead.....See chart below
Dummy antenna value to be used in series with generator.....See chart
Position of volume control.....Full on (Clockwise)
Position of Tone Control.....In Brilliant Position

POSITION OF TUNING DIAL	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED
High Frequency end	455 kc.	.1 mfd.	6SA7 Grid	Align IF. Four Trimmers
Low Frequency end	535 kc.	.1 mfd.	6SA7 Grid	Oscillator Trimmer
				Set limit of Band
1400 kc.	1400 kc.	200 mmf.	Antenna Lead-with built-in antenna connected	Antenna Trimmer
		400 ohms		Tune to max.
10 mc.	10 mc.		Antenna Lead-with built-in antenna connected	Short wave oscillator trimmer
				Set limit of band
9.6 mc.	9.6 mc.	400 ohms	Antenna Lead-with built-in antenna connected	Short wave antenna trimmer
				Tune to max.

REPEAT above Alignment Procedure at least once.



PART #10074



POWER SUPPLY 105-125 Volts AC
60 cycle, 65 watts.

SPEAKER
Type ..... Dynamic
Size ..... 10 Inch
Field Resistance....1200 Ohms

TUBES AND FUNCTIONS
6SA7GT ..... Oscillator Translator
6SK7GT ..... IF Amplifier
6SQ7GT ..... Detector-AVC
6SQ7GT .....Audio Amplifier
6K6GT .....Power Output
6X5GT ..... Rectifier

MARCH 25, 1942

POWER OUTPUT
Type ..... Pentode
Undistorted ..... 3.6 Watts
Maximum ..... 4.7 Watts

SEARS ROEBUCK CO.

SEARS PAGE 14-59
MODEL 7165
Ch. 109.423

MODEL 7167
Ch. 101.662-1A

SEARS ROEBUCK CO.

PRELIMINARY:

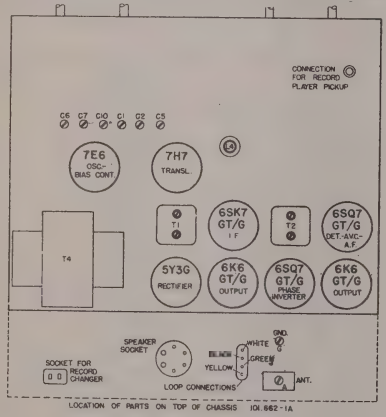
Output Meter Connections . . . . . Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts . . . . . 1.5 volts
Approximate microvolts input to indicate 500 milliwatts output . . . . . See chart below
Generator ground lead connection . . . . . Receiver chassis
Dummy Antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator Modulation. . . . . 30%, 400 cycles
Position of Volume Control. . . . . Fully on
Position of Tone Control . . . . . HI
Position of pointer with tuner fully closed . . . . . Last line below 540 calibration mark

BAND SWITCH POSITION	POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTED (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
A	Closed	455 KC	.1 mfd.	7H7 Transl. grid	T2, T1	IF	---
A	Open	1750 KC	.0002 mfd.	Ant. Terminal	C6	Oscillator	---
A	1410	1410 KC	.0002 mfd.	Ant. Terminal	C5, C2	Ant. Transl.	25
A	600 (rock)	600 KC	.0002 mfd.	Ant. Terminal	C7	Padder	100
B	Open	18.3 MC	400 ohms	Ant. Terminal	C10	Sw Oscillator	---
B	15 (rock)	15 MC	400 ohms	Ant. Terminal	C1	Transl.	20

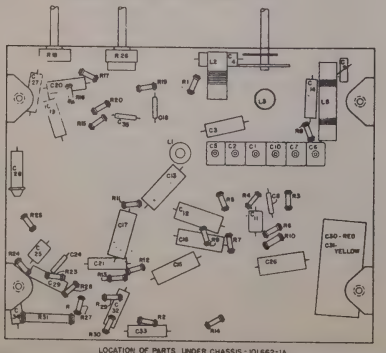
IMPORTANT ALIGNMENT NOTES

The Alignment must be done in the order given.

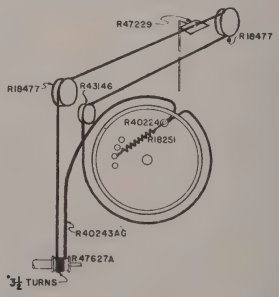
Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.



LOCATION OF PARTS ON TOP OF CHASSIS 101.662-1A



LOCATION OF PARTS UNDER CHASSIS - 101662-1A



Push Button Mechanism

Adjustment for each push button is locked or unlocked by tightening or loosening the slotted screwhead made accessible when push button knob is pulled off of its plunger. Stations are set up by unlocking the mechanism, tuning in station, pushing in plunger (being careful not to detune station), and securely locking the adjustment.

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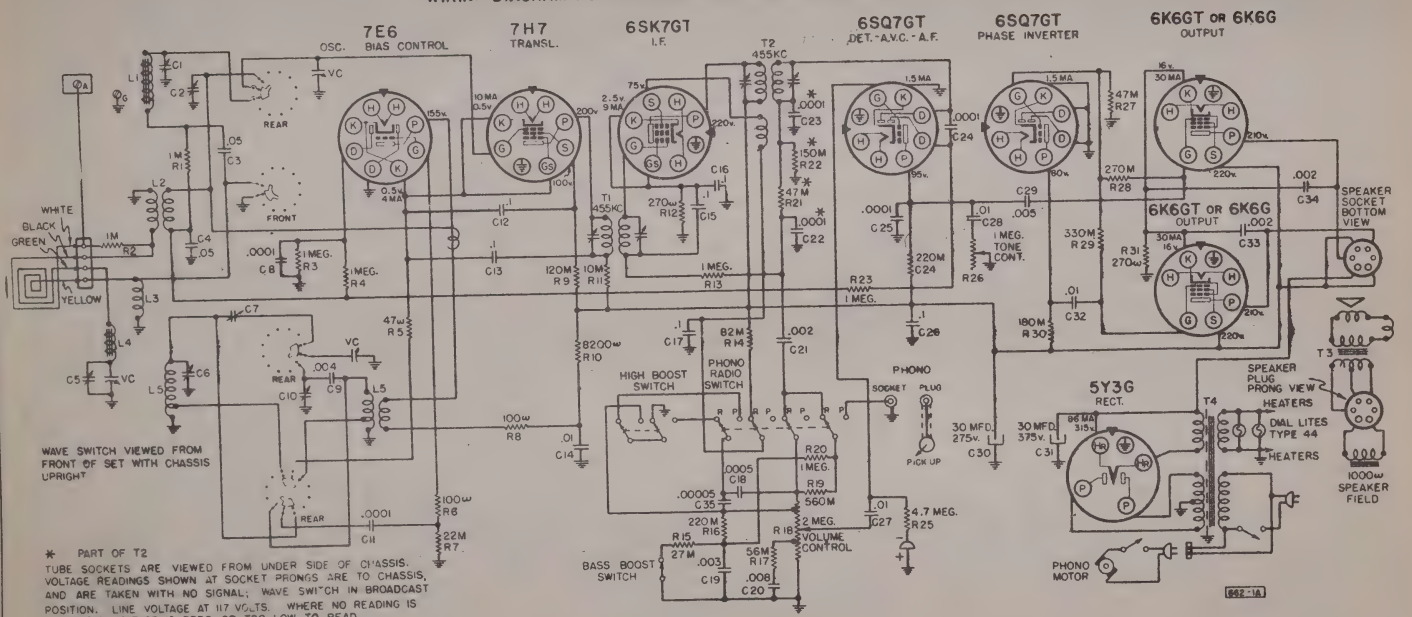
WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.662-1A



POWER OUTPUT:
- Type ..... Push Pull Pentodes
- Undistorted ..... 3.5 watts
- Maximum ..... 7 watts

INTERMEDIATE FREQUENCY ..... 455 KC

Date June 9. 1942

FREQUENCY RANGES:
- Band "A" ..... 540-1700 KC
- Band "B" ..... 6-18 MC

LOUDSPEAKER:
- Type ..... Dynamic
- Size ..... 10 inch
- Field Coil Resistance 1000 ohms
- Approx. field coil voltage drop 95 V.

MODEL 7168
Ch. 101.681-1A

SEARS ROEBUCK CO.

PRELIMINARY:

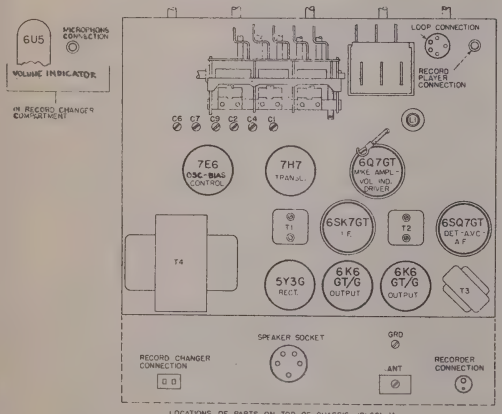
Output meter connections . . . . . Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts . . . . . 1.3 volts
Approximate microvolts input to indicate 500 milliwatts output . . . . . See chart below
Generator ground lead connection . . . . . Receiver chassis
Dummy Antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator Modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully on
Position of Tone Control . . . . . HI
Position of pointer with tuner fully closed . . . . . Last line below 540 calibration mark

BAND SWITCH POSITION	POSITION OF TUNER	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMER ADJUSTMENTS (IN ORDER SHOWN)	TRIMMER FUNCTION	APPROXIMATE MICROVOLTS
A	Closed	455 KC	.1 mfd.	7H7 Transl. grid	T2, T1	IF	----
A	Open	1750 KC	.0002 mfd.	Ant. Terminal	C6	Oscillator	----
A	1410 KC	1410 KC	.0002 mfd.	Ant. Terminal	C1, C2	Ant. Transl.	30
A	600 (rock)	600 KC	.0002 mfd.	Ant. Terminal	C7	Padder	125
B	Open	13.3 MC	400 ohms	Ant. Terminal	C9	SW Oscillator	----
B	15 (rock)	15 MC	400 ohms	Ant. Terminal	C4	SW Transl.	20

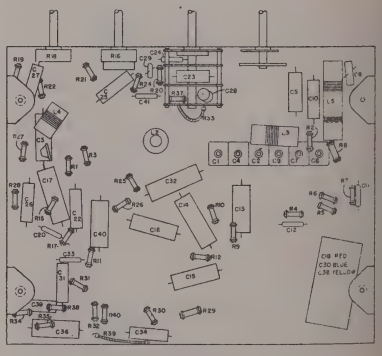
IMPORTANT ALIGNMENT NOTES

The Alignment must be done in the order given.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.



LOCATIONS OF PARTS ON TOP OF CHASSIS 101.681-1A


LOCATION OF PARTS UNDER CHASSIS 101.681-1A

TUBES AND FUNCTIONS:

7E6 . . . . . Oscillator, Bias Control
7H7 . . . . . Translator
6SK7GT . . . . . IF
6SQ7GT . . . . . Detector-AVC-AF
6SQ7GT . . . . . Phase Changer
2 - 6K6GT or 6K6G . . . . . Output
5Y3G. . . . . Rectifier

POWER SUPPLY:

All models available . . . . . 105-125 volt, 60 cycles AC: 100 watts

PUSH BUTTON TUNING MECHANISM:

The adjustment for each push button is locked or unlocked by tightening or loosening the slotted screwhead made accessible when the push button knob is pulled off of its plunger. Stations are set up by unlocking the mechanism, tuning in the station, pushing in the plunger (being careful not to detune the station), and securely locking the adjustment.

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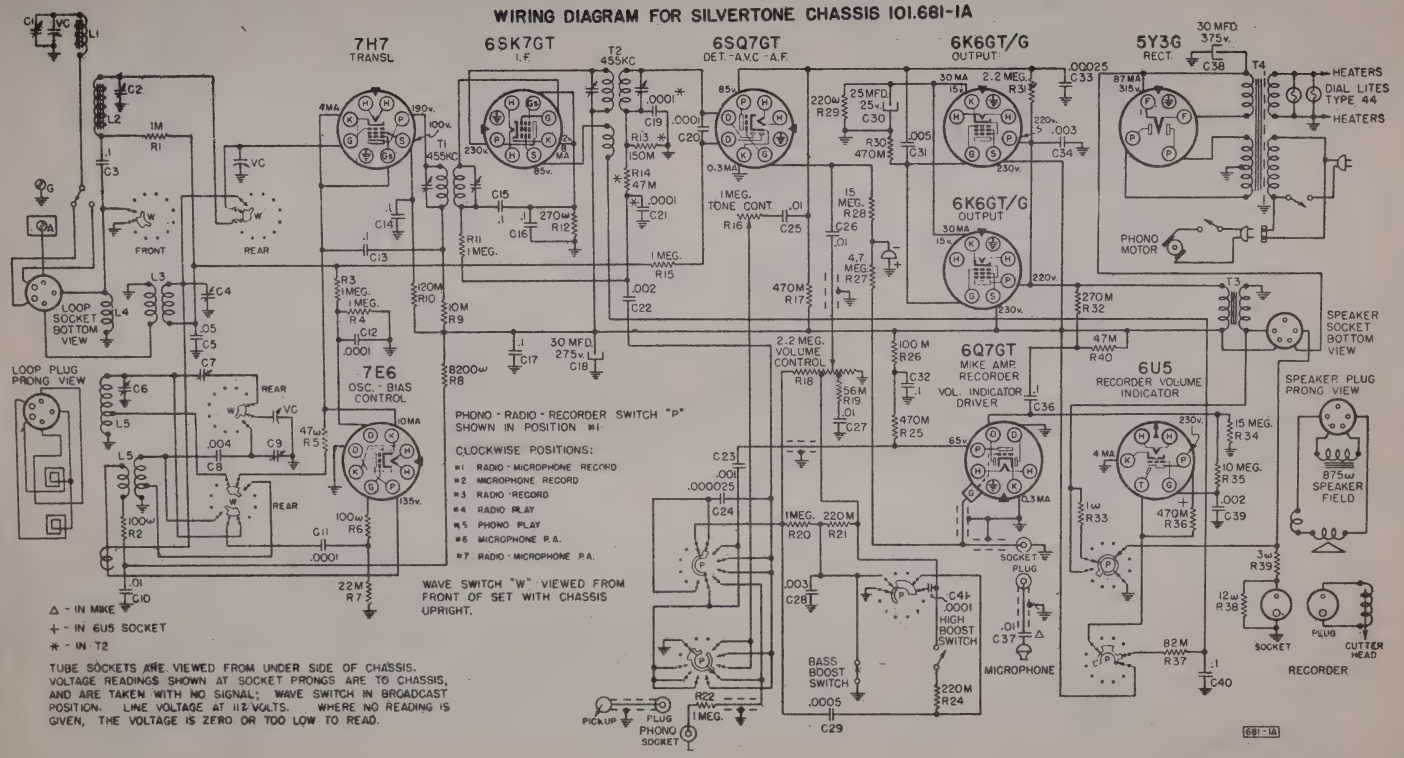

WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.681-1A
7H7 TRANSL
6SK7GT I.F.
6SQ7GT DET.-A.V.C.-A.F.
6K6GT/G OUTPUT
5Y3G RECT.
6K6GT/G OUTPUT
7E6 OSC.-BIAS CONTROL
6Q7GT MIKE AMP. RECORDER VOL. INDICATOR DRIVER
6U5 RECORDER VOLUME INDICATOR
HEATERS
DIAL LITES TYPE 44
HEATERS
PHONO MOTOR
LOOP SOCKET BOTTOM VIEW
LOOP PLUG PRONG VIEW
SPEAKER SOCKET BOTTOM VIEW
SPEAKER PLUG PRONG VIEW
875Ω SPEAKER FIELD
PHONO - RADIO - RECORDER SWITCH "P" SHOWN IN POSITION #1
CLOCKWISE POSITIONS:
#1 RADIO - MICROPHONE RECORD
#2 MICROPHONE RECORD
#3 RADIO - RECORD
#4 RADIO PLAY
#5 PHONO PLAY
#6 MICROPHONE P.A.
#7 RADIO - MICROPHONE P.A.
WAVE SWITCH "W" VIEWED FROM FRONT OF SET WITH CHASSIS UPRIGHT.
Δ - IN MIKE
+ - IN 6U5 SOCKET
* - IN T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 117 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
HIGH BOOST SWITCH
BASS BOOST SWITCH
MICROPHONE
PICKUP
PLUG
PHONO SOCKET
SOCKET
PLUG
CUTTER HEAD
RECORDER
681-1A

SEARS ROEBUCK CO.

MODEL 7168
Ch. 101.681-1A

SEARS PAGE 14-63

POWER OUTPUT:
Type ..... Parallel Pentodes
Undistorted ..... 3.5 watts
Maximum ..... 7 watts

INTERMEDIATE FREQUENCY ... 455 KC

Date June 9, 1942

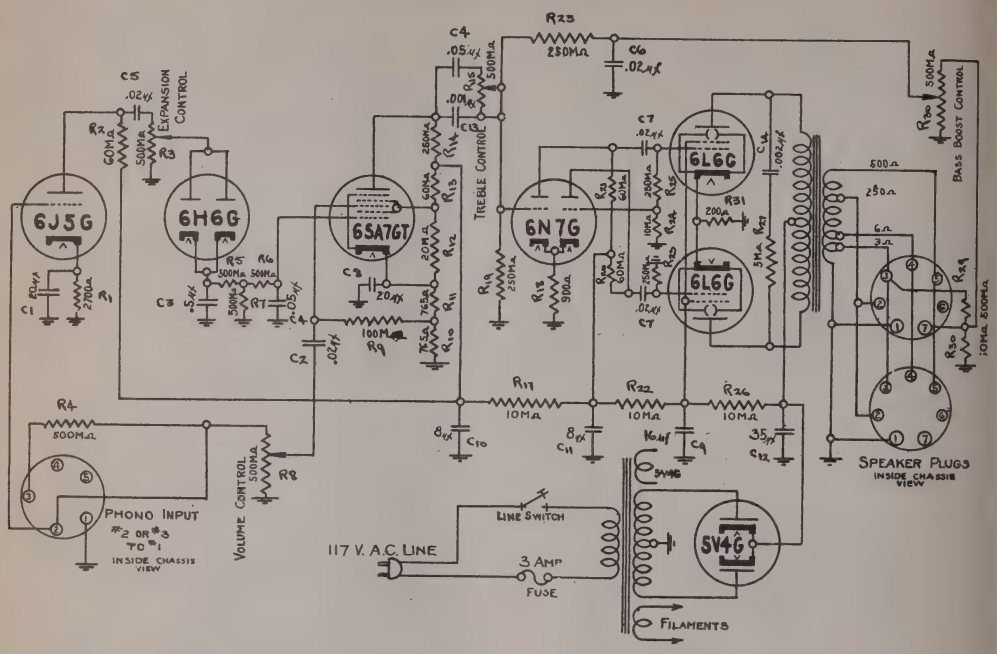
LOUDSPEAKER:
Type ..... Dynamic
Size ..... 10 inch
Field coil resistance 875 ohms
Approx. field coil voltage drop 95 V.

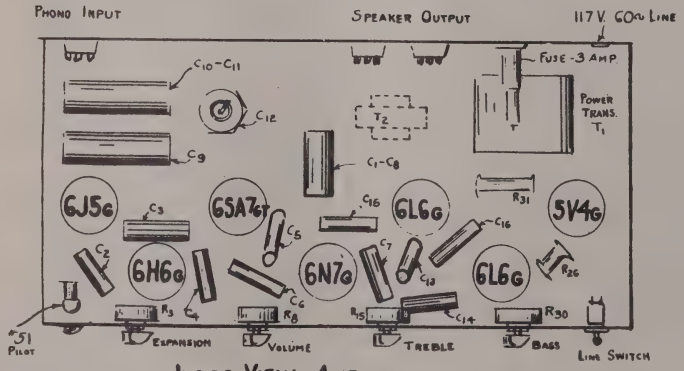
MODELS 7356, 7984,
12870
Chassis 138.250

SEARS ROEBUCK CO.

18 WATT, 7 TUBE, 3 STAGE, PHONOGRAPH AMPLIFIER

WITH VOLUME EXPANSION AND BASS BOOST





INSIDE VIEW AMP.

APRIL 19, 1943

TUBE COMPLEMENT

1	6J5G . . . Voltage Amplifier for volume expansion	1	6H6G . . . Rectifier for volume expansion voltage
1	6SA7GT . . . . Input for pickup	1	6N7G . . . . . .Inverter-driver
2	6L6G . . . . . Output	1	5V4G . . . . . .Rectifier

POWER SUPPLY

110-125 Volts, 50-60 cycle, A.C., 130 Watts

INPUT	OUTPUT
Phonograph input for crystal or other high impedance pickups.	3, 6, 250 and 500 ohms for P.M. speakers

©John F. Rider

MODEL 7188
Ch. 109.417

SEARS ROEBUCK CO.

AUTOMATIC RECORD CHANGER

GENERAL SPECIFICATIONS

Motor	105-125 volts 60 cycles
Plays	Ten 12 inch records
Plays	Twelve 10 inch records
Plays	Home recordings

TECHNICAL SERVICE DATA

1. There is no strain on the mechanism when the tonearm is accidentally rotated during its cycle. Merely return the tonearm to engage its proper notch--"H" for playing home recording discs or "A" for standard records.

2. The height-gauge prevents vertical shocks from reaching the mechanism. Rotate the height-gauge until the needle is approximately 1/16 inch below the top surface of the turntable.

3. The set screws for adjusting the tonearm are above the motorboard. If it is necessary to loosen these screws while servicing, reset as follows: Tighten one set-screw, turn on the motor, allowing the changing cycle to proceed until the tonearm starts to drop, at which point turn off the motor, stop the turntable before the tonearm has completed its drop and loosen the set screw. Then, while holding the tonearm over the record so that the needle is midway between the outer edge of the record and the beginning of the recording, tighten the set screws.

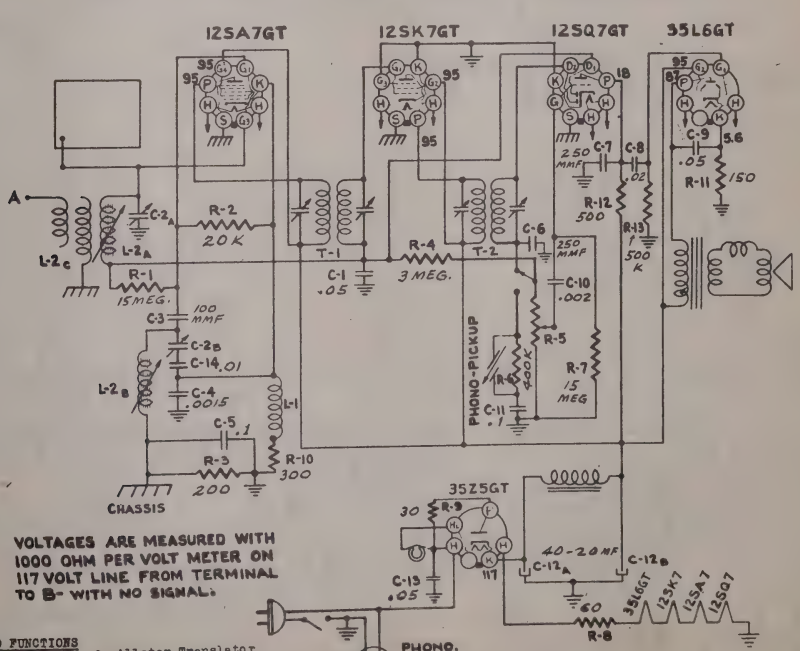
4. The automatic record support can be turned in either direction when adjusting for 10-inch or 12-inch records. The record support post is gauged in production so that the distance from the edge of the automatic record support when adjusted for playing 10-inch records to the nearest edge of the center spindle is 4 27/32 inches.

5. The record changer is adjusted in production so that the automatic mechanism is tripped when the needle is between 1 21/32 and 1¾ inches from the edge of the center spindle. This adjustment away from the tonearm bearing will cause the automatic mechanism to be engaged when the needle is at a greater distance from the spindle and bending the bracket towards the tonearm bearing will cause the engagement to occur when the needle is at a lesser distance from the spindle.

6. When replacing the four speed nuts that fasten the bottom strap, drive the three small speed nuts up tight with a hammer, but replace the large speed nut on the center spindle firmly with the fingers.

7. The three main bearings are made of "Oilite" bronze. They contain an oil supply sufficient for the life of the machine. After two years of normal use, add three drops of oil to the two felt washer reservoirs on the main motor bearing, a drop on the rubber tired motor idler pulley bearing and two drops on the ball thrust bearing at the bottom of the center spindle. Operation of any record changer below normal room temperature will result in reduced turntable speed and consequently poor reproduction.

Keep the rubber belt and the rubber tire of the motor idler pulley free of grease, oil, and dirt. A cloth dampened with naphtha is recommended for cleaning these rubber parts.



VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT METER ON 117 VOLT LINE FROM TERMINAL TO B- WITH NO SIGNAL.

TUBES AND FUNCTIONS

12SA7GT	Oscillator-Translator
12SK7GT	IF Amplifier
12SQ7GT	Detector-AVC-Audio
35L6GT	Power Output
35Z5GT	Rectifier

POWER OUTPUT

Type	Beam Power
Undistorted	.70 Watts
Maximum	.95 Watts

MODEL 7188
Ch. 109.417

SEARS ROEBUCK CO.

Output Meter Connection.....Across speaker voice coil
Connection of generator lead.....See chart below
Connection of generator ground lead.....Return of Phono Pickup
Dummy Antenna Value to be in series with generator output.....See chart below
Generator Modulation.....30%, 400 cycles
Position of Volume Control.....Fully clockwise
Phono-Radio Switch.....Radio position

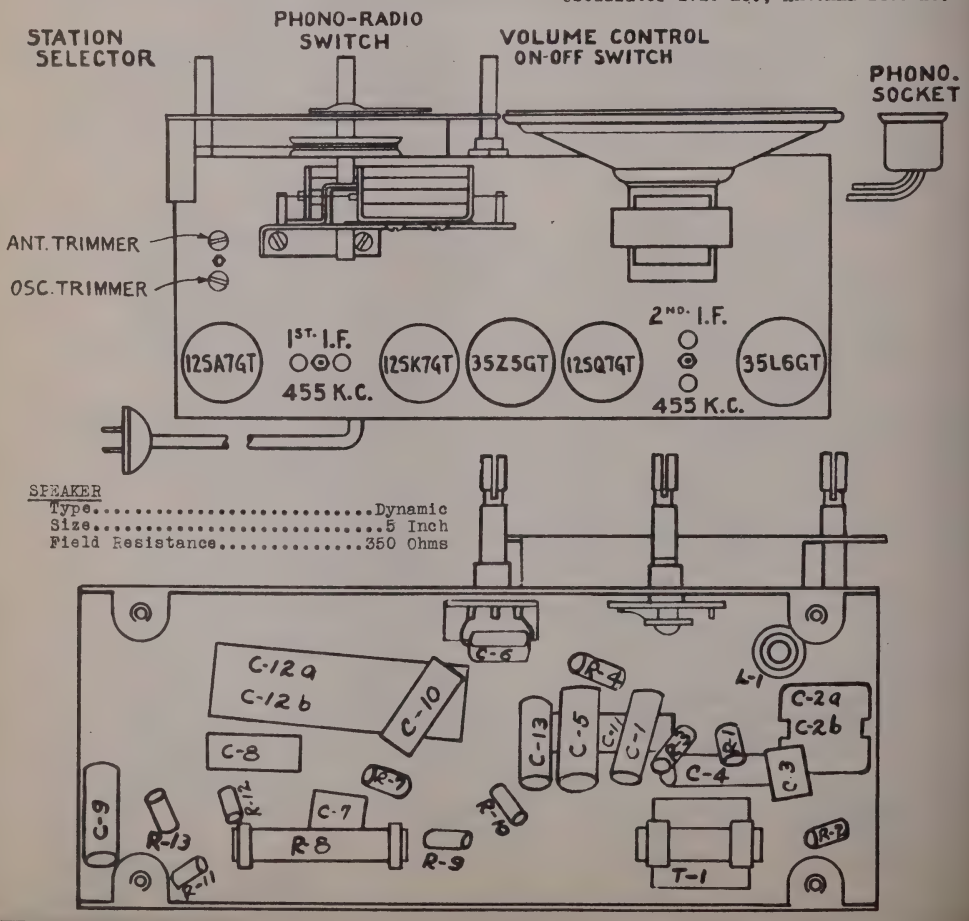
DIAL POSITION	GENERATOR FREQUENCY	DUMMY ANTENNA	GENERATOR CONNECTION	TRIMMERS ADJUSTED (In order shown)	REMARKS
H.F. End	I.F. 455 kc.	.1 mfd.	12SA7 Grid	T1, T2	Tune to max.
H.F. End (1720)	1720 kc.	200 mmf.	Antenna	Oscillator trimmer	Set limit of band
1400	1400 kc.	200 mmf.	Antenna	Antenna trimmer*	Tune to max.

*Capacitor plate must be connected while adjusting this trimmer.
The alignment procedure should be repeated stage by stage in the original order for greatest accuracy. Always keep the output from the generator at the lowest possible level so that the AVC action of the receiver is ineffective.

POWER SUPPLY.....105-125 volts AC 50 Watts
60 cycle only

FREQUENCY RANGE.....535 to 1720 kc.

ALIGNMENT FREQUENCIES.....Intermediate frequency 455 kc.,
Oscillator 1720 kc., Antenna 1400 kc.



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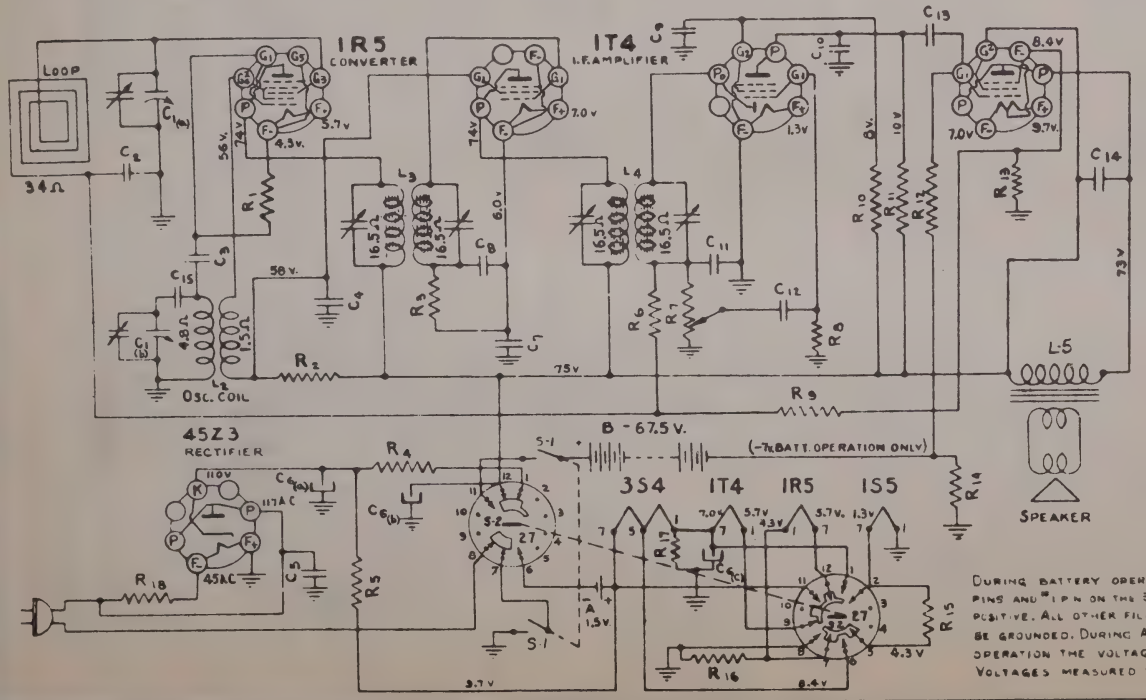
SCHEMATIC LOCATION	PART NO.	DESCRIPTION CHASSIS PARTS	PRICE EACH
R7	D8958	Control-Volume 1 meg.	1.25
C1	D9563	Condenser-Variable	2.25
C6,A,B,C	D8952	Condenser Elect 30 mfd-150 V 20 mfd.-150 V - 100 mfd.-12 V	1.00
C4, C8	D8830	Condenser-Paper-.01-120 V	.20
C7	D9135	Condenser-Paper-.25-.75 V	.20
C13	D581	Condenser-Paper-.005-600 V	.20
C2, C9	D580	Condenser-Paper-.05-200 V	.20
C14	D568	Condenser-Paper-.01-400 V	.20
C5	D563	Condenser-Paper-.05-400 V	.20
C12	D8540	Condenser-Paper-.001-600 V	.20
C11	D1286	Condenser-Mica 250 MMF	.20
C10	D2780	Condenser-Mica 50 MMF	.20
C3	D1285	Condenser-Mica 100 MMF	.20
C15	D8959	Condenser-Mica 485 2% MMF	.30
R15	D8963	Resistor-DD ohm, 1/2 Watt	.15
R14	D8964	Resistor-700 ohm, 1/3 Watt	.15
R5	D9314	Resistor-2200 ohm, Wire Wound	.35
R16	D8965	Resistor-1M 1/3 Watt	.15
R17	D8966	Resistor-1700 ohm, 1/3 Watt	.20
R13	D8968	Resistor-3M 1/3 Watt	.15
R4	D9468	Resistor-3M 1 Watt	.20
R2	D7125	Resistor-5M 1/3 Watt	.15
R1	D7122	Resistor-100M 1/3 Watt	.15
R11	D6723	Resistor-1 Meg 1/3 Watt	.15
R12	D8970	Resistor-2 Meg 1/3 Watt	.15
R6, R10	D8847	Resistor-4 Meg 1/3 Watt	.15
R3	D6724	Resistor-5 Meg 1/3 Watt	.15
R8	D6562	Resistor-10 Meg 1/3 Watt	.15
R9	D635	Resistor-6 Meg 1/3 Watt	.15

RETAIL SELLING PRICES PREPAID
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

1S5 2ND DET., AF, AVC.

3S4 OUTPUT


1R5 CONVERTER
1T4 I.F. AMPLIFIER
LOOP
34Ω
OSC. COIL
45Z3 RECTIFIER
B - 67.5 V.
(-7½ BATT. OPERATION ONLY)
SPEAKER
3S4 1T4 1R5 1S5
S-1
S-2
L-5
During battery operation all "7" pins and "1" pin on the 3S4 will be 1.5 v positive. All other filament pins will be grounded. During A.C. or D.C. 117 volt operation the voltages will be as indicated ±20%. Voltages measured with 1000 ohm per volt meter.

ALIGNMENT FREQUENCIES:

IF PEAK ... 455 KC

Oscillator 1610 KC

Antenna .. 1400 KC

FEBRUARY 27, 1942

SEARS ROEBUCK CO.

MODEL 7189
Ch. 109.378

SEARS PAGE 14-67

MODEL 7189
Ch. 109.378

SEARS ROEBUCK CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

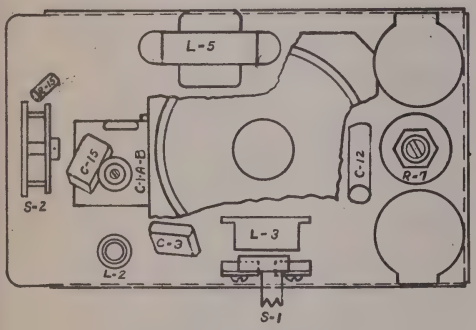
Output meter connection.....Across loudspeaker voice coil
Output meter reading to indicate 50 milliwatts.....0.42 volts
Generator ground lead connection.....To chassis through 0.1 mfd. cond.
Connection of generator output lead.....See table below
Generator modulation.....30%, 400 cycles
Position of Volume Control.....Fully on
Position of pointer with variable fully closed.....On 540 K. C.

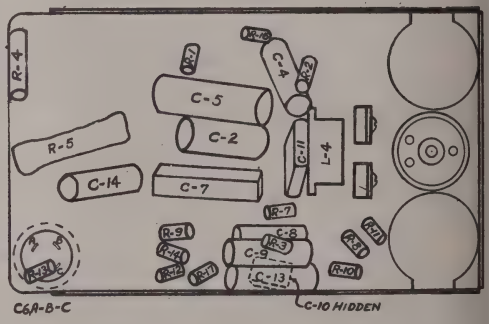
GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TRIMMERS TO TUNE	REMARKS
IF 455 K.C.	1R5 Grid	.1 Mfd.	H. F. End	IF Transformers 4 Trimmers	Tune to Max.
1600 K.C.	1R5 Grid	------	H. F. End (1600)	Oscillator Trimmer	Set Limit of band
1400 K.C.	Standard loop or single turn from generator lossely coupled	------	1400	Antenna Trimmer	Tune to Max.

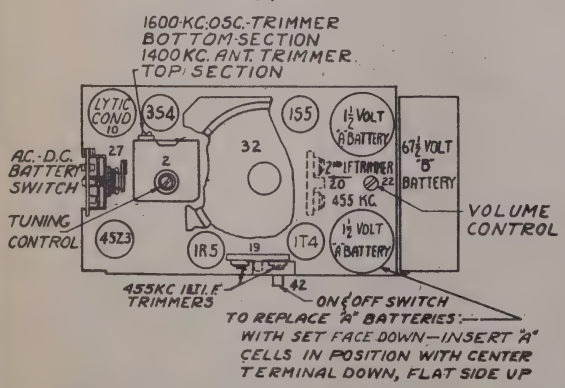
IMPORTANT ALIGNMENT NOTES:

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.
The location of all the alignment adjustments is shown on the Top View of the chassis.
The chassis is removed from the case in order to align the I.F. and oscillator, but the loop antenna must be left connected.
The chassis and the batteries must be in place in the cabinet during loop alignment. The loop trimmer is accessible by removing the back cover.







TUBES AND FUNCTIONS

1R5.....Oscillator-Translator
1T4.....IF Amplifier
1S5.....Detector-AVC-Audio
3S4.....Power Output
45Z3.....Rectifier

POWER OUTPUT

Type.....Pentode Tube
Undistorted..... .095 Watts
Maximum..... .125 Watts

SPEAKER

Type.....Permanent Magnet
Size.....8½ Inch

POWER SUPPLY.....105-125 volts AC or DC 20 Watts
or batteries 1 "B" Battery #5071 and 2 "A" batteries #4650.

FREQUENCY RANGE.....540 to 1600 kc.

ALIGNMENT FREQUENCIES.....Intermediate frequency 455 kc.,
Oscillator 1610 kc., Antenna 1400 kc.

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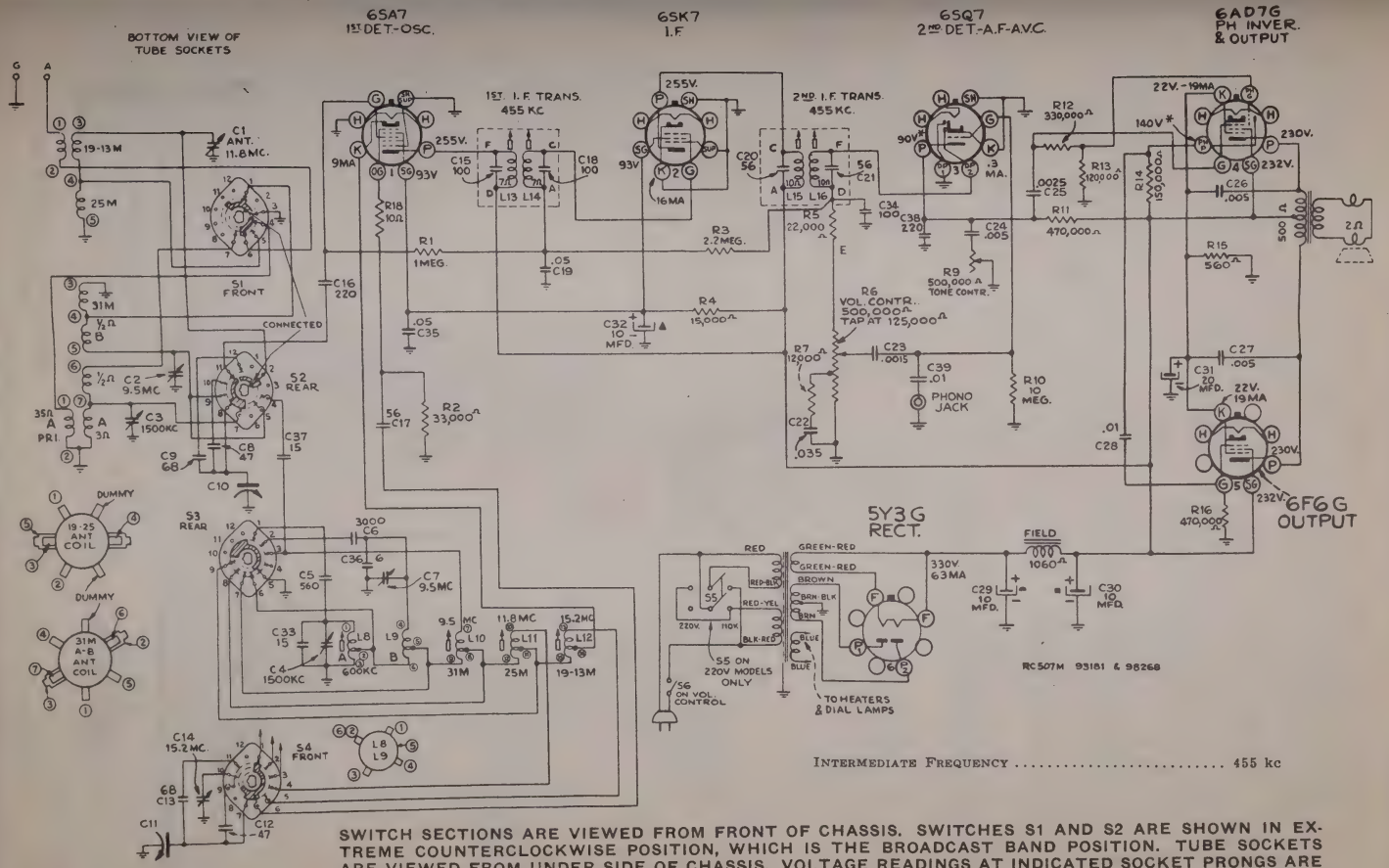
WIRING DIAGRAM FOR SILVERTONE CHASSIS—126.234



INTERMEDIATE FREQUENCY ..... 455 kc

SWITCH SECTIONS ARE VIEWED FROM FRONT OF CHASSIS. SWITCHES S1 AND S2 ARE SHOWN IN EXTREME COUNTERCLOCKWISE POSITION, WHICH IS THE BROADCAST BAND POSITION. TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMING ADJUSTMENTS. WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING VOLTAGES TO BE MEASURED WITH NO SIGNAL. FIGURES AT CATHODES ARE CATHODE CURRENTS IN MILLIAMPERES. VOLTAGES WITH STAR (★) ARE ACTUAL OPERATING VOLTAGES IN HIGH RESISTANCE CIRCUITS, MEASURED WITH ELECTRONIC VOLTMETER.

January 6, 1942

SEARS ROEBUCK CO.

MODEL 7905 Export
Chassis 126.234

(John F. Rider

MODEL 7905 Export
Chassis 126.234

SEARS ROEBUCK CO.

Calibration Scale on Variable Condenser Drive Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment when chassis is out of cabinet; therefore, a calibration scale is attached to the rear of the drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale (see "Dial Drive Drawing") must be in a vertical position when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

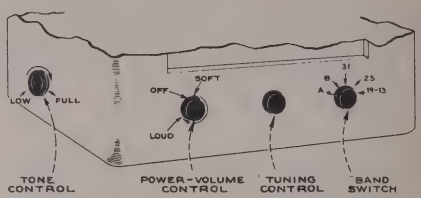
Dial - Indicator Adjustment.—After fastening the chassis in the cabinet attach the dial pointer to the drive cable with variable condenser fully closed and pointer on last calibration mark at 550 kc end of Broadcast "A" band. The dial pointer has a spring clip for attachment to the cable.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

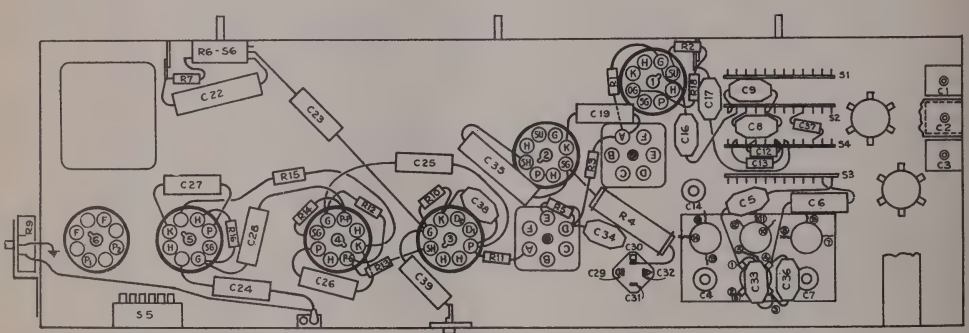
In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.



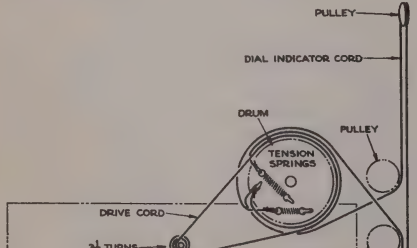
CONTROLS



TUBE, TRIMMER AND PARTS LOCATION—BOTTOM VIEW

Tuning Dial:

The tuning shaft is connected through a cord drive to a drum on the condenser shaft. A second cord drives the dial indicator by passing over a pulley on the chassis. "Condenser and Indicator Drive Cord" illustration shows the complete cord drive assembly and the correct number of turns which the cord should be wrapped around the drive shaft and condenser drum.



CONDENSER AND INDICATOR DRIVE CORD

POWER OUTPUT:

Type	Pentode
Undistorted	3.0 watts
Maximum	3.5 watts

POWER SUPPLY RATING:

105-120 volts, 25 cycle	75 watts
105-120 volts, 50-60 cycle	75 watts
105-130, 140-160, 200-250 volts, 50-60 cycle	75 watts

LOUDSPEAKER:

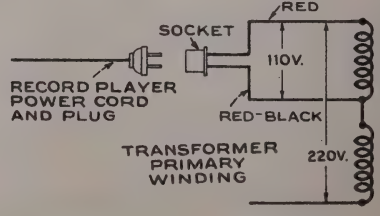
Type	6-inch electrodynamic
Voice Coil Impedance at 400 Cycles	3.4 ohms
Field Coil Resistance	1,060 ohms

FREQUENCY RANGES:

Standard Broadcast (A)	540-1,720 kc (555-174 m)
Medium Wave (B)	3,000-9,500 kc (100-31.5 m)
31 Meter Spread Band	9,500-12,500 kc (31.5-24.0 m)
25 Meter Spread Band	11,800-16,000 kc (25.5-18.8 m)
19-16-13 Meter Spread Band	15,500-22,500 kc (19.5-13.3 m)

CHASSIS FEATURES:

Jack for Phonograph Attachment
Magnetite-Core Adjusted I-F Transformers, and Oscillator Coils
Automatic Volume Control
High-Frequency Tone Control
Aural-Compensated Volume Control
Spread Bands for Short Wave Reception



RECORD PLAYER CONNECTIONS (220V—110V)

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SEARS ROEBUCK CO.

MODEL 7905 Export
Chassis 126.234

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections	Across speaker voice coil
Output meter reading to indicate 1.0 watt output	1.8 volts
Approximate average sensitivity in microvolts for 1.0 watt output	See chart below
Dummy antenna value to be inserted in series with generator output	See chart below
Connection of generator output lead	See chart below
Connection of generator ground lead	To chassis
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully clockwise
Position of Tone Control	Fully clockwise

LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS ON TOP OF CHASSIS

Wave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Dummy Antenna	Generator Connection	Trimmers Adjusted (In order shown)	Trimmer Function	Approximate Microvolts
"A"	Low End	455 kc	.001 mfd.	6SK7 I-F Grid	L15, L16	2nd I-F Trans.	4,000
"A"	Low End	455 kc	.001 mfd.	6SA7 Det.-Osc. Grid	L13, L14	1st I-F Trans.	70
"25 Meter"	11.8 mc (138.5°)	11.8 mc	300 ohms	Ant.	L11, C1	Osc.,* Ant.	23
"25 Meter"	15.2 mc (18.5°)	15.2 mc	300 ohms	Ant.	C14	Osc.*	
"19-13 Meter"	15.2 mc (156°)	15.2 mc	300 ohms	Ant.	L12	Osc.*	56
"31 Meter"	9.5 mc (156°)	9.5 mc	300 ohms	Ant.	L10, C2	Osc.,* Ant.	23
"Medium Band"	9.5 mc (11.5°)	9.5 mc	300 ohms	Ant.	C7, C3	Osc.,* Ant.	23
"Standard Band"	1,500 kc (27°)	1,500 kc	.0002 mfd.	Ant.	C4, C3	Osc., Ant.	16
"Standard Band"	600 kc (149.5°) (Rock)	600 kc	.0002 mfd.	Ant.	L8	Osc.	16

IMPORTANT ALIGNMENT NOTES

* Use minimum capacity peaks if two peaks can be obtained.

Where indicated by the word "Rock," the variable tuning condenser should be rocked back and forth a degree or two while making this adjustment.

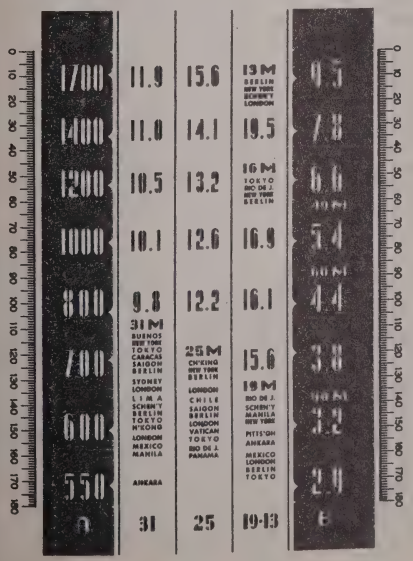
Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value to prevent the a-v-c action of the set interfering with accurate alignment.

Adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy used for alignment in any other band.

Note.—Oscillator tracks 455 kc above signal on all bands.

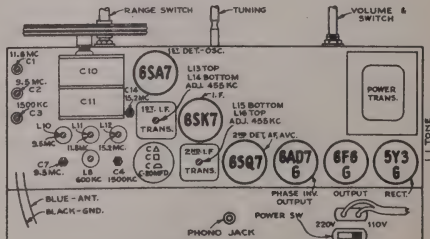
Values shown under, "Microvolts," are only approximate.



Calibration Scale

Reduced Reproduction of Receiver Dial, and Corresponding 180-0° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 150° on the calibration scale corresponds to approximately 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."



TUBE, TRIMMER AND PARTS LOCATION

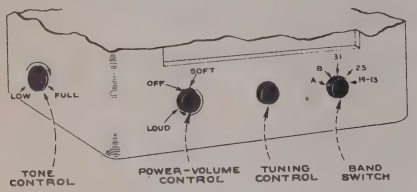
©John F. Rider

MODEL 7906 Export
Chassis 126.235

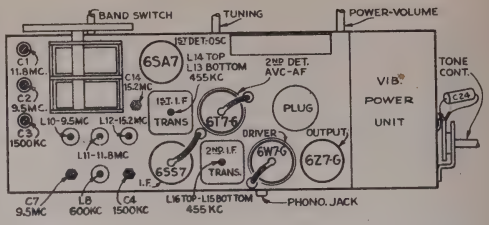
SEARS ROEBUCK CO.

Calibration Scale on Variable Condenser Drive Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment when chassis is out of cabinet; therefore, a calibration scale is attached to the rear of the drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale (see "Dial Drive Drawing") must be in a vertical position when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.



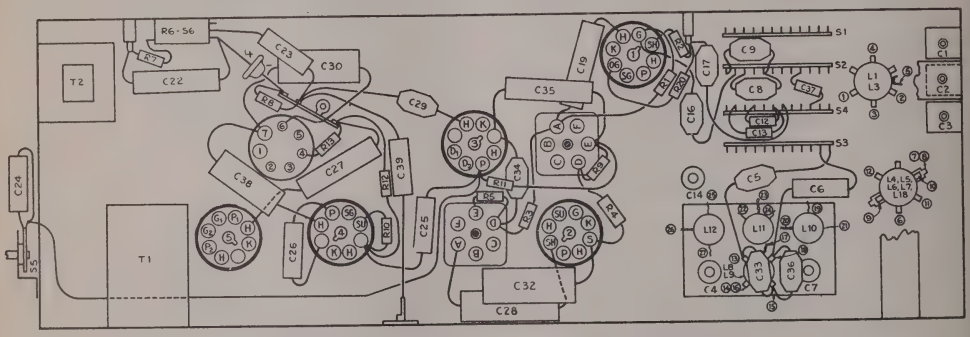
CONTROLS



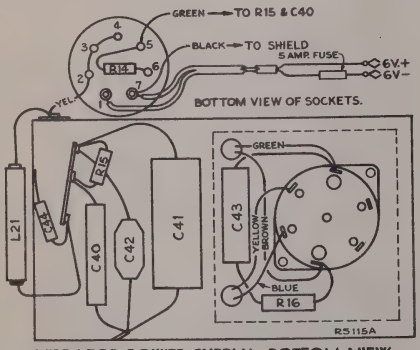
TUBE, TRIMMER AND PARTS LOCATION—TOP VIEW

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial - Indicator Adjustment.—After fastening the chassis in the cabinet attach the dial pointer to the drive cable with variable condenser fully closed and pointer on last calibration mark at 550 kc end of Broadcast "A" band. The dial pointer has a spring clip for attachment to the cable.



TUBE, TRIMMER AND PARTS LOCATION—BOTTOM VIEW



VIBRATOR POWER SUPPLY—BOTTOM VIEW

A-C Power Supply Unit

An A-C Power Supply Unit is available for the Model 7906 receiver. The installation of this unit allows the receiver to be operated on 105-125, 200-250 volts, 25-60 cycle a-c power supply. Installation is as follows:

a. Disconnect the battery leads. Detach the socket connecting the short cable from the Vibrator Power Unit to the Chassis.

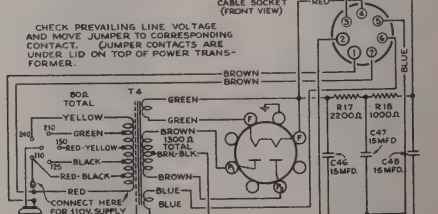
b. Set the switch on the A-C Power Unit for the voltage that is to be used, A-C 105 to 125 or 210 to 250 volts 25 to 60 cycles. Then attach the A-C Power Unit Cable to the chassis.

c. If desired, the Vibrator Unit may be removed from the chassis by unfastening the two screws on the chassis apron.

Socket Voltages with the A-C Power Supply Unit

(LINE SUPPLY VOLTAGE, 110 VOLTS)

Tube	Filament Voltage	Plate Voltage	Screen Voltage	Plate Current	Cathode Current
6SA7	6.15	182	66	1.1	6.0
6SS7	6.15	182	66	8.3	10.1
6T7G	6.15	55*		.25	.25
6W7G	6.15	178	182	7.0	8.8
6Z7G	6.15	207		9.7	9.7
5Y3G	4.55	Rectifier voltage 210, "B" current 34.9			



A-C POWER UNIT WIRING DIAGRAM

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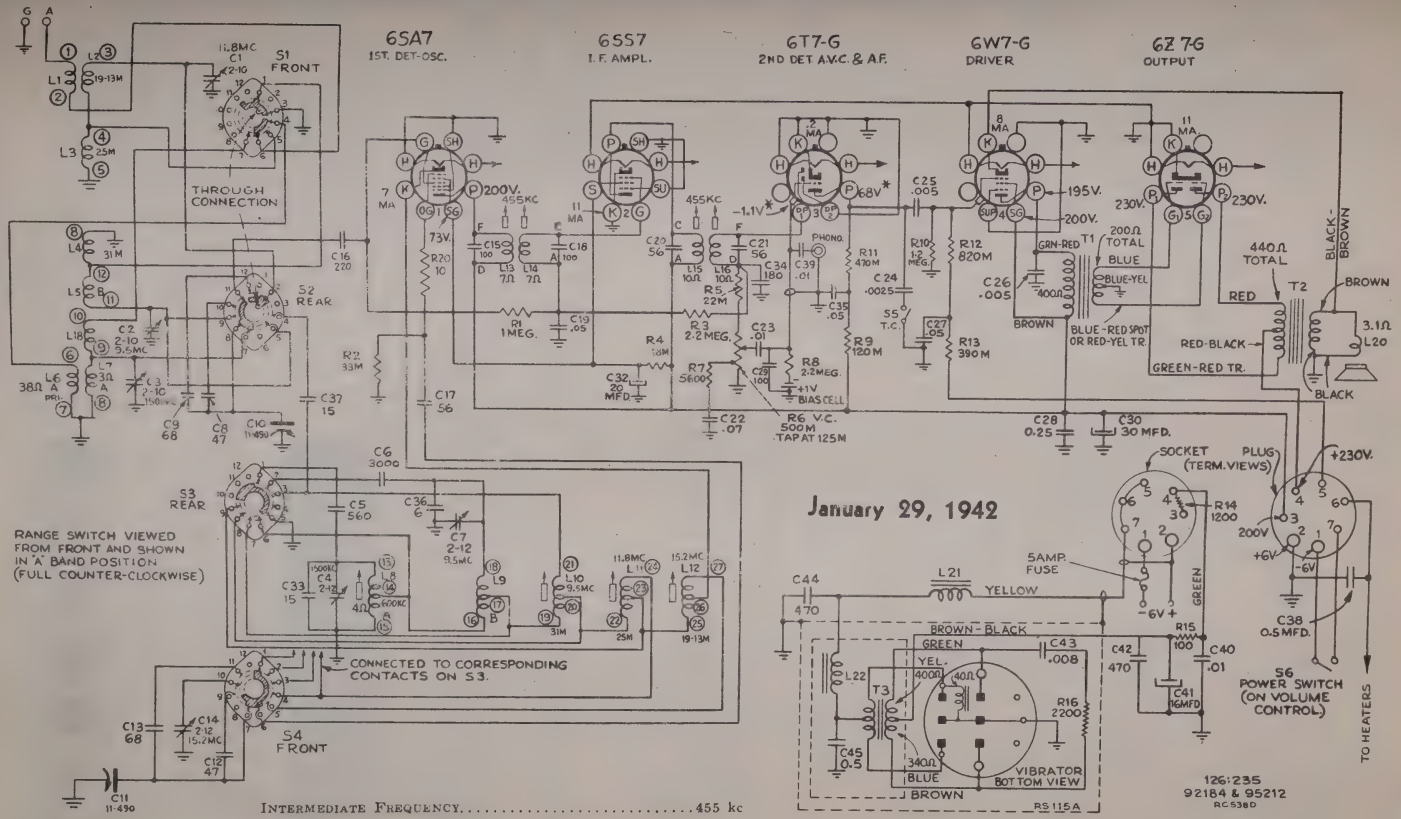
WIRING DIAGRAM FOR SILVERTONE CHASSIS—126.235



January 29, 1942

SWITCH SECTIONS ARE VIEWED FROM FRONT OF CHASSIS. SWITCHES S1 AND S2 ARE SHOWN IN EXTREME COUNTERCLOCKWISE POSITION, WHICH IS THE BROADCAST BAND POSITION. TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMING ADJUSTMENTS. WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING VOLTAGES TO BE MEASURED WITH NO SIGNAL. FIGURES AT CATHODES ARE CATHODE CURRENTS IN MILLIAMPERES. VOLTAGES WITH STAR (★) ARE ACTUAL OPERATING VOLTAGES IN HIGH RESISTANCE CIRCUITS, MEASURED WITH ELECTRONIC VOLTMETER.

MODEL 7906 Export
Chassis 126.235

SEARS ROEBUCK CO.

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections	Across speaker voice coil
Output meter reading to indicate 1.0 watt output	1.8 volts
Approximate average sensitivity in microvolts for 1.0 watt output	See chart below
Dummy antenna value to be inserted in series with generator output	See chart below
Connection of generator output lead	See chart below
Connection of generator ground lead	To chassis
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully clockwise
Position of Tone Control	Fully clockwise
Position of Dial Pointer with variable tuning condenser fully closed	To fall on last calibration mark at 540 KC end of "Broadcast" band

Wave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Dummy Antenna	Generator Connection	Trimmers Adjusted (In order shown)	Trimmer Function	Approximate Microvolts
A Band	Low End	455 kc	.01 mfd.	6SS7 I-F Grid	L15, L16	2nd I-F Trans.	2,100
A Band	Low End	455 kc	.01 mfd.	6SA7 1st Det. Grid	L13, L14	1st I-F Trans.	56
25M Band	11.8 mc (138.5°)	11.8 mc	300 ohms	Ant.	L11, C1	osc., ant.	35
25M Band	15.2 mc (17.0°)	15.2 mc	300 ohms	Ant.	C14	osc.*	
19-13M Band	15.2 mc (156.0°)	15.2 mc	300 ohms	Ant.	L12	osc.*	42
31M Band	9.5 mc (156.0°)	9.5 mc	300 ohms	Ant.	L10, C2	osc., ant.	38
B Band	9.5 mc (11.5°)	9.5 mc	300 ohms	Ant.	C7, C2	osc.*	35
A Band	1,500 kc (26.0°)	1,500 kc	.0002 mfd.	Ant.	C4, C3	osc., ant.	14
A Band	600 kc (150.0°) (Rock)	600 kc	.0002 mfd.	Ant.	L8 (Rock)	osc.	14

IMPORTANT ALIGNMENT NOTES

* Use minimum capacity peaks if two peaks can be obtained.

Where indicated by the word "Rock," the variable tuning condenser should be rocked back and forth a degree or two while making this adjustment.

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value to prevent the a-v-c action of the set interfering with accurate alignment.

Adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy used for alignment in any other band.

Note.—Oscillator tracks 455 kc above signal on all bands.

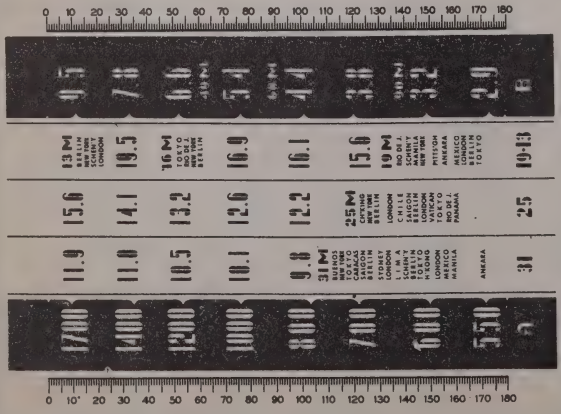
Values shown under, "Microvolts," are only approximate.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.



Calibration Scale

Reduced Reproduction of Receiver Dial, and Corresponding 180-0° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 150° on the calibration scale corresponds to approximately 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

Power Output	Battery Supply	A-C Supply
Undistorted	3.1 watts	3.0 watts
Maximum	4.5 watts	4.0 watts

Loudspeaker

Type	6-inch, permanent-magnet dynamic
Voice-coil Impedance at 400 cycles	3.4 ohms

Power Supply Ratings:

With vibrator power supply unit:	
6.3 volts, total current drain	3.2 amperes
With A-C power supply unit:	
100-130/140-160/195-250 volts, 25-60 cycles	38 watts

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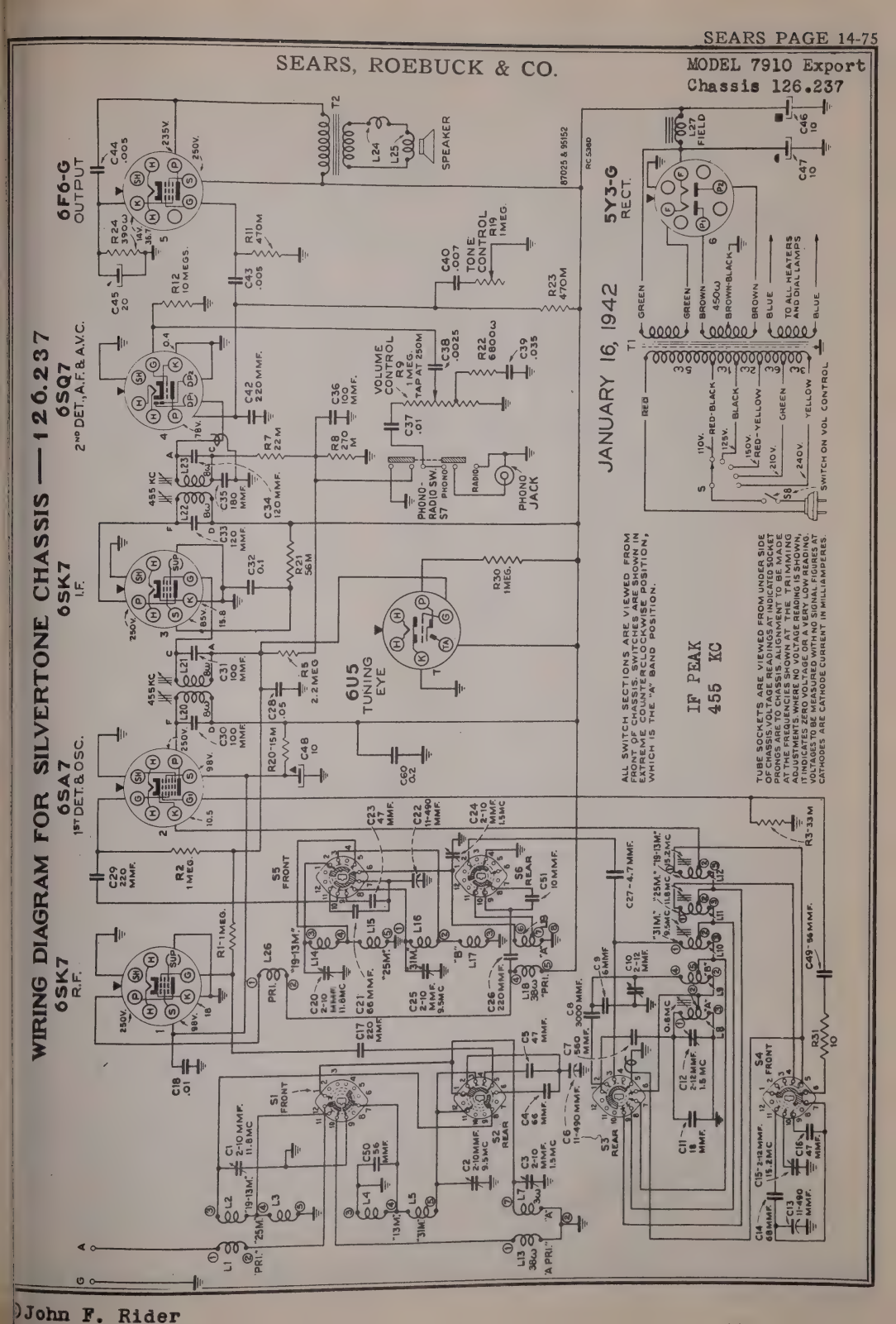
SEARS, ROEBUCK & CO.

MODEL 7910 Export
Chassis 126.237

WIRING DIAGRAM FOR SILVERTONE CHASSIS — 126.237


6SK7 R.F.
6SA7 1ST DET. & OSC.
6SK7 I.F.
6SQ7 2ND DET., A.F. & A.V.C.
6F6-G OUTPUT
5Y3-G RECT.
6U5 TUNING EYE
JANUARY 16, 1942
IF PEAK 455 KC
SPEAKER
PHONO JACK
TONE CONTROL R19 1MEG.
VOLUME CONTROL R9 1 MEG. TAP AT 250M
FIELD
TO ALL HEATERS AND DIAL LAMPS
SWITCH ON VOL CONTROL
ALL SWITCH SECTIONS ARE VIEWED FROM FRONT OF CHASSIS. SWITCHES ARE SHOWN IN EXTREME COUNTERCLOCKWISE POSITION, WHICH IS THE "A" BAND POSITION.
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT TO BE MADE AFTER SET HAS BEEN WARMED UP. IN MAKING ADJUSTMENTS WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. VOLTAGES TO BE MEASURED WITH NO SIGNAL. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

MODEL 7910 Export
Chassis 126.237

SEARS ROEBUCK CO.

Chassis Features:
Jack and Switch for Phonograph Attachment
Magnetite-Core Adjusted I-F Transformers, and Oscillator Coils
Automatic Volume Control
High-Frequency Tone Control
Aural-Compensated Volume Control
No. R-F Stages (all bands)..... one
Spread Bands for Short Wave Reception

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections..... Across speaker voice coil
Output meter reading to indicate 1.0 watt output..... 1.8 volts
Approximate average sensitivity in microvolts for 1.0 watt output..... See chart below
Dummy antenna value to be inserted in series with generator output..... See chart below
Connection of generator output lead..... See chart below
Connection of generator ground lead..... To chassis
Generator modulation..... 30%, 400 cycles
Position of Volume Control..... Fully clockwise
Position of Tone Control..... Fully clockwise

LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS ON TOP OF CHASSIS

Wave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Dummy Antenna	Generator Connection	Trimmers Adjusted (In order shown)	Trimmer Function	Approximate Microvolts
"A"	Low End	455 kc	.001 mfd.	6SK7 I-F Grid	L22, L23	2nd I-F Trans.	4,000
"A"	Low End	455 kc	.001 mfd.	6SA7 Det.-Osc. Grid	L20, L21	1st I-F Trans.	70
"25 Meter"	11.8 mc (138.5°)	11.8 mc	300 ohms	Ant.	L11, C1, C20	Osc.,* Ant., Det.	7
"25 Meter"	15.2 mc (18.5°)	15.2 mc	300 ohms	Ant.	C15	Osc.*	8.5
"19-13 Meter"	15.2 mc (156°)	15.2 mc	300 ohms	Ant.	L12	Osc.*	7
"31 Meter"	9.5 mc (156°)	9.5 mc	300 ohms	Ant.	L10, C2, C25	Osc.,* Ant., Det.	5.6
"Medium Band"	9.5 mc (11.5°)	9.5 mc	300 ohms	Ant.	C10	Osc.*	3
"Standard Band"	1,500 kc (27°)	1,500 kc	.0002 mfd.	Ant.	C12, C3, C24	Osc., Ant., Det.	2
"Standard Band"	600 kc (149.5°) (Rock)	600 kc	.0002 mfd.	Ant.	L8	Osc.	1.5

IMPORTANT ALIGNMENT NOTES

* Use minimum capacity peaks if two peaks can be obtained.

Where indicated by the word "Rock," the variable tuning condenser should be rocked back and forth a degree or two while making this adjustment.

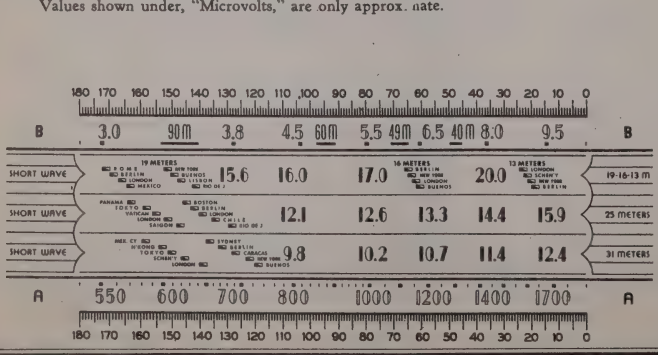
Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value to prevent the a-v-c action of the set interfering with accurate alignment.

Adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy used for alignment in any other band.

Note.—Oscillator tracks 455 kc above signal on all bands.

Values shown under, "Microvolts," are only approx. nate.



Calibration Scale

Reduced Reproduction of Receiver Dial, and Corresponding 180-0° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 150° on the calibration scale corresponds to approximately 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

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SEARS ROEBUCK CO.

MODEL 7910 Export
Chassis 126.237

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.

Calibration Scale on Variable Condenser Drive Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment when chassis is out of cabinet; therefore, a calibration scale is attached to the rear of the drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale (see "Dial Drive Drawing") must be in a vertical position when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet attach the dial pointer to the drive cable with variable condenser fully closed and pointer on last calibration mark at 550 kc end of Broadcast "A" band. The dial pointer has a spring clip for attachment to the cable.

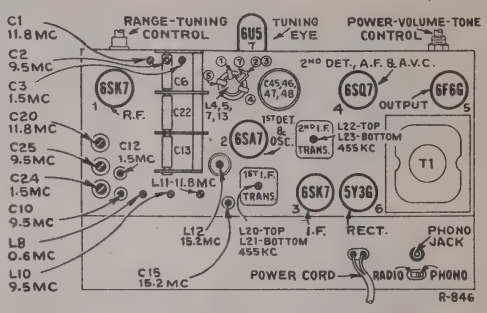

FIG. 3. TUBE, TRIMMER AND PARTS LOCATION

FIG. 4. CONTROLS

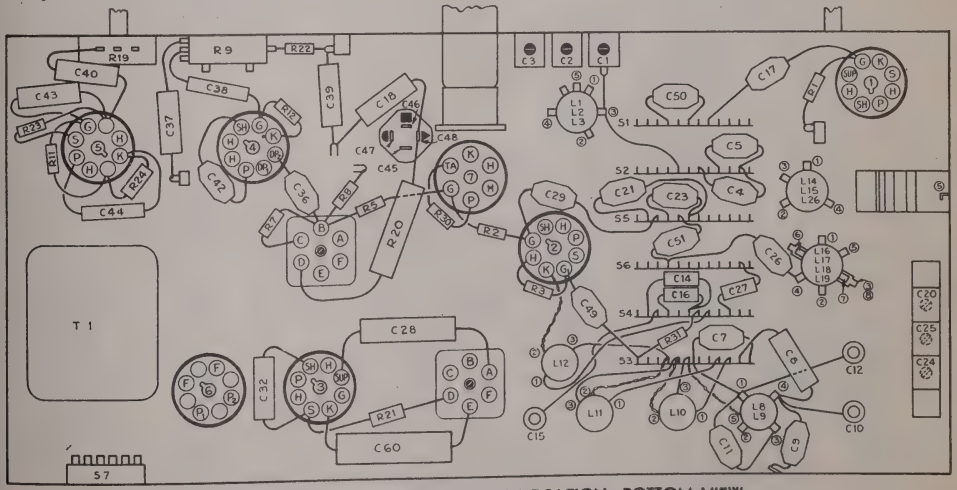

FIG. 5. TUBE, TRIMMER AND PARTS LOCATION—BOTTOM VIEW

Loudspeaker:

Type	6-inch electrodynamic
Voice Coil Impedance at 400 Cycles	3.4 ohms
Field Coil Resistance	1,060 ohms

Power Output:

Type	Pentode
Undistorted	2.5 watts
Maximum	4.5 watts

Frequency Ranges:

Standard Broadcast	540-1,720 kc (555-174 m)
Medium Wave	3,000-9,500 kc (100-31.5 m)
31 Meter Spread Band	9,500-12,500 kc (31.5-24.0 m)
25 Meter Spread Band	11,800-16,000 kc (25.5-18.8 m)
19-16-13 Meter Spread Band	15,500-22,500 kc (19.5-13.3 m)

Power Supply Rating:

105-120 volts, 25 cycle	75 watts
105-120 volts, 50-60 cycle	75 watts
105-130, 140-160, 200-250 volts, 50-60 cycle	75 watts

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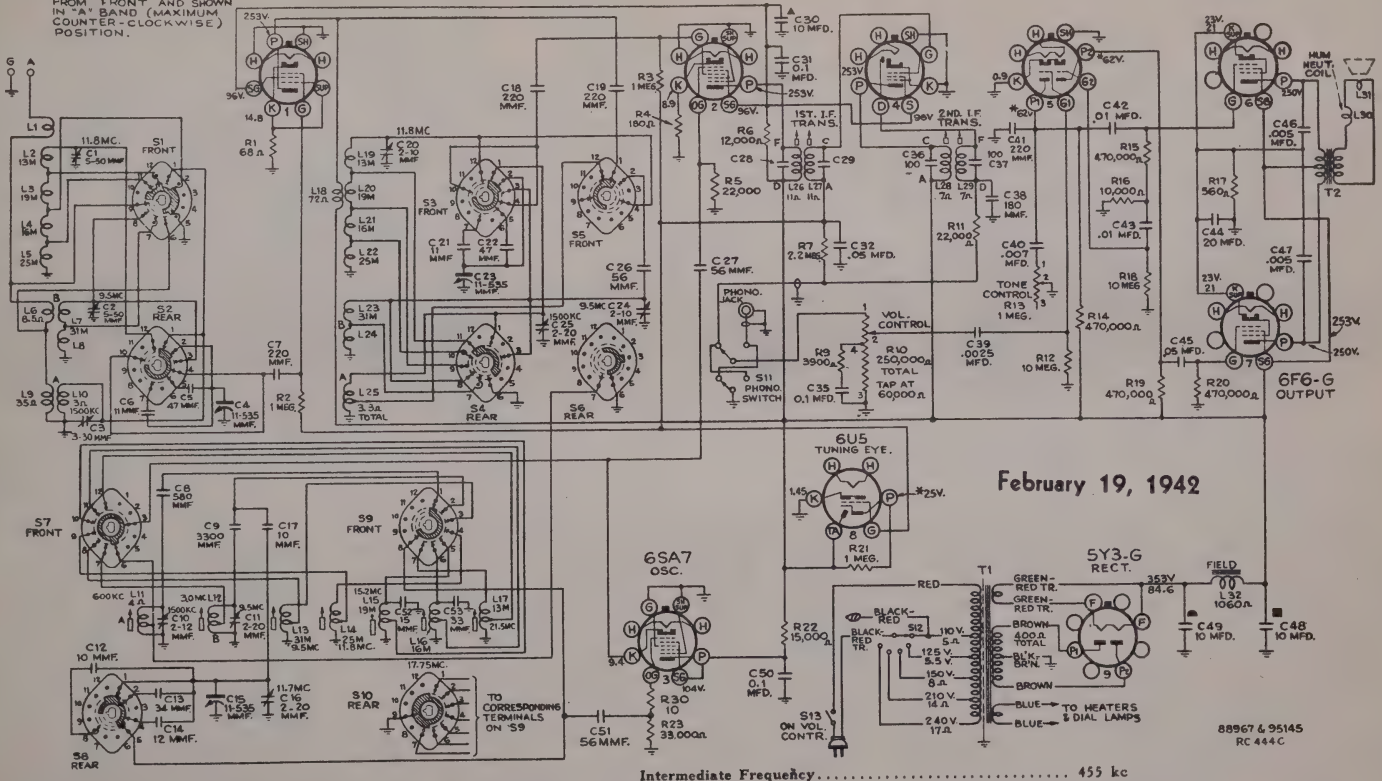
WIRING DIAGRAM FOR SILVERTONE CHASSIS—126.238



February 19, 1942

Intermediate Frequency..... 455 kc

ALL SWITCH SECTIONS ARE VIEWED FROM FRONT OF CHASSIS. SWITCHES ARE SHOWN IN EXTREME COUNTERCLOCKWISE POSITION, WHICH IS THE "A" BAND POSITION. TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMING ADJUSTMENTS. WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING VOLTAGES TO BE MEASURED WITH NO SIGNAL. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES. VOLTAGES WITH STAR (★) ARE ACTUAL OPERATING VOLTAGES IN HIGH RESISTANCE CIRCUITS MEASURED WITH ELECTRONIC VOLTMETER.

88967 & 95145
RC 444C

SEARS, ROEBUCK & CO.

MODEL 7915 Export
Chassis 126.238

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections	Across speaker voice coil
Output meter reading to indicate 1.0 watt output	1.5 volts
Approximate average sensitivity in microvolts for 1.0 watt output	See chart below
Dummy antenna value to be inserted in series with generator output	See chart below
Connection of generator output lead	See chart below
Connection of generator ground lead	To chassis
Generator modulation	30%, 400 cycles
Position of Volume Control	Fully Clockwise
Position of Tone Control	Fully Clockwise

Wave-Band Switch Position	Position of Dial Pointer	Generator Frequency	Dummy Antenna	Generator Connection	Trimmers Adjusted (In order shown)	Trimmer Function	Approximate Microvolts
A Band	Low End	455 kc	.01 mfd.	6SF7 1-F Grid	L28, L29	2nd I-F Trans.	8,400
A Band	Low End	455 kc	.01 mfd.	6SA7 1st Det. Grid	L26, L27	1st I-F Trans.	154
31M Band	9.5 mc (20°)	9.5 mc	300 ohms	Ant.	L13, C2, C24	Osc.,** Ant., Det.**	8.4
31M Band	11.7 mc (171°)	11.7 mc	300 ohms	Ant.	C16	Osc.**	
B Band	9.5 mc (180°)	9.5 mc	300 ohms	Ant.	C11	Osc.**	
B Band	3.0 mc (0°) (Rock)	3.0 mc	300 ohms	Ant.	L12	Osc.**	11.0
A Band	1,500 kc (149°)	1,500 kc	.0002 mfd.	Ant.	C10, C3, C25	Osc., Ant., Det.	4.9
A Band	600 kc (27°) (Rock)	600 kc	.0002 mfd.	Ant.	L11	Osc.	3.5
25M Band	11.8 mc (33°)	11.8 mc	300 ohms	Ant.	L14, C20, C1	Osc.,** Det.,* Ant.	8.4
19M Band	15.2 mc (37°)	15.2 mc	300 ohms	Ant.	L15	Osc.*	10.5
16M Band	17.7 mc (40°)	17.7 mc	300 ohms	Ant.	L16	Osc.***	9.8
13M Band	21.5 mc (55°)	21.5 mc	300 ohms	Ant.	L17	Osc.***	15.4

IMPORTANT ALIGNMENT NOTES

*Rock gang condenser slightly while peaking. Use maximum capacity peak if two peaks can be obtained.

**Use peak with plunger out if two peaks can be obtained.

***Use peak with plunger in if two peaks can be obtained.

Note.—Oscillator tracks above signal on "A," "B," "31M," "25M" and "19M" bands; below signal on "16M" and "13M" bands.

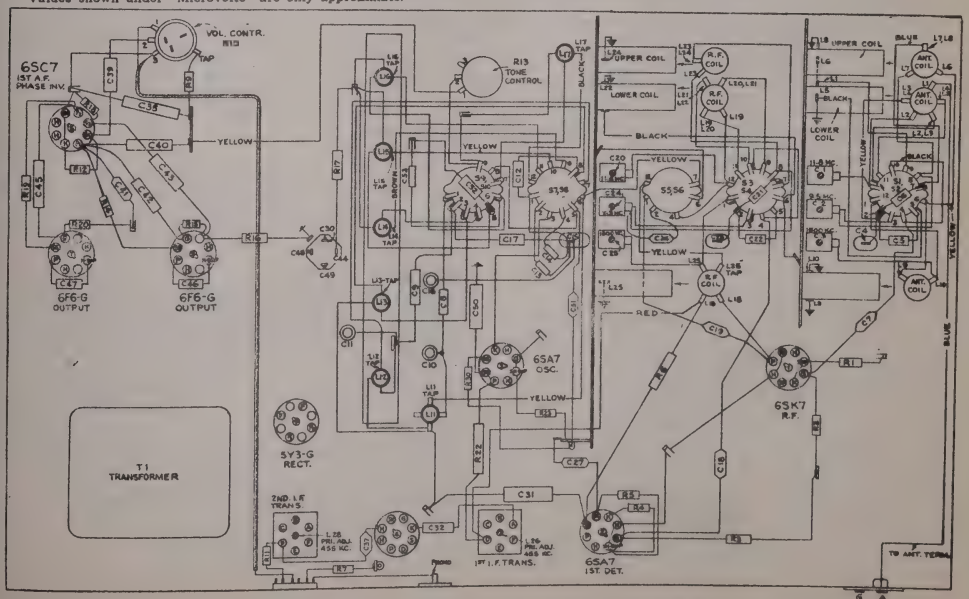
Where indicated by the word "Rock," the variable tuning condenser should be rocked back and forth a degree or two while making this adjustment.

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output of the generator at its lowest possible value to prevent the AVC action of the set from interfering with accurate alignment.

Adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy used for alignment in any other band.

Values shown under "Microvolts" are only approximate.



TUBE, TRIMMER AND PARTS LOCATION—BOTTOM VIEW

MODEL 7915 Export
Chassis 126.238

SEARS ROEBUCK CO.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "0" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

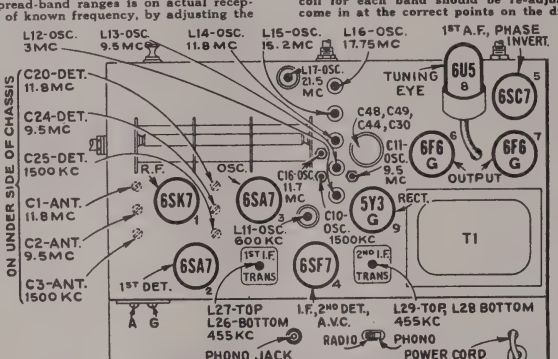
To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each band so that these stations come in at the correct points on the dial.

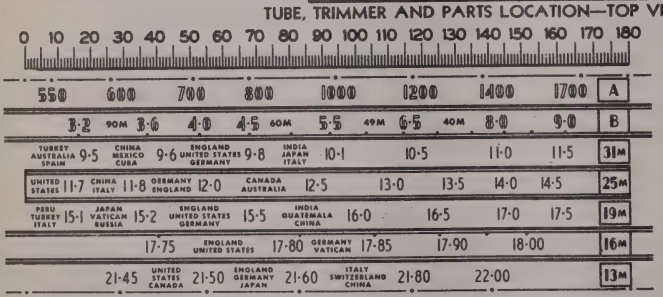
In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, or by zero-beating against standard broadcast stations.

When a test oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be re-adjusted so that the stations come in at the correct points on the dial.



TUBE, TRIMMER AND PARTS LOCATION—TOP VIEW


0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180
550 600 700 800 1000 1200 1400 1700 A
3.2 90M 3.6 4.0 4.5 60M 5.5 49M 6.5 40M 8.0 9.0 B
TURKEY AUSTRALIA SPAIN 9.5 CHINA MEXICO CUBA 9.6 ENGLAND UNITED STATES GERMANY 9.8 INDIA JAPAN ITALY 10.1 10.5 11.0 11.5 31M
UNITED STATES 11.7 CHINA ITALY 11.8 GERMANY ENGLAND 12.0 CANADA AUSTRALIA 12.5 13.0 13.5 14.0 14.5 25M
PERU TURKEY ITALY 15.1 JAPAN VATICAN RUSSIA 15.2 ENGLAND UNITED STATES GERMANY 15.5 INDIA GUATEMALA CHINA 16.0 16.5 17.0 17.5 19M
17.75 ENGLAND UNITED STATES 17.80 GERMANY VATICAN 17.85 17.90 18.00 16M
21.45 UNITED STATES CANADA 21.50 ENGLAND GERMANY JAPAN 21.60 ITALY SWITZERLAND CHINA 21.80 22.00 13M
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180

Calibration Scale

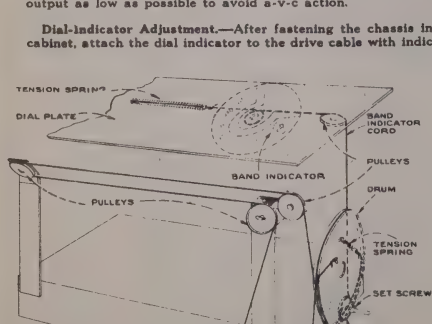
Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 27° on the calibration scale corresponds to approximately 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0" mark on the calibration scale when the plates are fully meshed.



CONDENSER AND INDICATOR DRIVE CORD

Tuning Dial:

The tuning shaft is connected through a cord drive to a drum on the condenser shaft. A second cord drives the band indicator by passing over a pulley on the band switch shaft. The complete cord drive assembly and the correct number of turns which the cord should be wrapped around the drive shaft and condenser drum, is shown in "Condenser and Indicator Drive Cord" illustration.

Loudspeaker:

Type (63K5) ..... 8-inch Electrodynamic
Voice Coil impedance ..... 2.2 ohms at 400 cycles

Power Supply:

105-120 volts, 25 cycle ..... 100 watts
105-130, 140-160, 200-250 volts, 60 cycle ..... 100 watts

Chassis Features:

Jack and Switch for Phonograph Attachment.
Magnetite-Core Adjusted I-F Transformers, and Oscillator Coils.
Automatic Volume Control.
High-Frequency Tone Control.
Aural-Compensated Volume Control.
R-F Stage on all Bands.
Spread Bands for Short Wave Reception.
Tuning Drive Ratio ..... 25 to 1

Power Output:

Type ..... Push Pull Pentode
Undistorted ..... 4.5 watts
Maximum ..... 5 watts

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SEARS ROEBUCK CO.

MODELS 8915, 8916, 8917, 8918, 8919, 8920
Chassis 138.120

TUBES AND FUNCTIONS:

1 6J7G . . . . . Input
1 6N7G . . . . . Driver
2 6L6G . . . . . Output
1 6W5G . . . . . Rectifier
1 6N7G . . . . . 3rd Stage

POWER SUPPLY: . . . . . 110-125 Volts, 50-60 cycle, AC only, 115 Watts or 6 volts DC

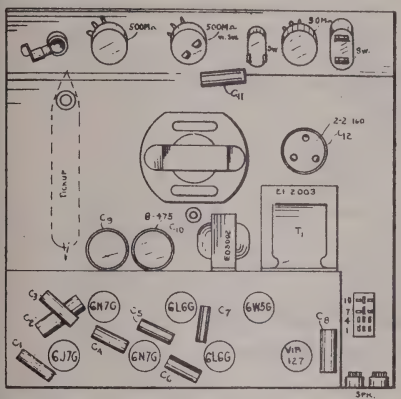
FREQUENCY CHARACTERISTICS. . . . . Curve-Substantially flat from 50 to 10,000 cycles

INPUTS:
1 input position to accomodate high impedance crystal, velocity, or no voltage velotron microphones, and one high impedance phono unit

PICKUP: - High impedance crystal type, 500M ohms

SPEAKERS: 12 inch permanent magnet type, 6 ohm voice coil. Standard equipment - Jensen type PM12C

GAIN . . . . . Approx. 124 DB

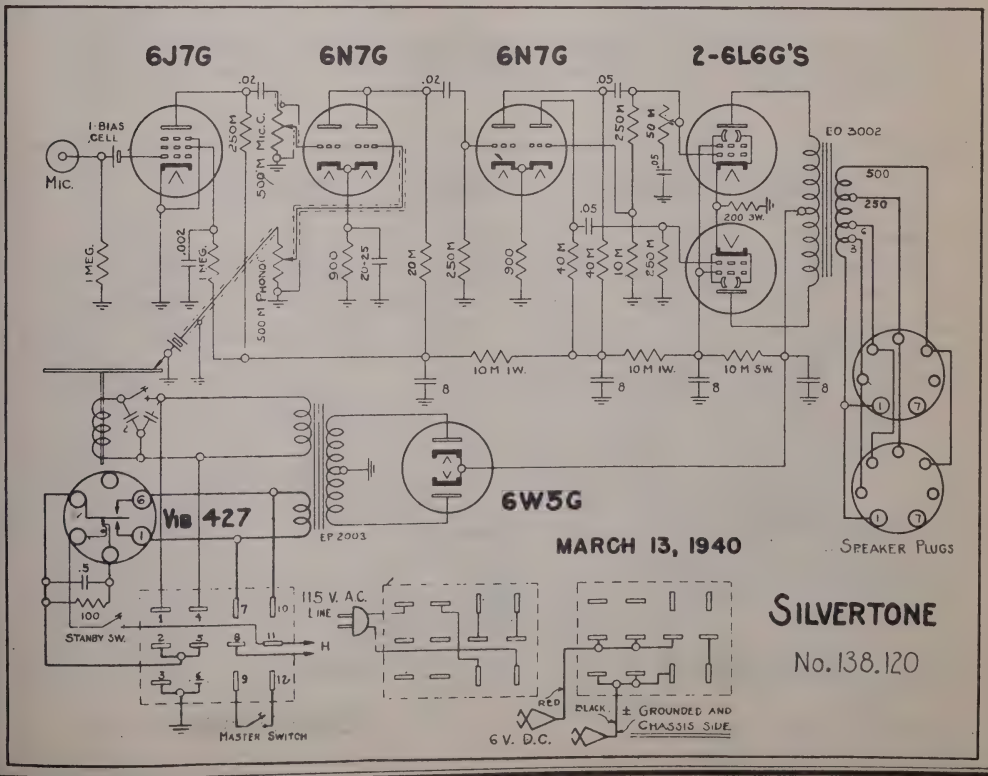


GENERAL INFORMATION AND SERVICE HINTS

This system is a combination 6 volt DC, 115 Volt 60 cycle AC system. Input is provided for one high impedance microphone. A self contained crystal pick-up and rim drive phono motor permit reproduction of recorded music.

When operated on a 6 volt storage battery the DC power is transformed to AC by means of a vibrator. AC operation is in the conventional manner.

To change from 6 volt operation it is only necessary to change from the 6 volt power cable to the AC cable. Each cable is equipped with a multi-point plug which makes proper connections when plugged into the amplifier. The 6 volt cable is equipped with two battery clips.



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MODELS 8935, 8936,
8937, 8938,
8939, 8940,
8941, 8942

SEARS, ROEBUCK & CO.

Chassis 138.180

TUBE COMPLEMENT:

2	6J7G . . . . . Input	1	5V4G . . . . . Rectifier
1	6N7G . . . . . Driver	3	6C5G . . . . . 2nd Stage
		2	6L6G . . . . . Output

POWER SUPPLY:. . . . . .110-125 volts, 50-60 cycle, AC only, 135 watts

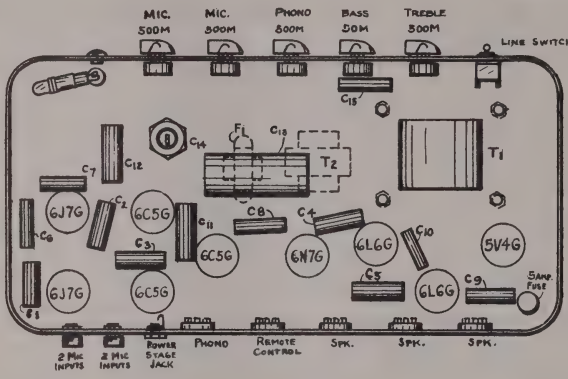
FREQUENCY CHARACTERISTICS. . .Curve-substantially flat from 50 to 10,000 cycles per second

INPUTS:
4 input positions each to accomodate high impendance crystalvelocity, or no voltage velotron microphones, and one high impedance phono unit.

PICKUP:- High impedance crystal type, 500M ohms

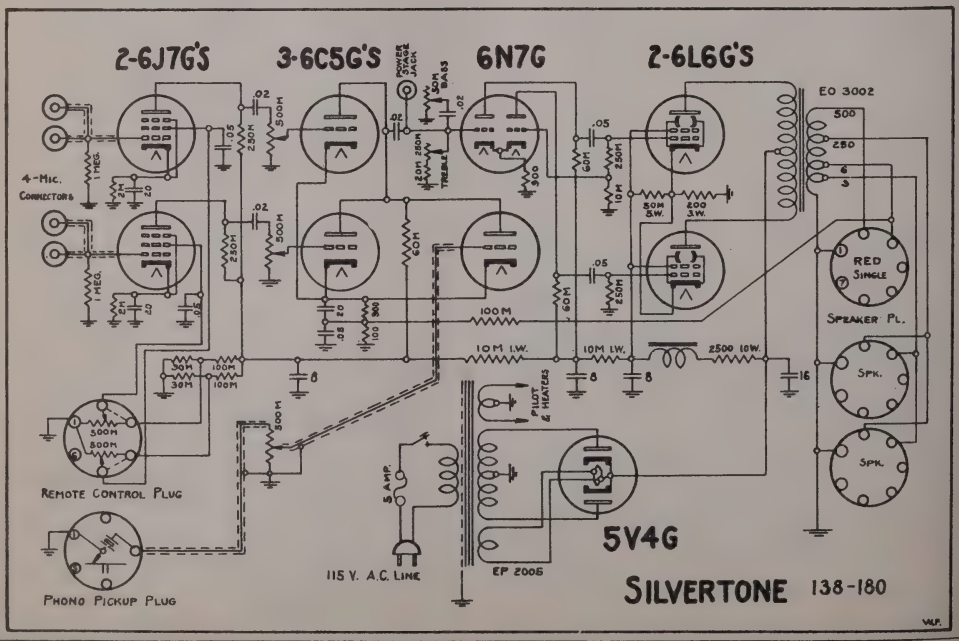
SPEAKERS: 12 inch permanent magnet type, 6 ohm voice coil. Standard equipment Jensen PM12H

GAIN:. . . . . Approximately 126 DB



MARCH 11, 1940

This unit contains a four stage amplifier having four high impedance microphone inputs feeding through 2 - 6J7G tubes which in turn feed two 6C5G's. The phono input feeds through a 6C5G, then both microphone and phono inputs feed into a 6N7G phase inverter which in turn feed 2 - 6L6G's. The rectifier is a 5V4G.



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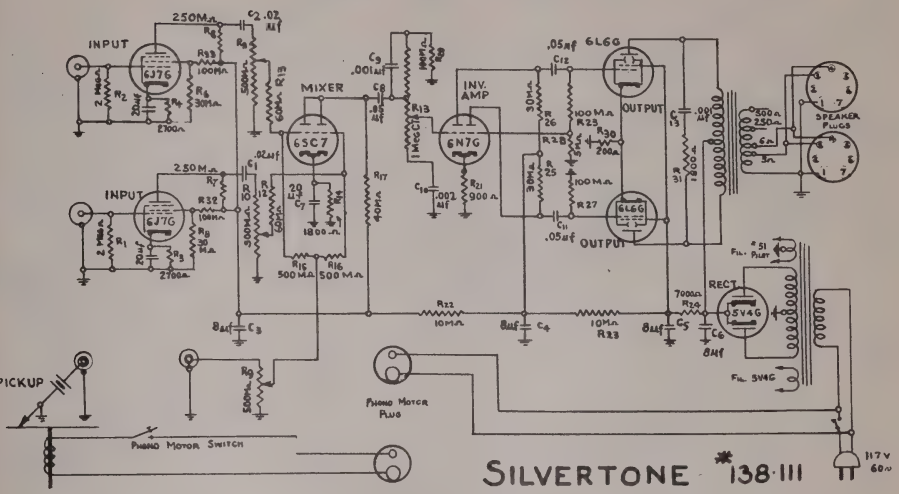
MODELS 12874, 12875
Chassis 138.007

SEARS, ROEBUCK & CO.

MODELS 12865, 12866, 12867
Chassis 138.111

22 WATT, 7 TUBE, 4 STAGE HIGH GAIN AMPLIFIER

MODELS 12865, 12866, 12867



APRIL 19, 1943

OUTPUT IMPEDANCE

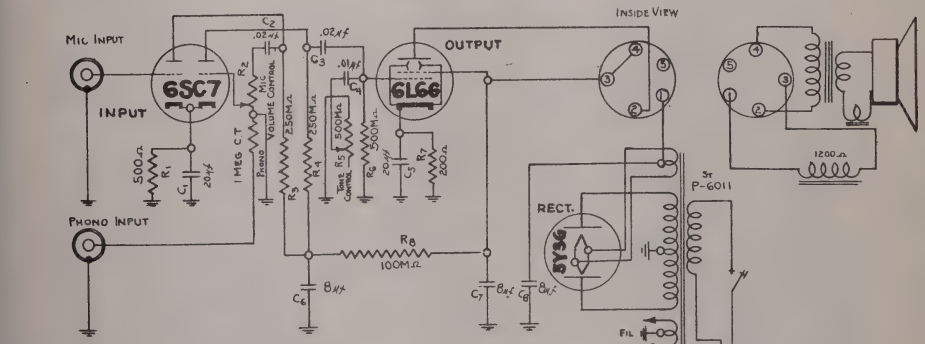
3, 6, 250 and 500 ohms

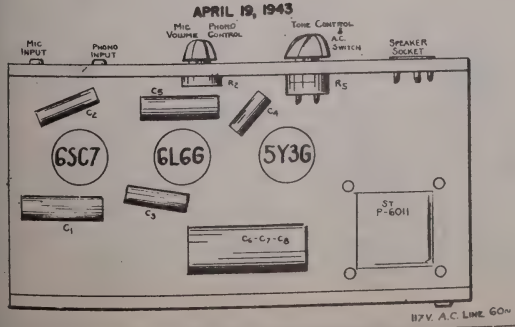
GAIN

Microphone - approx. 125 db
Phonograph - approx. 80 db

7 WATT, 3 TUBE, 2 STAGE AMPLIFIER

MODELS 12874, 12875





INPUTS

One input for crystal phono pick-up
One input for crystal or other high impedance microphone

OUTPUT IMPEDANCE

4000 ohms directly from plate of 6L6G
Field Supply for 1500 ohm speaker field

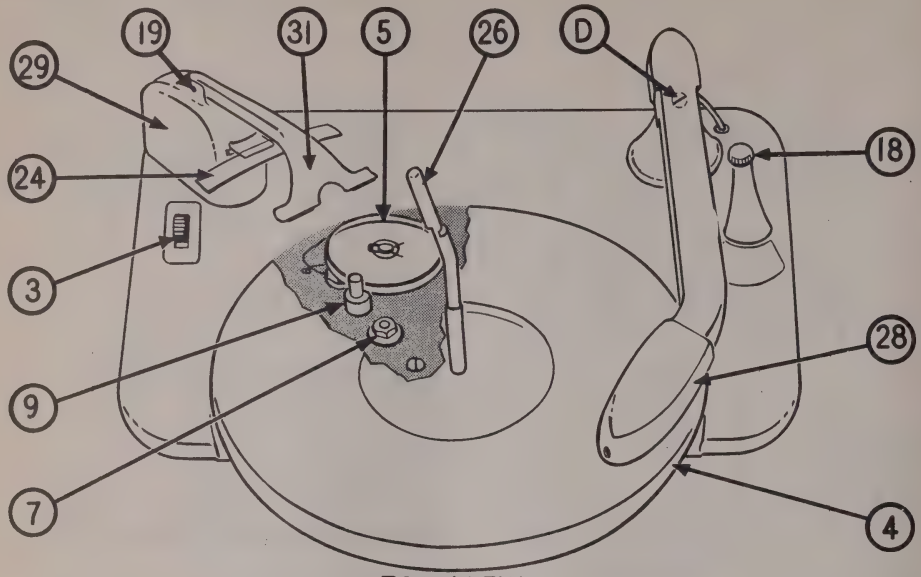
GAIN

Microphone input-approximately 110 db
Phono input-approximately 70 db

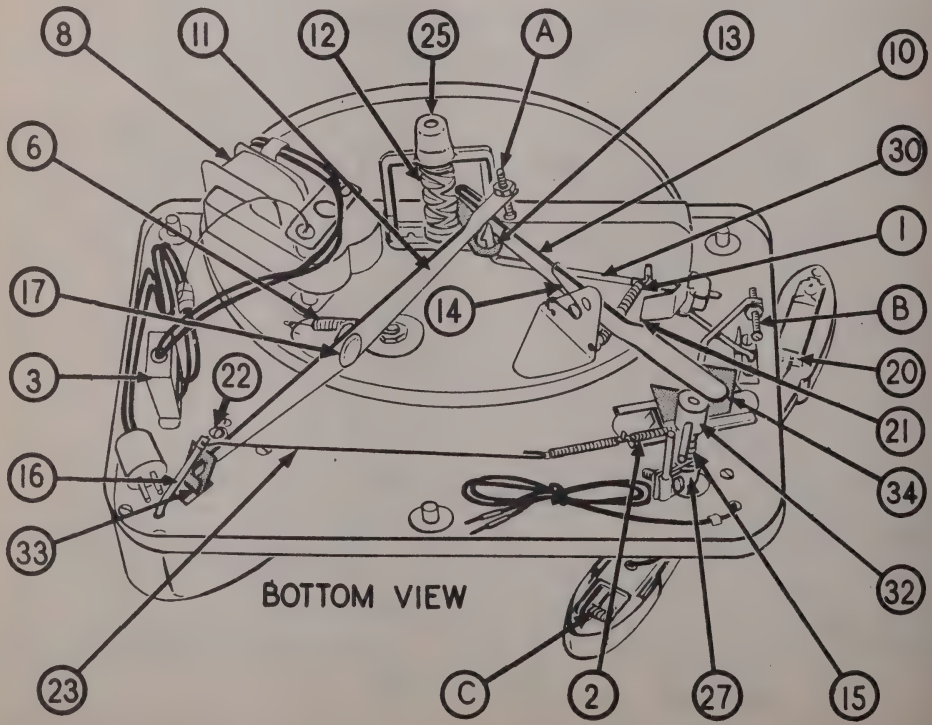
©John F. Rider

MODEL 100.301
Record Changer

SEARS, ROEBUCK & CO.



TOP VIEW



BOTTOM VIEW

©John F. Rider

©John F. Rider

APRIL 30 1942

AUTOMATIC RECORD CHANGER USED IN CONJUNCTION WITH 100.384-1 CHASSIS

FACTORY IDENTIFICATION NO. 100.301

TROUBLES & THEIR REMEDIES

1. NOISE WHILE CYCLING
This trouble is caused by the FOLLOWER ARM (10) being bent out of position. Straighten the arm.

2. TURNTABLE RUBS
Loosen set screw on WORM (12) with an Allen wrench and raise the spindle about 1/16".

3. DOES NOT CYCLE WITH REJECT BUTTON
Check to see if TRIP LINK (30) is releasing FOLLOWER (13). If TRIP LINK releases FOLLOWER but will not center on threads of WORM, bend the FOLLOWER ARM (10).

4. MOTOR SLOWS DOWN DURING CYCLING
Bend paddle end of FOLLOWER ARM (10) down slightly or loosen the EJECTOR SCREW (22) slightly.

5. RECORDS DO NOT DROP
Tighten EJECTOR SCREW (22) slightly. Always check on full stack of 10-12" records. Set screw so that bottom record just falls.

6. RECORD DROPS ON TONE ARM
Bend back end of FOLLOWER ARM (10) up slightly. Make sure EJECTOR SCREW (22) is adjusted properly.

7. MECHANISM KEEPS REPEATING ON TOP OF WORM
Bend TRIP LINK (30) back slightly so as to loosen the TRIP SPRING (Diagram No. 1) tension on FOLLOWER (13). It may be necessary to first loosen the set screw on the TRIP. If this does not correct the trouble, check the FOLLOWER ARM (10) to make sure it is straight and bend slightly if necessary.

8. MECHANISM KEEPS REPEATING ON BOTTOM OF WORM
This indicates a bent FOLLOWER ARM (10). Straighten arm.

9. FOLLOWER FLUTTERS WHILE PLAYING
Check to see if FOLLOWER ARM (10) is all the way up to top of WORM (12), if not, bend arm slightly in toward WORM to stop binding.

10. FOLLOWER ARM BINDS
Bend FOLLOWER ARM away from fulcrum at both sides of rivet.

11. FOLLOWER JAMS

Bend FOLLOWER ARM to straighten.

12. TONE ARM DOES NOT LAND AT BEGINNING OF RECORD OR MISSES RECORD ENTIRELY
Check EJECTOR to see if it is set for correct size of record. If EJECTOR is set for correct record size, the SET DOWN POSITION ADJUSTMENT should be loosened and the position of the TONE ARM adjusted as described under "TONE ARM SET-DOWN POSITION ADJUSTMENT."

13. TONE ARM DOES NOT GO INTO CYCLE AT END OF RECORD
Check to see if record has spiral finishing groove. If it has not, reject record by means of REJECT BUTTON. If trouble lies with mechanism, adjust screw "B" as described under "TONE ARM TRIP POSITION ADJUSTMENT."

14. RECORDS WEAR EXCESSIVELY
Check needle to see if worn out or defective. If needle is not cause of wear, lift the tone arm and increase the tension of the spring at the base as described under "NEEDLE PRESSURE ADJUSTMENT."

15. TONE ARM SLIPS OUT OF RECORD GROOVES OR SLIDES ACROSS RECORD
This is usually due to insufficient needle pressure. The needle pressure may be increased by loosening the spring tension at the base of the tone arm as described under "NEEDLE PRESSURE ADJUSTMENT."

16. TONE ARM SLIDES ACROSS TOP RECORD OF STACK
This is due to the tone arm having insufficient height to clear the top record on the turntable. This can be remedied by raising the tone arm height by means of the "TONE ARM HEIGHT ADJUSTMENT 'D'."

17. "WOW" IN RECORD REPRODUCTION
This is usually due to worn rubber rim on the idler wheel. If this is the case, replace the idler wheel.

DESCRIPTION OF CYCLE

To start the cycle on models with a switch on the base plate or on the radio control panel, turn on the switch and press down on the TONE ARM. This depresses the REJECT BUTTON (#18 on Diagram) on top of the rest post, which in turn through TRIP LINK (30) engages the FOLLOWER (13), starting the cycle.

When FOLLOWER (13) engages in WORM (12), FOLLOWER ARM (10) is pivoted at the pivot, lifting CRANK (32) which raises TONE ARM. CRANK (32) is fastened to the lift pin. As this rises and strikes the incline at the angular upper end of the INDEX PLATE (34), it causes a rotation of the CRANK (32) which in turn contacts the CRANK PIN (27) fastened to the TONE ARM shaft and swings the TONE ARM inward until the CRANK (32) strikes INDEX PLATE (34). Then as the FOLLOWER (13) returns to its starting position, the CRANK (32) drops, setting the TONE ARM on the record.

The set down position for 10" or 12" records is automatically controlled when the ejector is positioned so that the edge of the 10" or 12" records rest on the support bracket. The RECORD EJECTOR (24) can be set in the 10" or 12" position by merely slightly lifting it and pulling or pushing it in or out until the 10" or 12" numbers show at the edge of the opening in the housing.

ADJUSTMENTS

All adjustments can be made with record changer disconnected from the power outlet.

TONE ARM SET-DOWN POSITION ADJUSTMENT: To adjust the set-down position of the tone arm, trip the reject button and turn the turntable by hand in a clockwise direction until the CRANK (Diagram No. 32) strikes the INDEX PLATE (Diagram No. 34) and the TONE ARM starts downward toward the record. Loosen the screw on #27 and, holding the CRANK in contact with the lower portion of the INDEX PLATE, move the TONE ARM until it is directly above a point 1/8" in from the outside of a record of the size indicated on the EJECTOR SLIDE (24). Retighten the screw and carry the mechanism through the remainder of the cycle.

EJECTOR ARM SETTING (A): The adjustment of screw "A" determines the point in the cycle in which the next record falls. Turning the screw clockwise causes record falling to be delayed, while turning the screw counter-clockwise causes the records to fall earlier in the cycle. This screw should be adjusted using a 12 inch record in the 12 inch position. Adjust the screw so that the record falls when the tone arm has moved to its extreme outside position in the change cycle. Tighten the locking nut after the adjustment has been made.

TONE ARM TRIP POSITION ADJUSTMENT (B): The trip position is adjusted by screw "B". For proper operation the screw should be adjusted to trip the mechanism at the eccentric finishing groove on a record. This will assure satisfactory operation for the majority of records in use. Turning the screw clockwise will cause earlier tripping of the mechanism; turning counter-clockwise will delay the tripping. Tighten the locking nut on the screw when the correct adjustment has been obtained.

NEEDLE PRESSURE ADJUSTMENT (C): To increase the weight on the needle, should it jump grooves or slide across the grooves too easily, lift the tone arm, and relieve the spring tension by releasing the small sprocket wheel a quarter turn at a time. On the other hand, should the records and needle wear too fast, increase the spring tension with the sprocket to decrease the needle pressure.

TONE ARM HEIGHT ADJUSTMENT (D): The height to which the tone arm rises during the change cycle is governed by the adjustment of the screw under the tone arm on the top of the tone arm post. Turning this screw clockwise will lower the height to which the tone arm rises and vice versa. The proper adjustment may be made by placing 12 ten inch records on the turntable and adjusting the screw to the point where the tone arm clears the top record during the change cycle.

EJECTOR SETTING: The small screw, (Diagram No. 22), makes two adjustments: It varies the tension of the spring used on the EJECTOR mechanism (24); and it also moves the stationary position of the EJECTOR with respect to the rest of the mechanism. To lower the spring tension on the EJECTOR, loosen the lock nut on the screw and turn the screw counter-clockwise. Turning the screw counter-clockwise also moves the EJECTOR farther away from the SPINDLE. Turning the screw clockwise increases the tension of the EJECTOR spring and also moves the EJECTOR closer to the SPINDLE.

The correct adjustment of the screw may be obtained as follows:

Set the EJECTOR for 12" records and place ten 12" records on the spindle. Turn the turntable by hand and observe record dropping. The screw should be adjusted so that the bottom record just falls. The screw is correctly set when almost entirely in the "out" position. The spring tension on the EJECTOR is then relatively small and stalling of the motor is less likely to occur.

NOTE: After adjusting this screw, check the adjustment of "A". Remember to tighten the locking nut after adjusting a screw.

MODEL 101.202
Record Changer

SEARS ROEBUCK CO.

SILVERTONE

RADIO REPAIR PARTS PRICE LIST AND SERVICE INSTRUCTIONS

AUTOMATIC RECORD CHANGER AND HOME RECORDER UNIT

FACTORY IDENTIFICATION NO. 101.202

Authorized Replacement Parts for this model may be obtained from any Sears, Roebuck and Co. Retail Store or Mail Order branch. Always give part numbers and the chassis identification number.

The following description should help greatly in analyzing the cause of any mechanical trouble that may be encountered. The reference numbers serve to identify parts shown on the accompanying photographs.

AUTOMATIC CHANGING CYCLE

After the RECORDS have been arranged in the desired order, move the MOVABLE RECORD SUPPORT (24) to the proper position. The FRICTION SPRING (38) will hold it in position. Load the RECORDS on the SPINDLE (2) and bring the HOLD DOWN FINGER (26) to rest on the top RECORD. Move the CONTROL BUTTON (16) to the REJ position and release. It will be returned to the AUT position by the INDEX SPRING ASSEMBLY (39) acting against the CONTROL LEVER ASSEMBLY (15). These operations will have started the TURNTABLE (1) rotating and tripped MECHANISM. The STUD in the CONTROL LEVER (15) has contacted and rotated the AUTO TRIP LEVER (13) until the STUD in the AUTO TRIP LEVER (13) is released from the NOTCH in the AUTO TRIP CAM (31).

Then the DRIVE WHEEL CARRIER LEVER (12) rotates on STUD (40), being pulled by the SPRING (34) until the DRIVE WHEEL (27) contacts the inside of the RIM of the TURNTABLE (1). The SPRING (34) maintains this contact during the change cycle. The rotating TURNTABLE (1) now drives the DRIVE WHEEL (27) to which is attached at the lower end of the SMALL SHAFT the FRICTION DRIVE PULLEY (28). This rotary motion is transmitted through the INTERMEDIATE DRIVE WHEEL AND PINION ASSEMBLY (29) to the MAIN CAM ASSEMBLY (30) causing it to rotate. The TONE ARM (6) is first lifted vertically, through the LIFT PIN (8), then swings outward and is held there until after the RECORD has dropped onto the TURNTABLE (1).

The feeding of the RECORDS is as follows: The ROLLER mounted on the FEED LEVER (17) rides against the WALL on the BOTTOM SIDE of the MAIN CAM (30), pulled by the SPRING (36). This WALL RECEDES at the proper time and allows the SPRING (36) to rotate the FEED LEVER (17), which is pivoted on the ALIGNING BRACKET (20). The opposite end of the FEED LEVER (17) is connected to the INTERMEDIATE FEED LEVER (18), which pivots in the FEED SUPPORT (23).

The upper end of the INTERMEDIATE FEED LEVER (18) engages a ROUND HOLE in the FEED FINGER (19) so that the motion being transmitted can be effective for either 10 INCH or 12 INCH RECORDS. As this FEED FINGER (19) slides forward, it contacts the BOTTOM RECORD of the stack. Only the BOTTOM RECORD has clearance between the bottom of the CAP (3) and the LEDGE of the SPINDLE (2). It is carried forward until it drops from the LEDGE onto the TURNTABLE (1). Now, of course, the next RECORD comes down to rest on the SPINDLE (2).

The MAIN CAM (30) continues its rotation and resets the feed mechanism, pulling the FEED FINGER (19) back to its original position. Also the TONE ARM (6) is swung back to a position over the EDGE of the RECORD. This is done by the WALL on the TOP SIDE of the CAM (30) and later by the LEAF SPRING (41) working against the PIN in the SWEEP LEVER (9), which is clamped to the SLEEVE (7). This SLEEVE (7) extends up through the MOTORBOARD (42) to the TONE ARM (6).

The purpose of the LEAF SPRING (41) is to provide a FLEXIBLE MEMBER which will thrust the PIN in the SWEEP LEVER (9) against the STOP LEVER (11) but, nevertheless, allow PIN to stop against whichever STEP has been set up.

The SELECTION of the proper STEP on the STOP LEVER (11) is the means of automatically bringing the NEEDLE down on the EDGE of the RECORD to be played. The STOP LEVER (11) pivots on a stud attached to the MOTORBOARD (42). The opposite end of the STOP LEVER (11) rests against the STOP SELECTOR ROD (22) for 12 INCH RECORDS and against the STOP SELECTOR DOG (21), attached to the STOP SELECTOR ROD (22), for 10 INCH RECORDS.

The STOP SELECTOR ROD (22) extends upward through the MOTORBOARD (42) and FEEDER SUPPORT (23) to connect with a SWIVEL in the MOVABLE RECORD SUPPORT (24). Thus the DROP POINT for the NEEDLE is SET AUTOMATICALLY when the MOVABLE RECORD SUPPORT (24) IS POSITIONED, for the proper size RECORD.

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As the MAIN CAM (30) continues its rotation the PULL IN SPRING (33), attached to the SWEEP LEVER (9), holds the PIN against the STOP LEVER (11), while the LEAF SPRING (41) moves clear of the PIN. During this cam movement the TONE ARM (6) is lowered slowly until the NEEDLE rests on the EDGE of the RECORD.

As the MAIN CAM (30) nears HOME POSITION the ROLLER on the FEED LEVER (17) rolls over a PEAK on the CAM WALL and at this moment the NOTCH in the AUTO TRIP CAM (31) pulls against the STUD in the AUTO TRIP LEVER (13), rotating the DRIVE WHEEL CARRIER LEVER (12) and disengaging the DRIVE WHEEL (27) from the RIM of the TURNTABLE (1).

The engagement of the STUD in the AUTO TRIP LEVER (13) with the NOTCH in the AUTO TRIP CAM (31) is maintained by the TRIP LEVER SPRING (37).

At this time the SPRING (36)performs a HOMING function, that is, it pulls the ROLLER on the FEED LEVER (17) down the SLOPE on the CAM WALL into the HOMING NOTCH, holding, the MECHANISM in proper position and adding a little clearance between the DRIVE WHEEL (27) and the TURNTABLE (1). During the last movement of the CAM(30) the PROJECTION ON THE CAM (30) engages the bent down EAR on the STOP LEVER (11) rotating the STOP LEVER (11) out of range of the PIN in the SWEEP LEVER (9) allowing the TONE ARM (6) to move freely across the RECORD. If the EDGE of the RECORD has a STARTING SPIRAL the NEEDLE will be LEAD into the MUSIC GROOVES. If the EDGE of the RECORD is SMOOTH the PULL IN SPRING (33) will PULL the NEEDLE into the MUSIC GROOVES.

The SLEEVE (4) on the SPINDLE (2) reduces to a MINIMUM the FRICTION of the RECORDS rubbing against the SPINDLE (2). The downward load of the TURNTABLE (1) and RECORDS is carried on the THRUST BEARING (5).

There are TWO AUTOMATIC means of TRIPPING the MECHANISM besides the REJ position of the CONTROL BUTTON (16) described previously.

The POSITIVE TRIP operates as follows: The TONE ARM (6) moving in toward the SPINDLE (2) carries with it the SWEEP LEVER (9), which contacts the HEAD of the POSITIVE TRIP SCREW (32) mounted in the AUTO TRIP LEVER (13). Thus the AUTO TRIP LEVER (13) is rotated until the STUD is released from the NOTCH in the AUTO TRIP CAM (31).

The RATCHET TRIP operates as follows: As the TONE ARM (6) moves across the RECORD the TOOTHED EDGE of the SWEEP LEVER (9) rides against the PAWL (14) mounted on the AUTO TRIP LEVER (13). When the NEEDLE follows into the ECCENTRIC GROOVE an OSCILLATING movement is imparted to the SWEEP LEVER (9). During the OUTWARD movement the TEETH in the EDGE of the SWEEP LEVER (9) catch on the PAWL (14), causing it to STAND UP, rotating the AUTO TRIP LEVER (13) and releasing the STUD from the NOTCH in the AUTO TRIP CAM (31).

THE AUTOMATIC LOCKOUT MECHANISM

When making a RECORDING or when playing RECORDS MANUALLY the AUTOMATIC LOCKOUT LEVER (44) when depressed at the end marked "R" interferes with the CONTROL LEVER (15) so that it cannot be moved into AUT or REJ position. Also an INTERFERENCE or LOCKED condition is maintained between the end of the CONTROL LEVER (15) and the STUD near the outer end of the DRIVE WHEEL CARRIER LEVER (12) so that the CARRIER LEVER (12) CANNOT ROTATE even though the STUD in the AUTO TRIP LEVER (13) is swung out of the NOTCH in the AUTO TRIP CAM (31).

THE AUTOMATIC FEED FOR THE CUTTER ARM

The TURNTABLE HUB (45) acting as a PULLEY drives the RUBBER TIRE WHEEL (46). To this WHEEL (46) is attached the PINION (47) which drives the GEAR (48). The Pinion (49) is attached to Gear (48) and drives the GEAR (50). Attached to the GEAR (50) is the DRIVE PULLEY (51) which drives the RUBBER COVERED SECTOR (52). As the CUTTER ARM (54) is brought into the EDGE of the RECORDING BLANK the SECTOR (52) engages the DRIVE PULLEY (51) and the STYLUS is then FED across the RECORD, cutting about 110 LINES PER INCH. The STYLUS will continue its inward travel until a distance from the SPINDLE (2) of about 1 5/8 inches is reached. The CUTTER ARM should then be lifted and can be pulled back toward its rest, overcoming the FRICTION of the SECTOR (52) against the DRIVE PULLEY (51) in doing this.

ADJUSTMENT OF THE RECORDER FEED MECHANISM

The positions of the three STUDS (55, 56 and 57) have been very carefully set at the factory and should not require any adjustment. However, if it is certain that the position of one or more of these studs has shifted, proceed as follows: Remove the TURNTABLE (1) and loosen the THREE NUTS (58) on the bottom of the MOTORBOARD (42). Remove the GEAR & PINION ASSEMBLY (48-49). Tighten the NUT (58) on STUD (55) very slightly until the STUD (55) will hold its position definitely, but can be shifted readily by light blows on the sides of the NUT (58).

HOLD THE TURNTABLE (1) LEVEL AND ROTATE TO AND FRO AS IT IS LOWERED. THIS WILL ALLOW THE HUB (45) TO ROLL INTO ENGAGEMENT WITH THE DRIVE WHEEL (46). Move the STUD (55) a little at a time until DEFINITE, but NOT EXCESSIVE FRICTION is established between the rubber tire of DRIVE WHEEL (46) and the TURNTABLE HUB (45).

The friction can be tested by taking a long pencil and holding the ERASER against the DRIVE WHEEL TIRE (46) while rotating the TURNTABLE (1) slowly by hand. The FORCE thus applied against the PENCIL ERASER should seem CONSIDERABLE although the friction should not be great enough to SLOW DOWN the TURNTA SPEED.

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The next step, with the TURNTABLE (1) removed, is to adjust the STUD (57). The NUT (58) on this STUD (57) should be tightened slightly as described before and the STUD (57) should be moved as previously mentioned, a little at a time, until a DEFINITE but NOT EXCESSIVE FRICTION is established between the DRIVE PULLEY (51) and the SECTOR (52). This adjustment can be tested as follows: By swinging the CUTTER ARM (54) to and fro the SECTOR (52) should SPIN the GEAR & DRIVE PULLEY (50-51) EASILY when they are not held. Now, when the GEAR (50) is held there should be CONSIDERABLE DRAG of the SECTOR (52) against the DRIVE PULLEY (51) when the CUTTER ARM (54) is swung to and fro as before.

The GEAR & PINION ASSEMBLY (48-49) should now be replaced on STUD (56). The STUD (56) should be shifted a little at a time, as before stated, until a fairly close mesh of the gear teeth is attained at all points (47-48) and (49-50). The GEARS AND PINIONS MUST NOT BIND AT ANY POINT however. After this setting has been established, carefully tighten all three NUTS (58).

A final check of these adjustments can be made with a testing recording, to see whether a proper spacing of the grooves is being maintained. Speed can be checked by means of a standard STROBOSCOPE disc for 78 RPM turntables. The speed check to be made while STYLUS IS CUTTING.

ELEVATION OF THE CUTTER ARM

The elevation of the CUTTER ARM (54) has been set at the factory and should not need any adjustment. The procedure is very simple in case it should become necessary, however. The ELEVATION ADJUSTING SCREW is turned COUNTER CLOCKWISE to RAISE and CLOCKWISE to LOWER the CUTTER ARM (54). (This screw can be seen in the CUTTER ARM BRACKET (53) when the CUTTER ARM (54) is raised). The NUT is used to lock the ELEVATION ADJUSTING SCREW in place after making adjustment. The LOWER EDGE of the CUTTER ARM (54) should be PARALLEL with the TOP SURFACE of a SINGLE RECORDING DISC laying on the TURNTABLE.

ADJUSTMENTS OF THE CHANGER MECHANISM

If the RUBBER DRIVE PULLEY (28) does not have enough friction against the INTERMEDIATE DRIVE WHEEL (29), the mechanism may not be driven through the complete cycle. Also, the slipping that will occur in this case will soon wear a groove in the RUBBER PULLEY (28) requiring early replacement of the part. The friction can be increased by loosening the BOTTOM of the two NUTS (43), running both NUTS (43) up a little tighter against the RUBBER PULLEY (28) and then locking the two NUTS (43). Too much friction of the PULLEY (28) against the INTER. DRIVE WHEEL (29) may cause the TRIPPING of the mechanism to be SLUGGISH. Also the MAIN CAM (30) may NOT pull HOME.

If the RECORD SUPPORTS (24-25) get damaged, the RECORDS MAY NOT REST EVENLY on all BUTTONS. In this case the RECORD SUPPORTS (24-25) should be straightened until the TOP SURFACES OF ALL BUTTONS are the same VERTICAL DISTANCE from the MOTORBOARD (42). Care must be taken to see that the BUTTONS on the MOVABLE RECORD SUPPORT (24) are correct for BOTH 10 INCH and 12 INCH positions.

If the TONE ARM (6) has been strained out of position, it can be reset as follows: Loosen the SCREW (10) in the SWEEP LEVER (9) just enough to allow a reasonable amount of friction between the SWEEP LEVER (9) and the SLEEVE (7). Then by holding the SWEEP LEVER (9) and moving the TONE ARM (6) the estimated correct amount, the new setting can be tested as follows: Trip the mechanism (WITH POWER OFF), by moving the CONTROL BUTTON (16) to REJ and release. Then rotate the TURNTABLE (1) by hand until the NEEDLE is coming down and is about 1/16 inch above the record. IF THE NEEDLE IS NOT ABOUT 1/8 INCH inside the EDGE of the RECORD, the correction can be made with the CAM (30) in this position. Very carefully, hold the PIN in the SWEEP LEVER (9) against the STOP LEVER (11) and move the TONE ARM (6) to the proper position (NEEDLE 1/8 INCH INSIDE EDGE OF RECORD). BE SURE THE MOVABLE RECORD SUPPORT (24) IS SET FOR THE SIZE RECORD THAT IS ON THE TURNTABLE (1). Make certain that about 1/64 INCH END PLAY IS MAINTAINED AT THE TONE ARM PIVOT SLEEVE (7) before tightening the CLAMP SCREW (10) on the SWEEP LEVER (9).

The ELEVATION of the TONE ARM (6) can be adjusted as follows: Remove the LIFT PIN (8) and STRAIGHTEN THE BEND of the PIN (8) slightly to RAISE the TONE ARM (6). To LOWER the TONE ARM (6) the LIFT PIN (8) should be BENT more nearly to the shape of a RIGHT ANGLE. The amount of bending to be slight until the PIN (8) is tried again. BE CAREFUL NOT TO KINK THE LONG LEG OF THE PIN (8). THERE IS DANGER OF CAUSING A BIND IN THE SLEEVE (7).

The POSITIVE TRIP SCREW (32) should be turned COUNTER-CLOCKWISE for an EARLIER TRIP and CLOCKWISE for a LATER TRIP.

LUBRICATION

The THRUST BEARING (5) may be lubricated with a LIGHT GREASE. Any of the other bearings may be lubricated with a GOOD QUALITY LIGHT OIL. DO NOT ALLOW ANY LUBRICANT TO COME IN CONTACT WITH ANY RUBBER PART OR, WITH ANY FRICTION DRIVE PART EITHER RUBBER OR OTHER MATERIAL.

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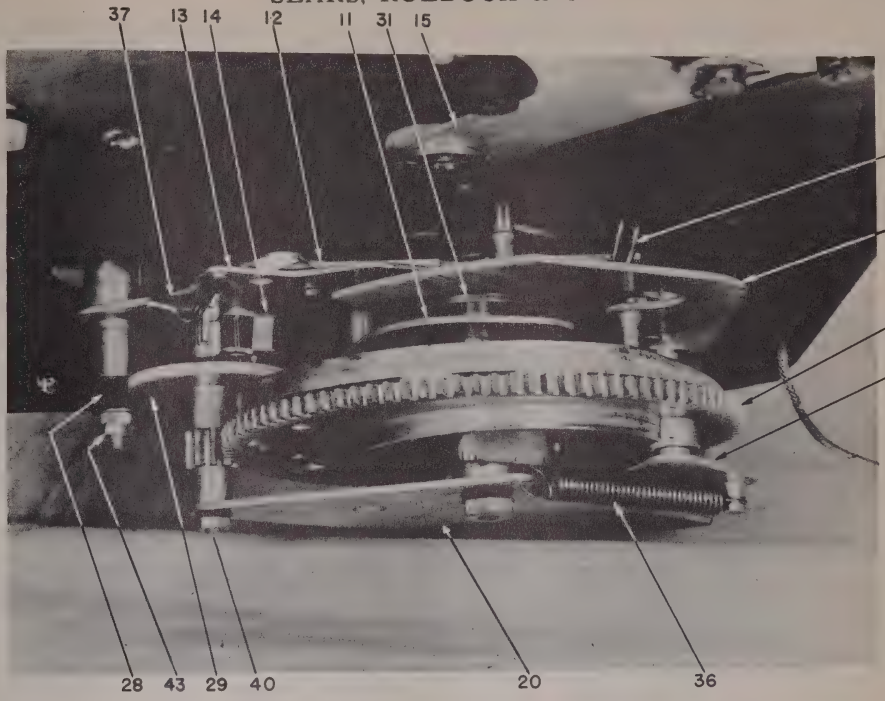

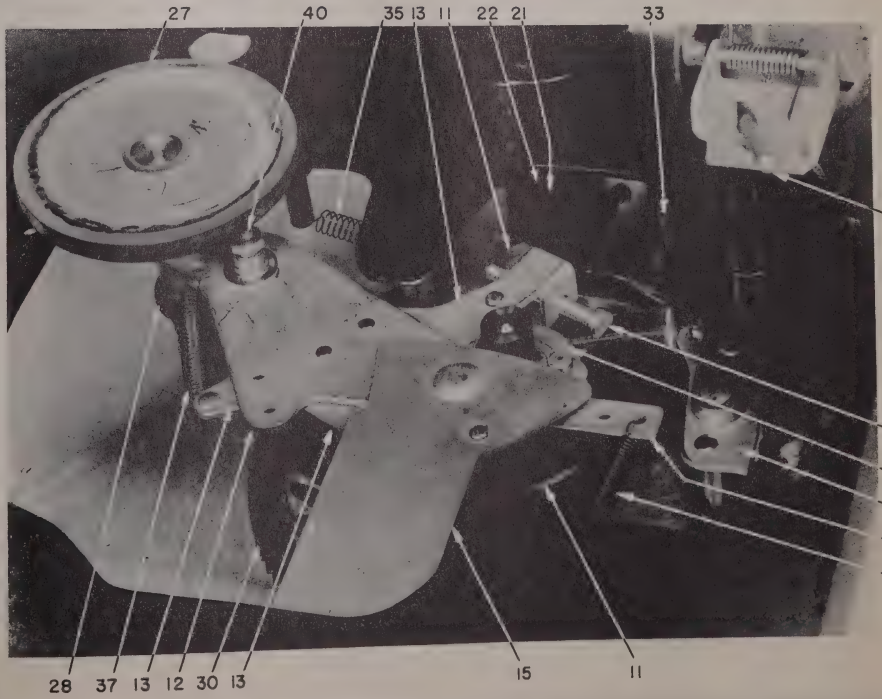

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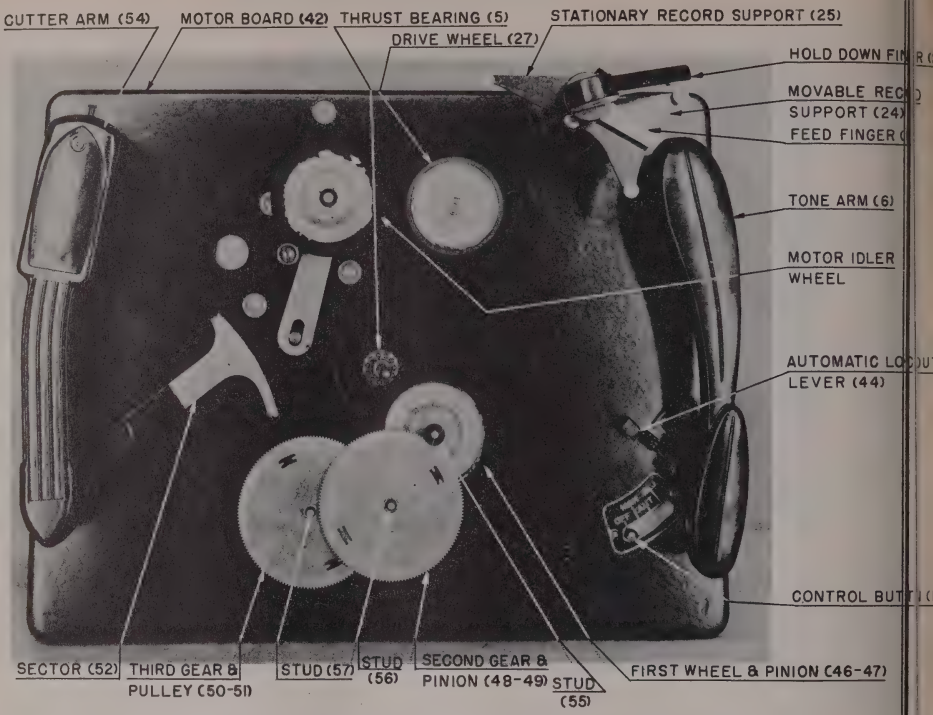

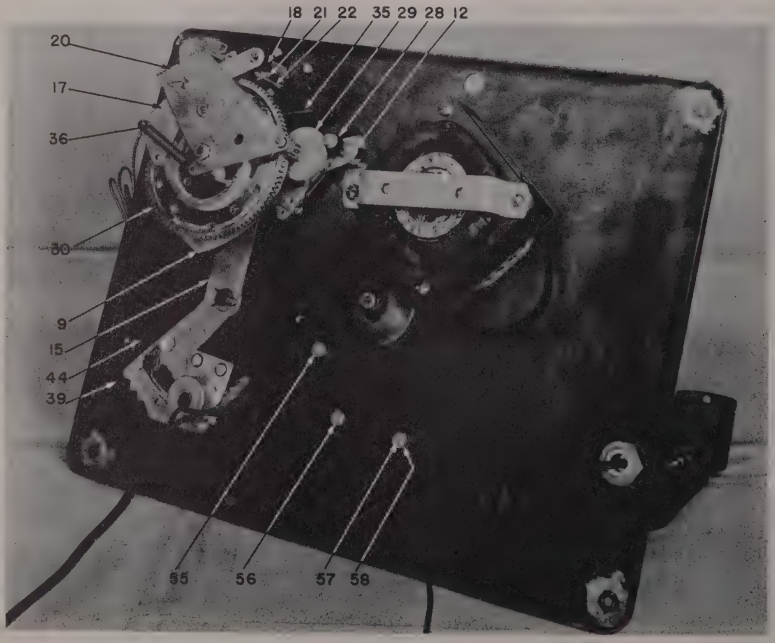

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MODELS 101.605, 101.606
Recorder

101.605 differs from 101.606 in the pickup cartridge used. 101.605 uses part No. R46346 cartridge. 101.606 uses part No. R47584 cartridge.

All of the recorder mechanism is above the base plate so that in most cases it is not necessary to remove the unit from the cabinet to make any operating adjustments required.

Alphabetically arranged index letters are used in the illustrations. Parts with prefixed letter "E" will be found in the illustration of the top of the unit. Parts with the prefix letter "F" will be found in the illustration of the bottom of the unit. Adjustments that may be required are described in the following paragraphs.

First remove the turntable and inspect gears and drive discs for imperfect mesh or worn gear teeth. It will be found desirable to use a gauge which just fits the turntable shaft and has a diameter of 1.000 to 0.995. This gauge should be placed in position, or the distance from the center of the shaft to the drive disc, EE, should be accurately measured to be .500 to .498.

Once this distance has been correctly determined, a light tap of a hammer on a block of wood placed at the base of the drive disc stud, EC, may be sufficient to relocate the stud. All the gear studs, EC, EB, EH, may be relocated this way if great care is observed.

If the distance is greater than a few thousandths of an inch, it may be advisable to loosen the lock nuts which hold the studs. These are below the base plate and may necessitate the removal of the unit from the cabinet.

When it is certain that the drive disc, EE, will contact the turntable hub with just enough force to assure positive drive, the gear and collar, EJ, should be inverted on its stud, EH, so that the contact between the sector, EI, and the collar may be observed. The adjustment of the stud, EH, is made in the same way as described previously. Again caution is required in striking the blow with a block of wood or similar cushioning material at the large base of the stud. Never strike the shank of the stud.

When the proper adjustment has been reached, the sector, EI, should drive the gear and collar assembly, EJ, positively, yet should be readily returned to rest position when the gear, EJ, is held solidly.

The intermediate gear assembly, EF, is moved in the manner described previously until a complete mesh is obtained with the other gears, without tight spots.

The gears are then reassembled in their original order, the locking pin, EA, and washer, ED, are replaced and the turntable is lightly set on the shaft. A slight spinning motion imparted to the table will aid in proper seating of the rim and the hub against the respective drive discs.

After the turntable is firmly seated on the shaft, with the drive pin, EG, in the slot of the hub, a few trials should be made to see if there is too much or too little traction against the sector, EI.

When lubricating the studs and gear hubs, use only fine light grease, using great care that none touches any of the rubber driving surfaces.

The arm, post and sector assembly may be removed by removing the fillister head lock screw in the post just below the arm. Be sure to rotate the assembly to clear the turntable or remove the table before lifting this assembly. Disconnect the cutter leads, FC, before removing this assembly. Use only fine light grease for post and bushing lubricant.

The lock, FH, which prevents the automatic operation of the changer should be adjusted so that the foot of the lock rod, FI, clears the follower when the cutter arm is in the rest position and just moves so as to be beneath the follower when the arm is removed from the rest.

Adjustment of the cutter arm, FB, is accomplished by turning the screw, FG, which is exposed when the arm is raised, until the head of the arm is just 1/4" above the surface of a record to be cut. Tighten the lock nut after adjusting.

Cutting stylus pressure is adjusted by means of the knurled, round nut, FF, in the body of the arm.

The cutting pressure should be 1-1/2 ounces or the width of the groove should be just as wide as the uncut surface, depending upon the method of observation.

If it is found necessary to replace the cutting head, FD, the stylus set screw, FA, is removed, then by applying a slight force with the thumb to the suspension spring, FE, the head may be easily grasped and dislodged from its seat. Unhook from the suspension spring and replace.

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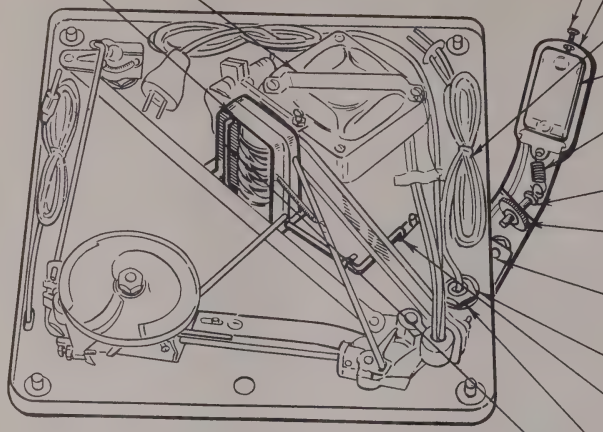
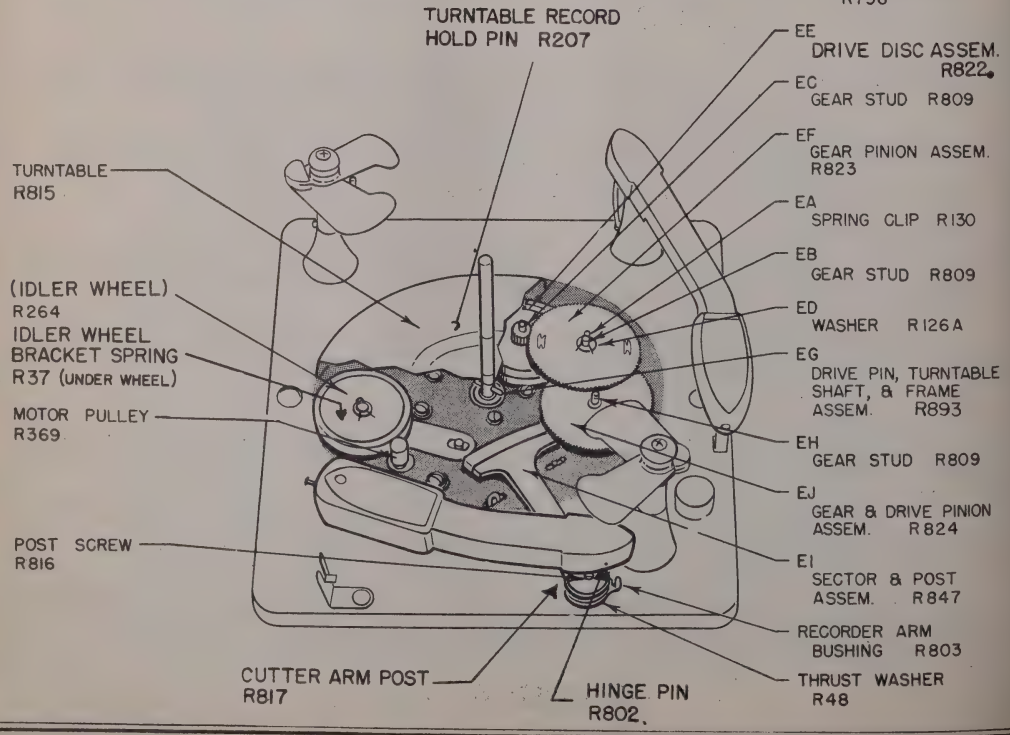
MODELS 101.605,
101.606

SEARS ROEBUCK CO.

Recorder





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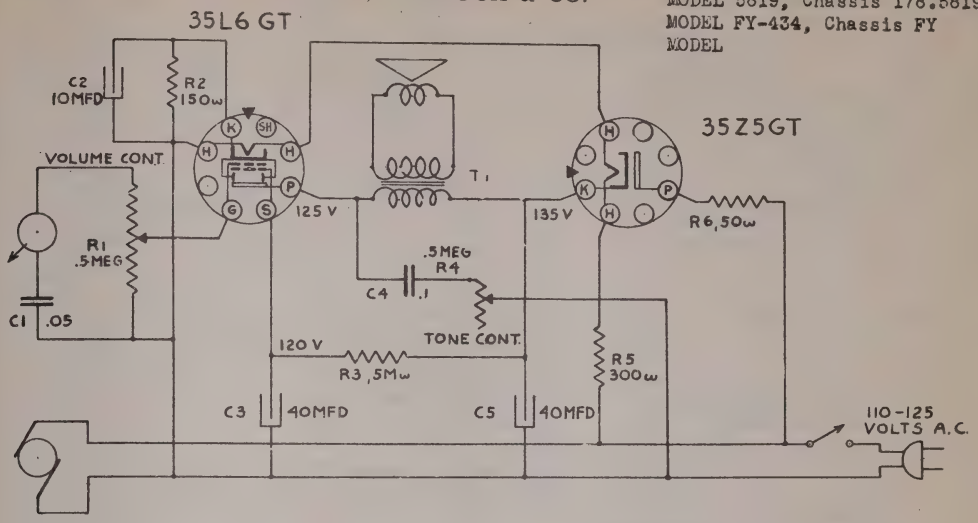
SEARS, ROEBUCK & CO.

MODEL 5818, Chassis 184.5818
MODEL 5819, Chassis 178.5819
MODEL FY-434, Chassis FY
MODEL



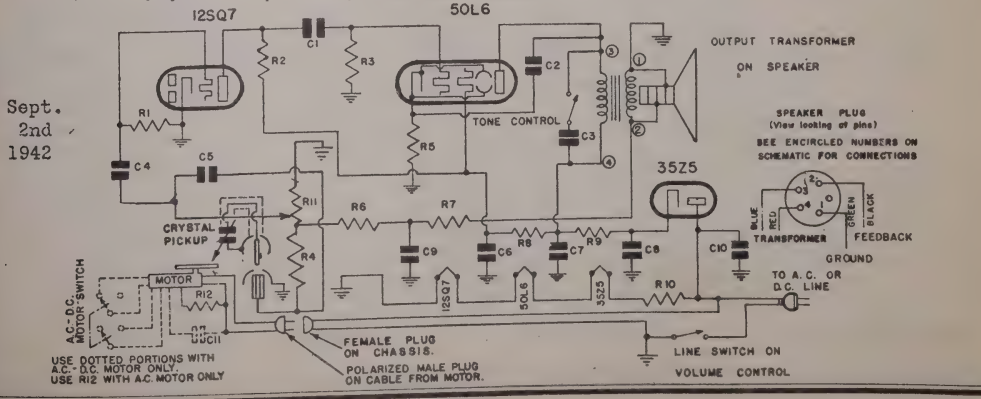
Model 5818 Chassis 184.5818 A. C. Record Player Amplifier January 4, 1943
" 5819 " 178.5819 Electric Phonograph November 25, 1942

Model FY - 434 Chassis FY Electric Amplified Portable Phonograph

When ordering, specify part numbers. List price each effective as of Dec. 1, 1941. Subject to change without notice.

*Item	Part No.	DESCRIPTION	PRICE
R1	4XR-327	15 megohm ¼ watt carbon resistor	$ .16
R2, R3	KR-56	500,000 ohm ½ watt carbon resistor	.16
R4, R6	KR-57	1 megohm ½ watt carbon resistor	.16
R7	KR-53	50,000 ohm ½ watt carbon resistor	.16
R8	KR-51	2,500 ohm ½ watt carbon resistor	.16
R9	9JR-450	175 ohm 1 watt carbon resistor	.16
R10	9YR-460	133 ohm 3 watt wire-wound resistor	.25
R11	9YR-459	Volume control 2.5 megohm	.80
R12	KR-55	250,000 ohm ½ watt carbon resistor	.16
C1, C2	LC-65	0.02 mf, 400 volt tubular condenser	.20
C3	BC-12	0.05 mf, 200 volt tubular condenser	.20
C4	3HC-274	0.002 mf, 600 volt tubular condenser	.20
C5	IC-51A	0.00001 mf, mica condenser	.20
C6, C7 C8	8JC-513B	Multiple dry electrolytic condenser, 150 volt; C6, C8—20 mf, C7—40 mf	.95
C9	FC-29	0.02 mf, 200 volt tubular condenser	.20
C11	9JC-534	0.05 mf, 200 volt tubular condenser	.20

Sept. 2nd 1942



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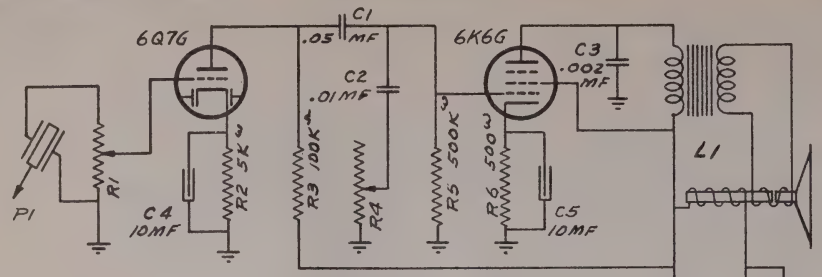
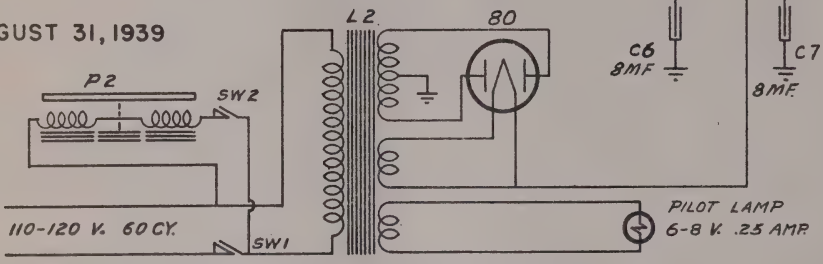
MODEL 5827, Chassis 134.903
MODEL 5827, Chassis 138.903

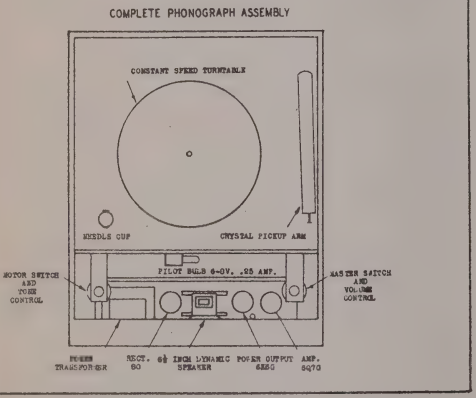
SEARS, ROEBUCK & CO.

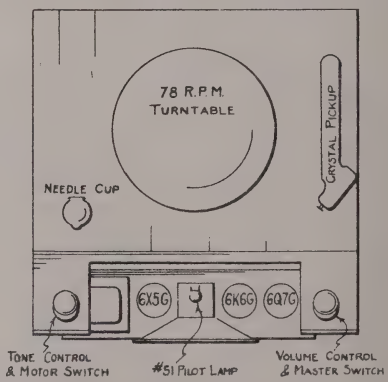


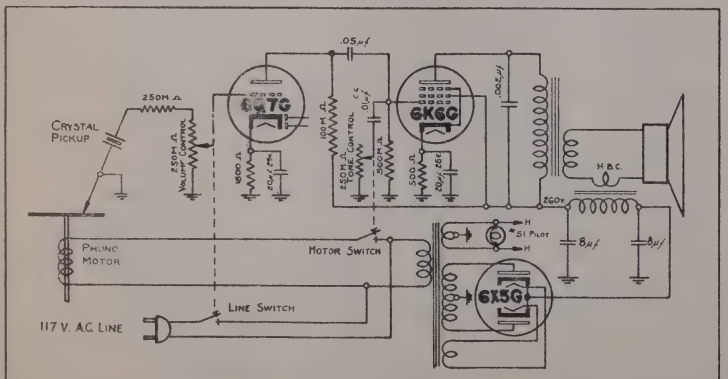
CHASSIS 134.903

AUGUST 31, 1939









JANUARY 18, 1940 SILVERTONE 138.903

Tube Complement

6Q7G	Amplifier
6K6G	PWR Output
6X5G	Rectifier

Power Consumption
50 Watts

Portable
Electric
Phonograph

©John F. Rider

SEARS ROEBUCK CO.

MODEL 5828, Chassis 138.906
MODEL 5829, Chassis 138.904

PORTABLE ELECTRIC PHONOGRAPH

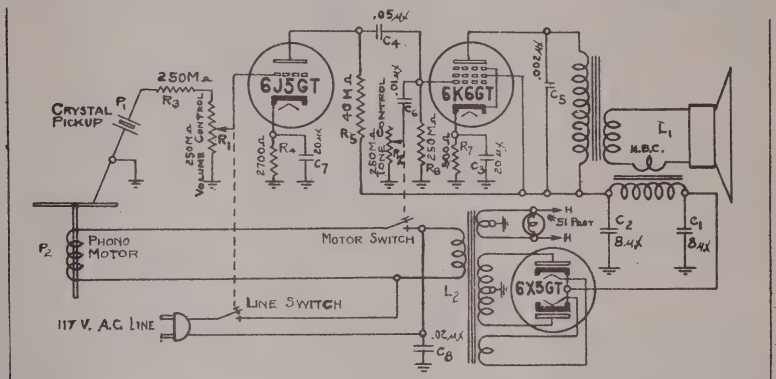
TUBE, COMPLEMENT

6J5GT . . . . . Amplifier
6K6GT . . . . . Power Output
6X5GT . . . . . Rectifier

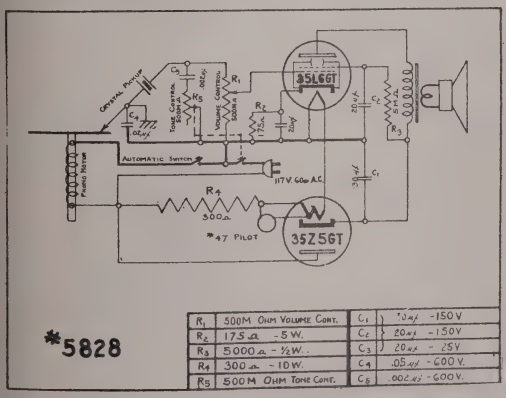
JANUARY 4, 1943

POWER SUPPLY:
Model 5829 is supplied for operation from 105 to 125 volts, 60 cycles, AC only.

Power Consumption . . . . . 50 Watts



R_1	250M Ω Volume Control	R_5	40M Ω ½ Watt	C_1	8 μf - 450 V.	C_5	.002 μf	400 V.
R_2	250M Ω Tone Control	R_6	250M Ω ½ Watt	C_2	8 μf - 450 V.	C_6	.01 μf	- 400 V.
R_3	250M Ω ½ Watt	R_7	500 Ω 1 Watt	C_3	20 μf - 25 V.	C_7	20 μf	- 25 V.
R_4	2700 Ω ½ Watt			C_4	.05 μf - 400 V.	C_8	.02 μf	- 400 V.

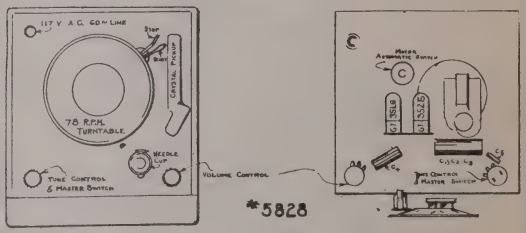


R_1	500M Ohm Volume Cont.	C_1	.04 μf	-150 V
R_2	175 Ω .5 W.	C_2	20 μf	-150 V
R_3	5000 Ω - ½ W.	C_3	20 μf	-25 V
R_4	300 Ω - 10 W.	C_4	.05 μf	-600 V.
R_5	500M Ohm Tone Cont.	C_5	.002 μf	-600 V.

ELECTRIC PHONOGRAPH

MODEL 5828

FACTORY IDENTIFICATION NO. 138.906



TUBE COMPLEMENT

35L6GT . . . . . Amplifier
35Z5GT . . . . . Rectifier

POWER SUPPLY

JANUARY 4, 1943

Model 5828 is supplied for operation from 105 to 125 volts, 60 cycles, A.C. only.

Power consumption . . . . . 40 Watts

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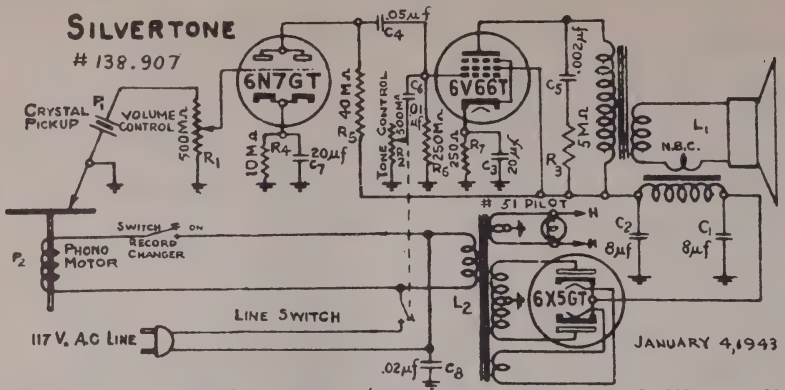
MODEL 5833, Chassis 138.907
MODEL 6226, Chassis 134.802, -1 SEARS ROEBUCK CO.



R1 500M Ohms Volume Control	R5 40M Ohms 1/2 W.	C1 8 Mf. - 450 V.	C5 .002 Mf. - 400 V.
R2 500M Ohms Tone Control	R6 250M Ohms 1/2 W.	C2 8 Mf. - 450 V.	C6 .01 Mf. - 400 V.
R3 5000 Ohms 1/2 W.	R7 250 Ohms 1 W.	C3 20 Mf. - 25 V.	C7 20 Mf. - 25 V.
R4 10M Ohms 1/2 W.		C4 .05 Mf. - 400 V.	C8 .02 Mf. - 400 V.

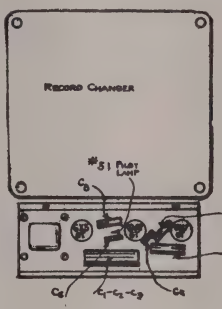
PORTABLE ELECTRIC PHONOGRAPH
MODEL 5833

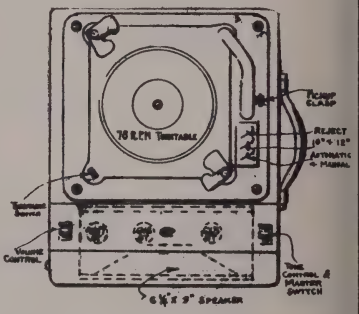
POWER SUPPLY

Model 5833 is supplied for operation from 105 to 125 Volts, 60 cycles AC Power Consumption - 50 Watt.

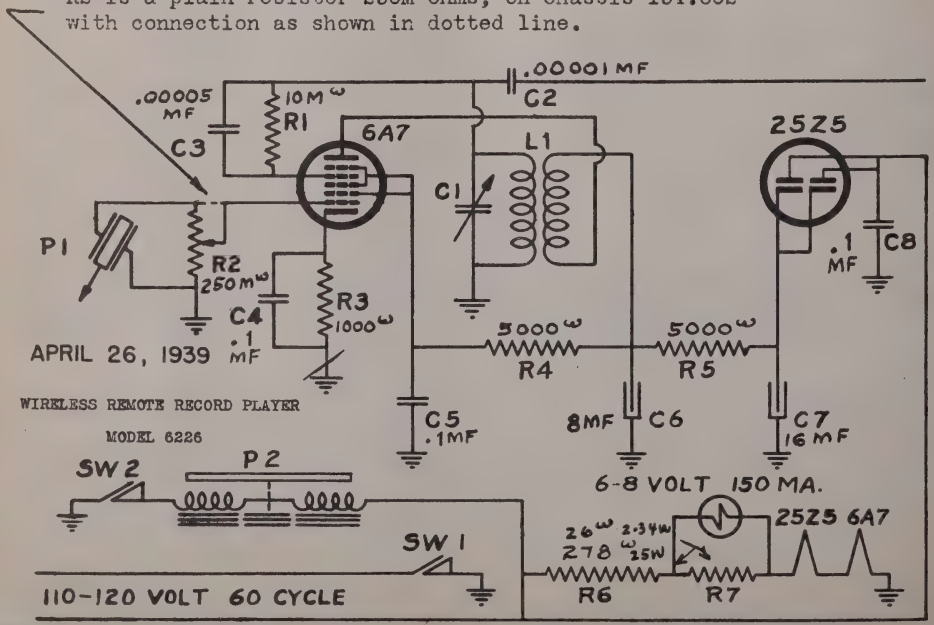
TUBE COMPLEMENT

6N7GT .. Amplifier
6V6GT .. Power Output
6X5GT .. Rectifier





R2 is a plain resistor 250M ohms, on chassis 134.802 with connection as shown in dotted line.



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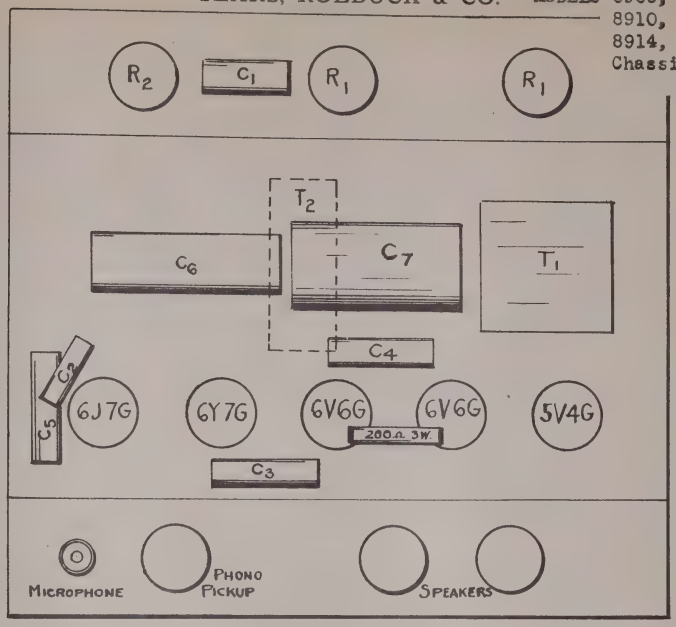
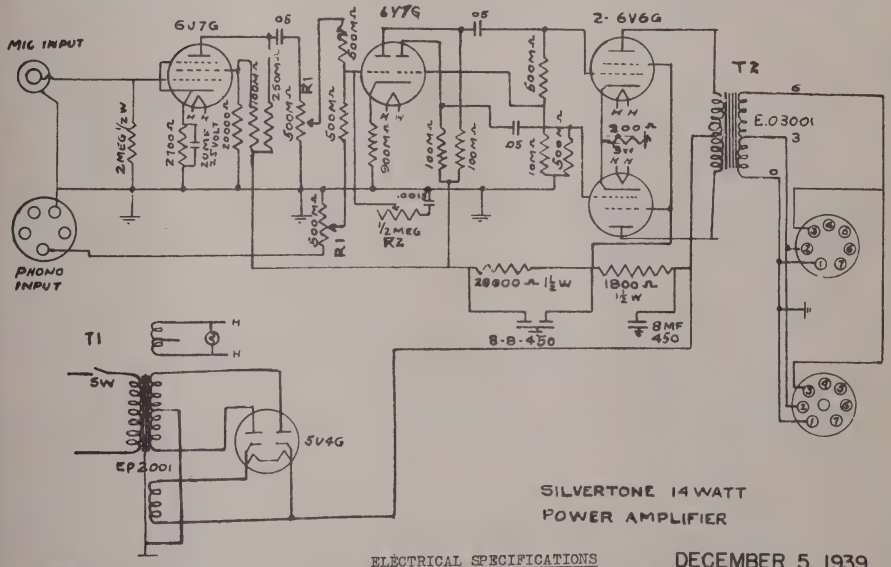
SEARS, ROEBUCK & CO. MODELS 8906, 8907, 8908, 8909, 8910, 8911, 8912, 8913, 8914, Chassis 138.100





SILVERTONE 14 WATT POWER AMPLIFIER

ELECTRICAL SPECIFICATIONS — DECEMBER 5, 1939

TUBE COMPLEMENT:
1 6J7G . . . . . Input
1 6Y7G . . . . . Inverter Amplifier
2 6V6G . . . . . Output
1 5V4G . . . . . Rectifier

POWER SUPPLY: . . . . . 110-125 volts, 50-60 cycle, AC 86 Watts

FREQUENCY CHARACTERISTICS . . . . Curve - substantially flat from 50 to 10,000 cycles per second

INPUTS:
2 input positions each to accomodate high impedance crystal, velocity, or no voltage velotron microphones, and one high impedance phono unit

PICKUP: High impedance crystal type, 500M ohms

SPEAKERS: 8 inch permanent magnet type, 6 ohm voice coil. Standard equipment - Jensen type PM8C

GAIN: . . . . . Approx. 118 DB

OUTPUT IMPEDANCE: . . . . . 3-4 and 6-8 ohms

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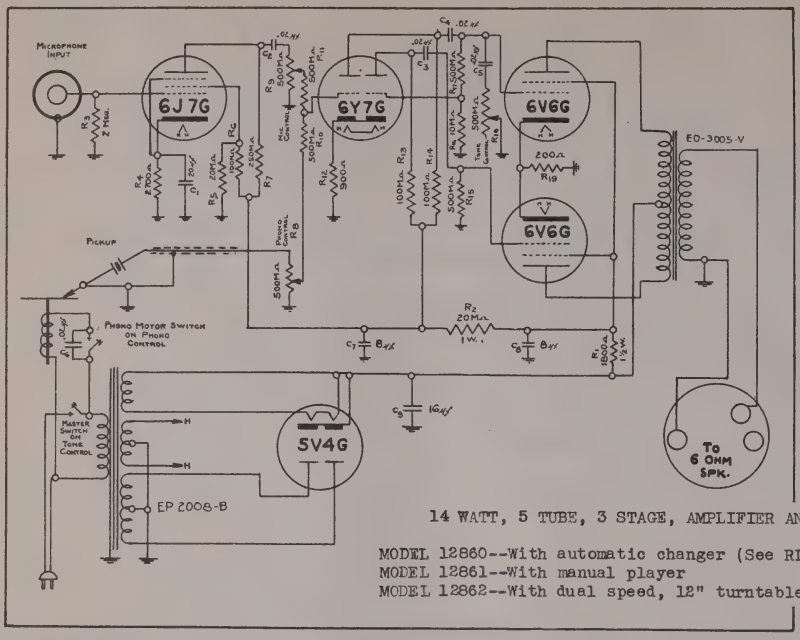
MODELS 12860, 12861, 12862
Chassis 138.150

SEARS, ROEBUCK & CO.



14 WATT, 5 TUBE, 3 STAGE, AMPLIFIER AND RECORD PLAYER

MODEL 12860--With automatic changer (See RL 277).
MODEL 12861--With manual player
MODEL 12862--With dual speed, 12" turntable and long tone arm

TUBE COMPLEMENT

1 6J7G. . . . . Input
1 6Y7G. . . . . Inverter-Amplifier
2 6V6G . . . . . Output
1 5V4G . . . . . Rectifier

INPUTS

One input position to accomodate crystal or other high impedance microphone, and one high impedance phono unit.

OUTPUT

6 ohm secondary for P.M. speaker

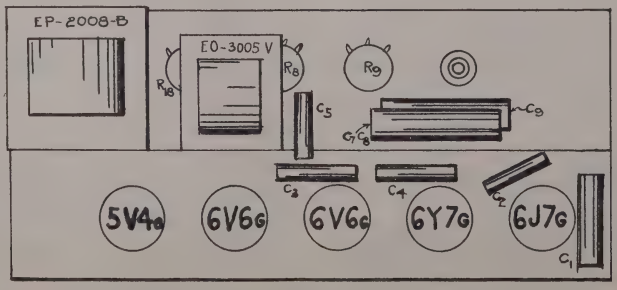
GAIN

Approx: . . . . . 118 db.

MECHANICAL SPECIFICATIONS (Amplifier)

OPERATING CONTROLS (Amplifier)

1 Phono volume control
1 microphone volume control
1 Tone control and A.C. switch

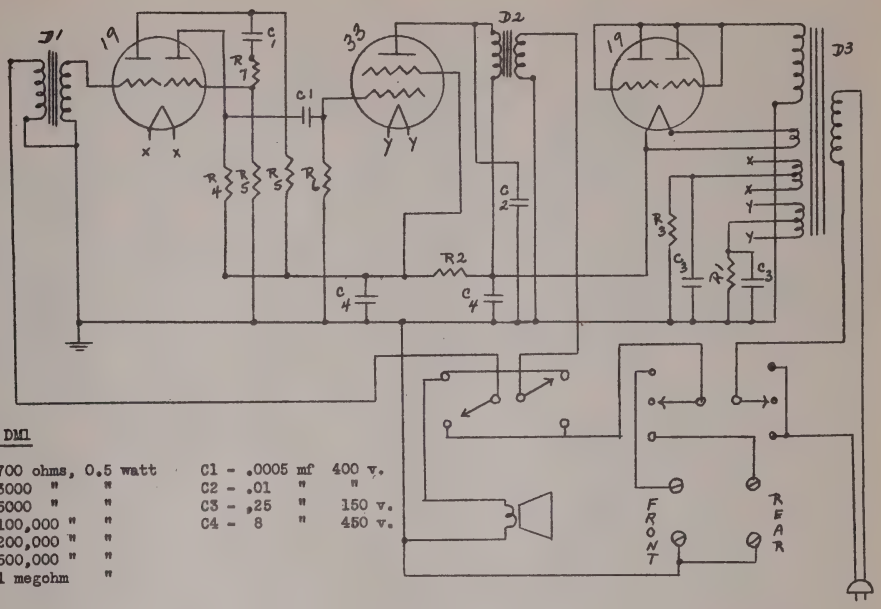


INSIDE VIEW

©John F. Rider

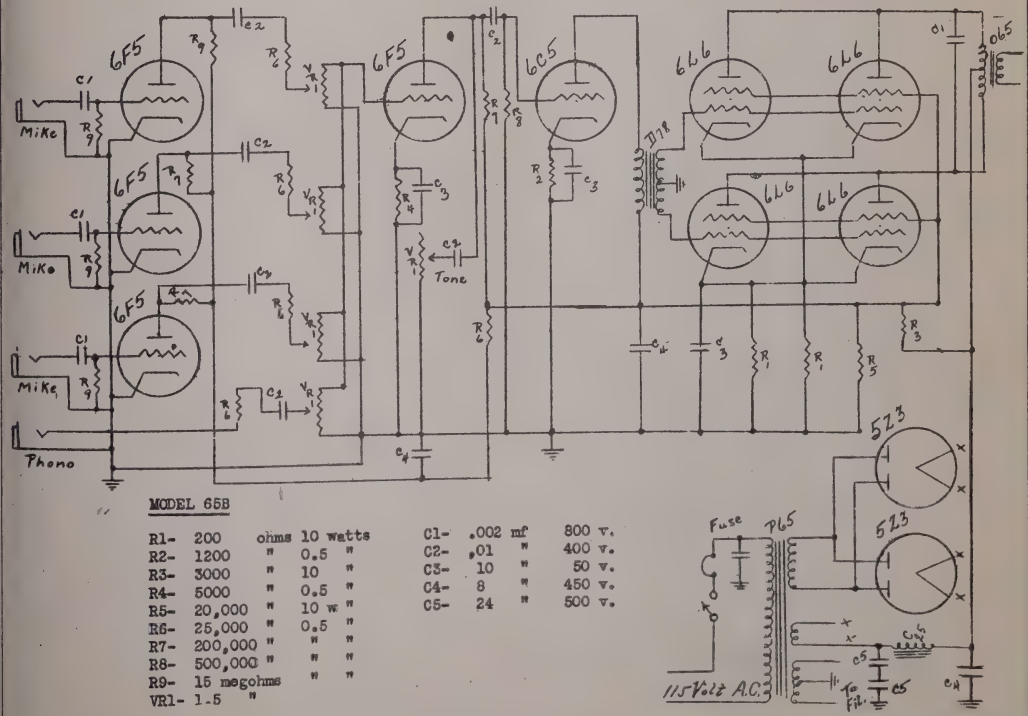
MODEL DM1
MODEL 65B

SETCHELL-CARLSON, INC.



MODEL DM1

R1 - 700 ohms, 0.5 watt		C1 - .0005 mf	400 v.
R2 - 3000 "	"	C2 - .01 "	"
R3 - 5000 "	"	C3 - .25 "	150 v.
R4 - 100,000 "	"	C4 - 8 "	450 v.
R5 - 200,000 "	"		
R6 - 500,000 "	"		
R7 - 1 megohm	"		



MODEL 65B

R1-	200	ohms 10 watts	C1-	.002 mf	800 v.
R2-	1200	" 0.5 "	C2-	.01 "	400 v.
R3-	3000	" 10 "	C3-	10 "	50 v.
R4-	5000	" 0.5 "	C4-	8 "	450 v.
R5-	20,000	" 10 w "	C5-	24 "	500 v.
R6-	25,000	" 0.5 "			
R7-	200,000	" " "			
R8-	500,000	" " "			
R9-	15 megohms	" "			
VR1-	1.5	"			

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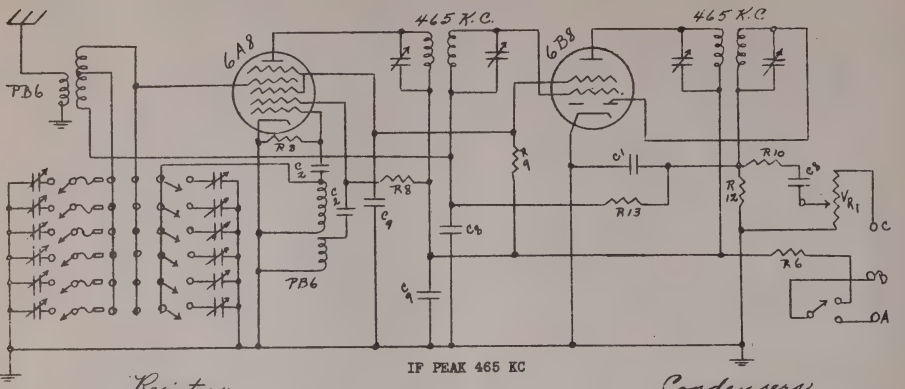
MODEL RA50

SETCHELL-CARLSON, INC.

Setchell - Carlson — Model R. A. 50



IF PEAK 465 KC

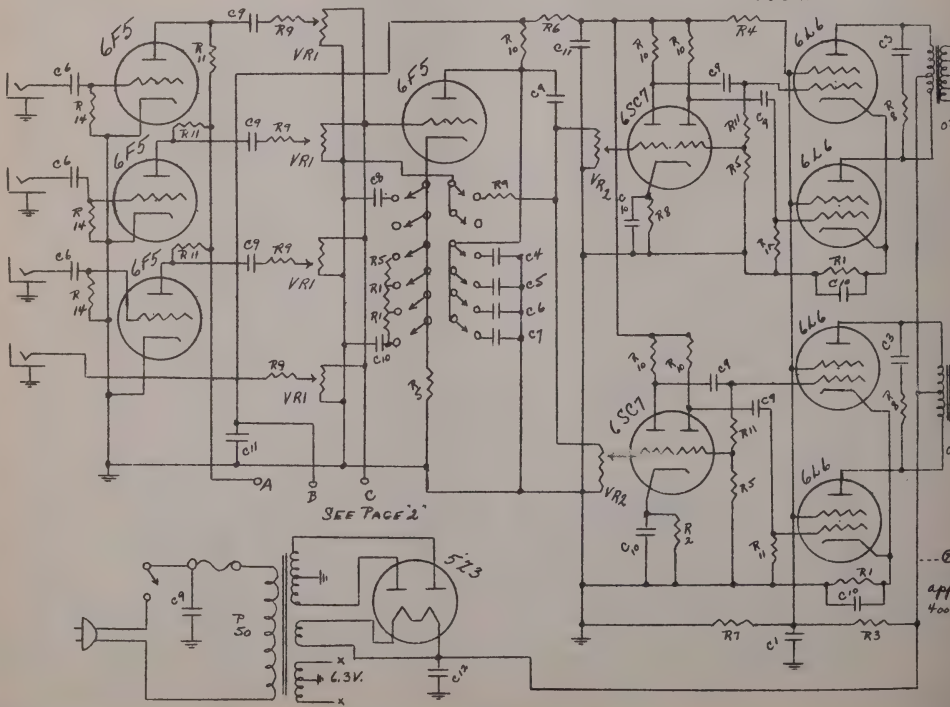
Resistors

R1- 700 ~ 5 Watt
R2- 1700 ~ 1/2 "
R3- 2500 ~ 10 "
R4- 3000 ~ 1/2 "
R5- 5000 ~ 1/2 "
R6- 10,000 ~ 1/2 "
R7- 20,000 ~ 10 "
VR1- 5 Meg. Vol. Contr.

R8- 25,000 ~ 1/2 Watt
R9- 50,000 ~ " "
R10- 100 M ~ " "
R11- 700 M ~ " "
R12- 500 M ~ " "
R13- 1 Meg ~ " "
R14- 15 Meg ~ " "
VR2- 1/2 Meg. Vol. Contr.

Condensers

C1-.0001 Mfd. Mica
C2-.0005 " "
C3-.001 " 600 V paper
C4-.0025 " 400 " "
C5-.005 " " " "
C6-.01 " " " "
C7-.025 " " " "
C8-.1 " 700 V. "
C9-.1 " 400 V. "
C10- 10 " 50 V. Electrolytic
C11- 10 " 450 V.
C12- 25 " 500 V.



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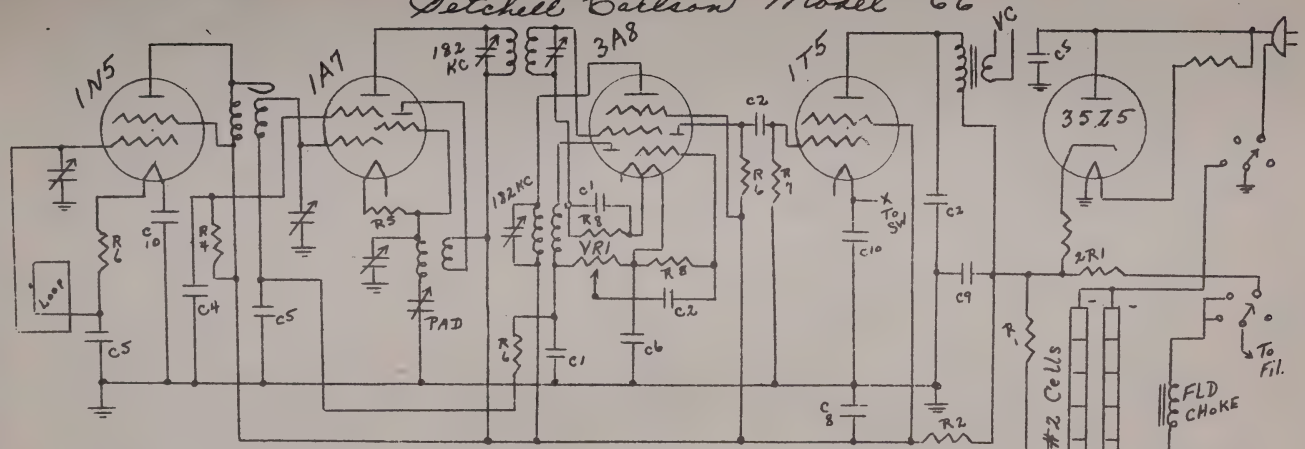
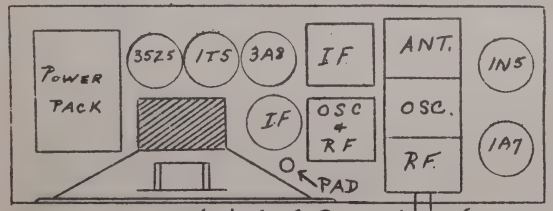
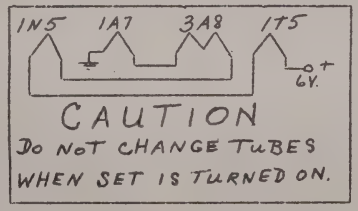
IF PEAK 182 KC

Setchell Carlson Model "66"







6 V. D. C. Operation (Car)

Connect battery cable as furnished to 6 V. Bat. "Red" to pos. (+) "natural" to neg. (-). For Car - determine polarity, Connect to ammeter and ground. "Motor noise elimination" - Use condenser on generator and ammeter. Distributor suppressor necessary for best reception.

Resistors

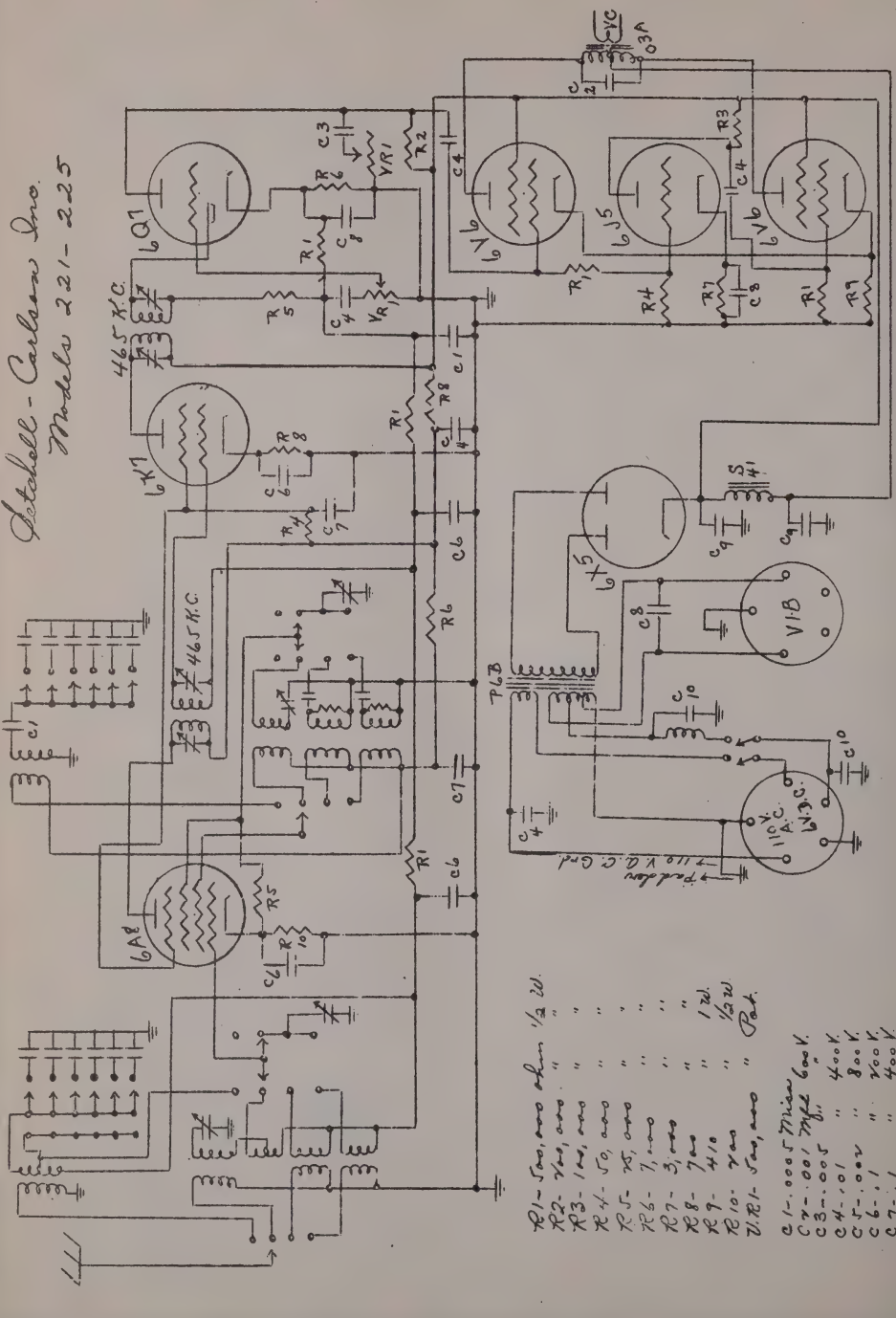
R1- 300 Ω
R2- 3000 Ω
R4- 50,000 Ω
R5- 100,000 Ω
R6- 1 meg Ω
R7- 2 meg Ω
R8- 15 meg Ω
VR1- 500,000 Ω VC
2R1- 145-7000 Ω

Condensers

C1- .0005-600 V
C2- .001- "
C3- .005- "
C4- .01- "
C5- .05- "
C6- .47-100 V
C7- .4- "
C8- 20-150 V
C9- 40- "
C10- 50- 75 V.

MODELS 221, 225

SETCHELL-CARLSON, INC.



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SETCHELL-CARLSON, INC.

MODEL 421RD
Radio-Dor-A-Fone

MODEL 421 RD RADIO-DOR-A-FONE

ATTACH EXTERNAL SPEAKER to terminals in back of chassis marked "Ext. Spkr." Switch directly over these terminals is to turn radio reception "off or on" to the external speaker.

NOTE: If additional antenna is not used, ground wire should be connected to Ant. Post. (Eliminates dead spot.)

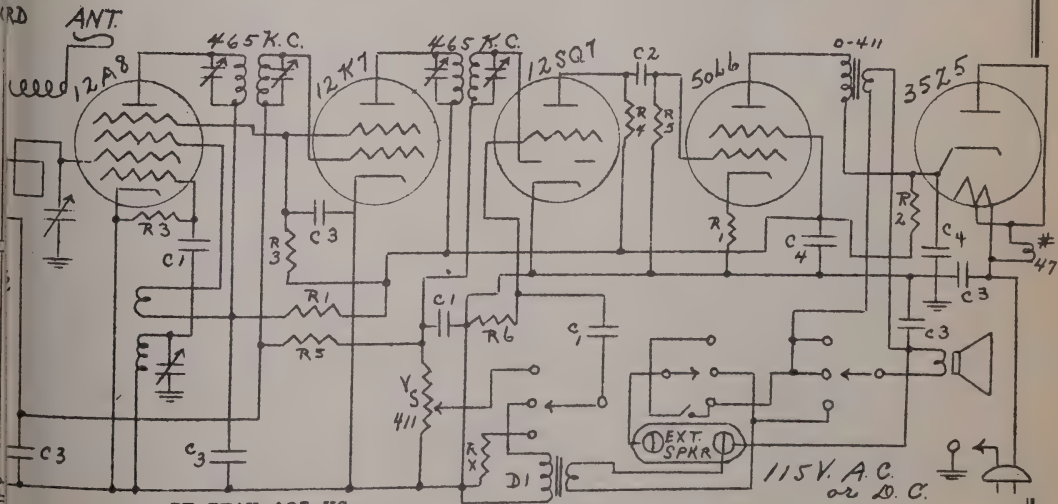
DIRECT CURRENT - When used on 110 volts D.C. reverse plug in wall socket if set is dead.

EXTERNAL SPEAKER connections are isolated and are free from ground except through an .05 by-pass condenser for RF purposes. Resistor marked RX can be raised or omitted to increase sensitivity on "Talk-Listen" positions, however, this will increase feed-back.

"OFF-ON" SWITCH is incorporated with the volume control, which is the small knob on the lower right side. Set the pointer knob to "Radio" for regular radio reception. Set the switch in rear of chassis to turn "off or on" radio reception to external speaker as desired. Position of this switch does not alter operation of Dor-A-fone "talk or listen" position. Volume control position does not alter operation of Dor-A-fone "talk or listen" position.

TO TALK through to the external speaker, turn pointer knob to "Talk" position

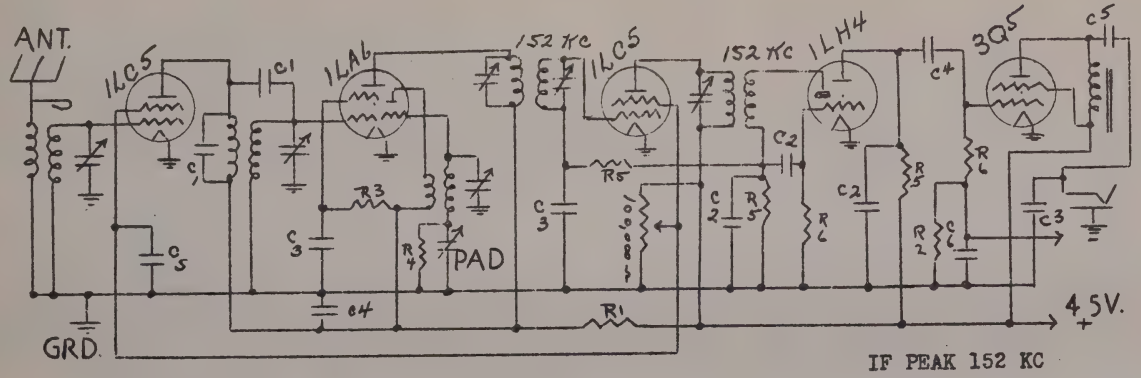
TO LISTEN from external speaker, turn pointer knob to "Listen" position.



IF PEAK 465 KC

R1- 200 ohms 0.5 w.	R5- 0.5 megohm 0.5w.	C1- .0005 mf 600V	VS411-0.5 meg
R2- 1200 " "	R6- 15 " "	C2- .01 " 400V	Vol.Cont.
R3- 50,000 " "	RX- 100,000 ohms.	C3- .05 " 200V	D1-Input Trans.
R4- 200,000" "	(Raise or omit for higher gain talk-listen)	C4- 50-20 " 150V	C411-Output "

SETCHELL-CARLSON MODEL 501



IF PEAK 152 KC

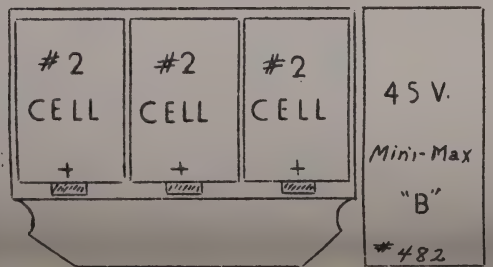
CONDENSERS

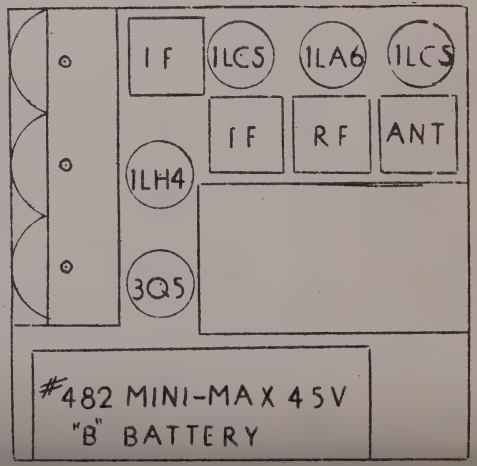
C1-.00002 MICA
C2-.0005 MICA
C3-.001 600 VOLT
C4-.01 400 "
C5-.05 200 "
C6-10 50 "

RESISTORS

R1-150 OHMS
R2-600 "
R3-25,000 "
R4-200,000 "
R5-1 MEG "
R6-2 MEG "

REAR VIEW





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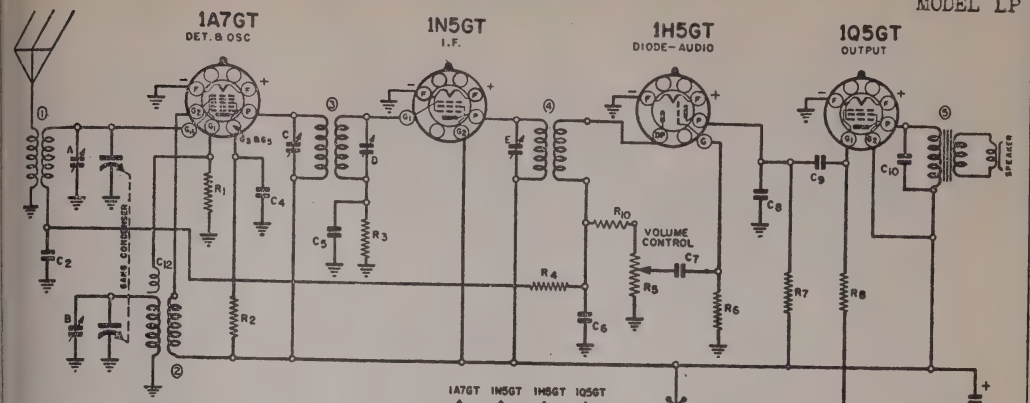
SONORA PRODUCTS, INC.

MODEL KZ
MODEL LP

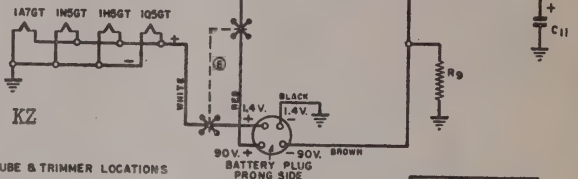


DIAG NO	PART NO	DESCRIPTION
	N-1577	200,000 ohm 20%
	N-3323	60,000 ohm 10%
	N-1263	10 MEGOHM 20%
	N-1373	2 MEGOHM 20%
	N-3411	1 MEG. VOL. CONT.
	N-1370	2 MEGOHM 20%
	N-1262	1 MEGOHM 20%
	N-1378	2 MEGOHM 20%
	N-2590	420 ohm 10%
	N-1260	50,000 ohm 20%
		(all resistors are .5 watt size.)
	N-1345	.05 MFD. 200V.
	N-1345	.05 MFD. 200V.
	N-1376	.02 MFD. 400V.
	N-1342	50 MMFD. 20%.
	N-2712	.004 MFD. 400V.
	N-1342	50 MMFD. 20%
	N-1344	.01 MFD. 400V.
	N-2712	.004 MFD. 400V.
	N-1367	CAPACITY IN OSCILLATOR COIL

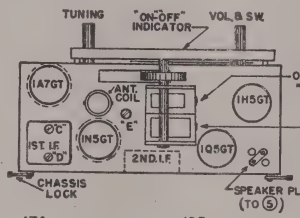
DIAG NO	PART NO	DESCRIPTION
1	N-3408	ANTENNA COIL
2	N-3409	OSCILLATOR COIL
3	N-3410	1ST I.F. TRANS.
4	N-2648	2ND. I.F TRANS.
5	N-3406	6" P.M. SPKR. & OUTPUT TRANS.
6		BATTERY SW. ON VOL. CONT.
	N-3407	GANG CONDENSER
	N-1525	BATTERY CABLE

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION, VOL. VIII.

MODEL KZ



TUBE & TRIMMER LOCATIONS



I. F. 456 K.C.

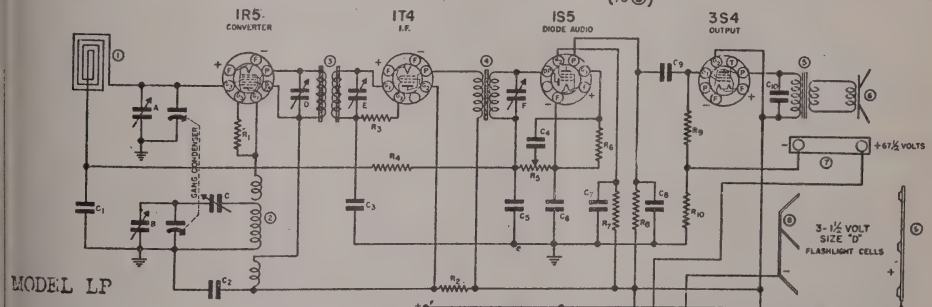
NOTE: TUBE SOCKETS SHOWN FROM WIRING SIDE.

4 TUBE - 1½ VOLT

SUPERHETERODYNE
SINGLE BAND

DRAWN W.J.F. APPROVED
JULY 11, 1940.

KZ



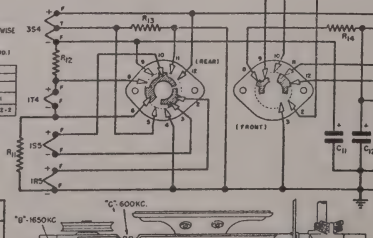
MODEL LP

DIAG NO	PART NO	DESCRIPTION
R_1	N-1778	100,000 OHM .5W 20%
R_2	N-4278	4,700 OHM .5W 10%
R_3	N-1263	10 MEGOHM .5W 20%
R_4	N-4277	2.2 MEGOHM .5W 20%
R_5	N-4013	1 MEGOHM VOLUME CONTROL
R_6	N-4028	6.8 MEGOHM .5W 20%
R_7	N-4062	3.3 MEGOHM .5W 20%
R_8	N-1262	1 MEGOHM .5W 20%
R_9	N-4277	2.2 MEGOHM .5W 20%
R_{10}	N-4279	820 OHM .5W 10%
R_{11}	N-4229	680 OHM .5W 10%
R_{12}	N-4280	56 OHM .5W 10%
R_{13}	N-4281	1800 OHM .5W 10%
R_{14}	N-4065	2200 OHM .5W 10%
R_{15}		1870 OHM 4.8W 5%
R_{16}	N-4252	82 OHM 1.3W 10%
R_{17}		1000 OHM 5.6W 10%
	N-4185	2 GANG CONDENSER
1	N-4296	LOOP ANTENNA (WOOD)
	N-4253	LOOP ANTENNA (PLASTIC)
2	N-4257	OSCILLATOR COIL
3	N-4170	1 ST I.F. TRANSFORMER
4	N-4259	2 ND I.F. TRANSFORMER
5	N-4256	OUTPUT TRANSFORMER
6	N-4255	3½" P.M. SPEAKER
7	N-4274	B BATTERY CONNECTOR
8	N-4220	A BATTERY SPRING CONTACT (NEGATIVE)
9	N-4222	A BATTERY CONTACT STRIP (POSITIVE)
	N-4215	CHANGEOVER SWITCH

SWITCH SHOWN IN COUNTER-CLOCKWISE (AC-DC) POSITION.
(BOTH VIEWS AS SEEN FROM SHAFT END)

POS.	CONTACTS MADE FRONT	REAR
AC-DC	8-9, 11-12	2-3, 4-10
OFF	NONE	2-3-4, 8-10-11
BATTERY	2-3, 9-10	3-4-5-6, 8-9-10-12-2

I.F 456KC



TUBE AND TRIMMER LOCATIONS

DIAG NO	PART NO	DESCRIPTION
C_1	N-1345	.05 MFD. 200 V.
C_2	N-1345	.05 MFD. 200 V.
C_3	N-1346	.01 MFD. 400 V.
C_4	N-2712	.004 MFD. 400 V.
C_5		.0001 MFD. (IN 2nd I.F. CAN)
C_6	N-1351	.1 MFD. 200 V.
C_7	N-1344	.01 MFD. 400 V.
C_8	N-1342	50 MMFD. MICA
C_9	N-1344	.01 MFD. 400 V.
C_{10}	N-2712	.004 MFD. 400 V.
C_{11}		100 MFD. 12V.
C_{12}	N-4208	30 MFD. 150V. ELECTROLYTIC
C_{13}		30 MFD. 150V.
C_{14}	N-1346	.05 MFD. 400 V.

"B"-1650KC.
"C"-600KC.
"D"-
1ST I.F. 456KC.
"E"-
"A"-1400KC

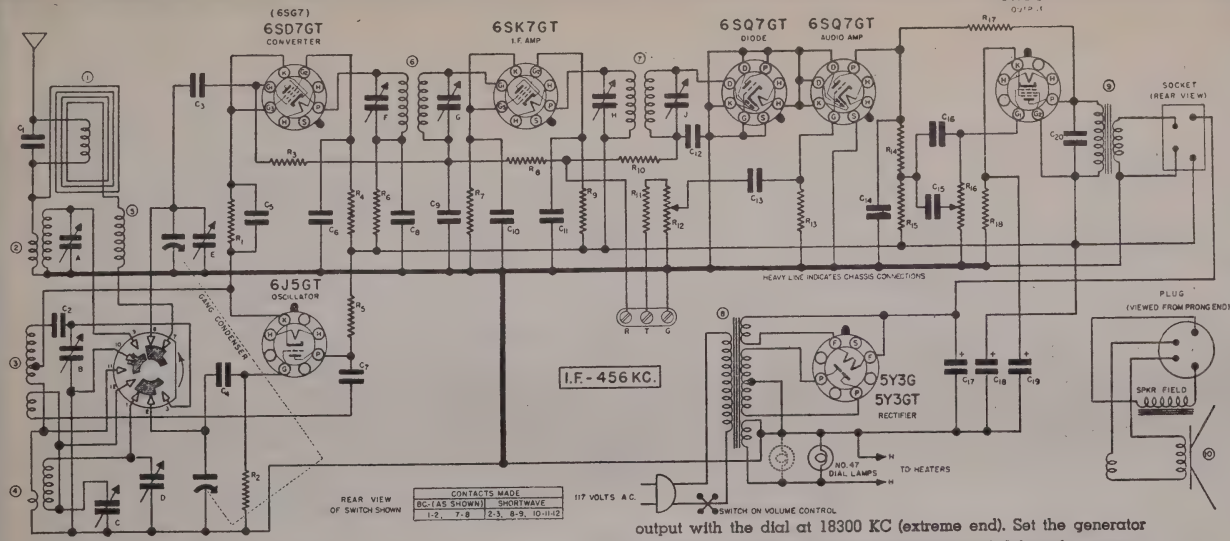
LINE CORD DISCONNECTS WHEN BACK IS REMOVED

5 TUBE - 3 WAY PORTABLE

BATTERY, 110-120 VOLTS AC OR DC.
SUPERHETERODYNE
SINGLE BAND

DRAWN: APP'D
MAY, 1941.

©John F. Rider

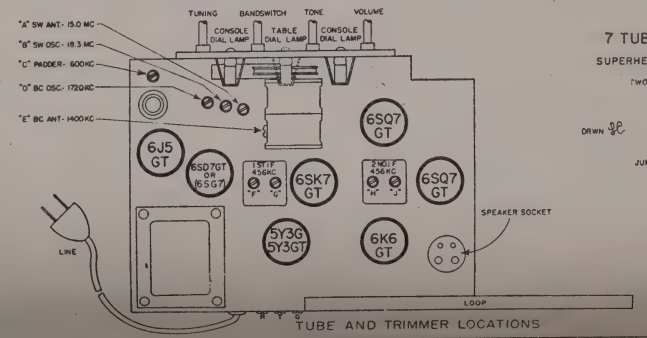


DIAG. NO.	PART NO.	DESCRIPTION
R_1	N-3341	1,000 OHM .5W. 10%
R_2	N-4063	47,000 OHM .5W. 20%
R_3	N-4062	3.3 MEGOHM .5W 20%
R_4	N-4423	330,000 OHM .5W. 20%
R_5	N-4451	27,000 OHM, 5W, 10% (TABLE)
R_5	N-4422	47,000 OHM, 1W, 10% (CONSOLE)
R_6	N-4258	10,000 OHM .5W. 20%
R_7	N-4121	270 OHM, 5W, 10% (TABLE)
R_7	N-4420	330 OHM, 5W, 10% (CONSOLE)
R_8	N-1262	1 MEGOHM .5W. 20%
R_9	N-4063	47,000 OHM, 5W, 20% (TABLE)
R_9	N-4120	68,000 OHM, 5W, 20% (CONSOLE)
R_{10}	N-4087	47,000 OHM .5W 20%
R_{11}	N-4064	33,000 OHM .5W. 20%
R_{12}	N-4396	0.5 MEGOHM VOLUME CONTROL
R_{13}	N-1263	10 MEGOHM .5W. 20%
R_{14}	N-4064	33,000 OHM .5W. 20%
R_{15}	N-4423	330,000 OHM .5W. 20%
R_{16}	N-4399	0.5 MEGOHM TONE CONTROL
R_{17}	N-4424	2.2 MEGOHM .5W. 10%
R_{18}	N-4421	470 OHM 1W. 10%
C_1	N-1343	.00025 MFD. MICA 20%
C_2	N-1690	.004 MFD. MICA 5%
C_3	N-1343	.00025 MFD. MICA 20%
C_4	N-1342	.00005 MFD. MICA 20%
C_5	N-1345	.05 MFD. 200 V. 20%
C_6	N-1376	.02 MFD. 400 V. 20%
C_7	N-1344	.01 MFD 400 V. 20%
C_8	N-1623	.1 MFD. 400 V. 20%
C_9	N-1345	.05 MFD. 200 V. 20%
C_{10}	N-1351	.1 MFD. 200 V 20%
C_{11}	N-1623	.1 MFD. 400 V. 20%
C_{12}	N-1374	.0001 MFD. MICA 20%
C_{13}	N-1344	.01 MFD. 400 V. 20%
C_{14}	N-1374	.0001 MFD. MICA 20%
C_{15}	N-1347	.006 MFD. 600 V. 20%
C_{16}	N-1344	.01 MFD 400 V. 20%
C_{17}		(2 MFD. 400 WV.)
C_{18}	N-4418	10 MFD. 400 WV. ELECTROLYTIC (TABLE)
C_{19}		20 MFD. 25 WV.
C_{17}		(4 MFD. 450 WV.)
C_{18}	N-4429	4 MFD. 450 WV. ELECTROLYTIC (CONSOLE)
C_{19}		20 MFD. 25 WV.
C_{20}	N-1347	.006 MFD. 600 V. 20%
	N-4397	2 GANG CONDENSER
	N-4400	BANDSWITCH
1	N-4401	LOOP ANTENNA (TABLE)
1	N-4428	LOOP ANTENNA (CONSOLE)
2	N-4402	SW ANTENNA COIL
3	N-4404	SW OSCILLATOR COIL
4	N-4403	BC OSCILLATOR COIL
5	N-4407	LOOP SERIES COIL
6	N-4405	1ST I.F. TRANSFORMER
7	N-4406	2ND I.F. TRANSFORMER
8	N-4396	POWER TRANSFORMER (TABLE)
8	N-4427	POWER TRANSFORMER (CONSOLE)
9	N-4395	OUTPUT TRANSFORMER (TABLE)
9	N-4426	OUTPUT TRANSFORMER (CONSOLE)
10	N-4394	6" DYNAMIC SPEAKER (TABLE)
10	N-4425	8" DYNAMIC SPEAKER (CONSOLE)

I.F. ALIGNMENT. With the wave switch in the Broadcast Band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6SG7 or 6SD7) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis base. Align all four I.F. trimmers to peak or maximum reading on the output meter.

BROADCAST BAND ALIGNMENT. With the switch turned to the broadcast position, connect the antenna to the generator through a 100 MMF dummy and the ground of the set (Black wire) to the generator ground. Set the dial and generator at 1720 KC. Align the BC oscillator trimmer for maximum output. Set the generator at 1400 KC and tune-in signal with the dial. Adjust antenna trimmer for maximum output. Next set the generator at 600 KC and tune in the signal with the dial. Adjust the BC pad by rocking the gang back and forth while adjusting the pad until maximum output is attained. Recheck the adjustment at 1400 KC as the pad adjustment may have caused misalignment.

SHORT WAVE BAND ALIGNMENT. With the band switch turned to the S. W. position, connect the generator to the antenna with a 400 ohm dummy and the ground of the set (Black wire) to the generator ground. Adjust the S. W. oscillator to give a maximum output with the dial at 18300 KC (extreme end). Set the generator at 15000 KC and tune-in the signal with the dial. Adjust the antenna trimmer for maximum output. With a strong signal input turn the dial to approximately 1 M. C. lower in frequency and pick up the image frequency. If the image is not received, it will be necessary to return the dial to 18300 KC to reduce the capacity in the oscillator trimmer until a second signal is received. Proceed as before with the alignment of the antenna and recheck for image frequency.



TUBE AND TRIMMER LOCATIONS

7 TUBE A.C.
SUPERHETERODYNE
TWO BAND

DRWN JC APP'D
JUNE, 1941

THE SPARKS-WITHINGTON CO.

MODELS 7EW36, 7-36, 8-36

SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 7-36 & 8-36
INTERMEDIATE FREQUENCY 456 K.C.

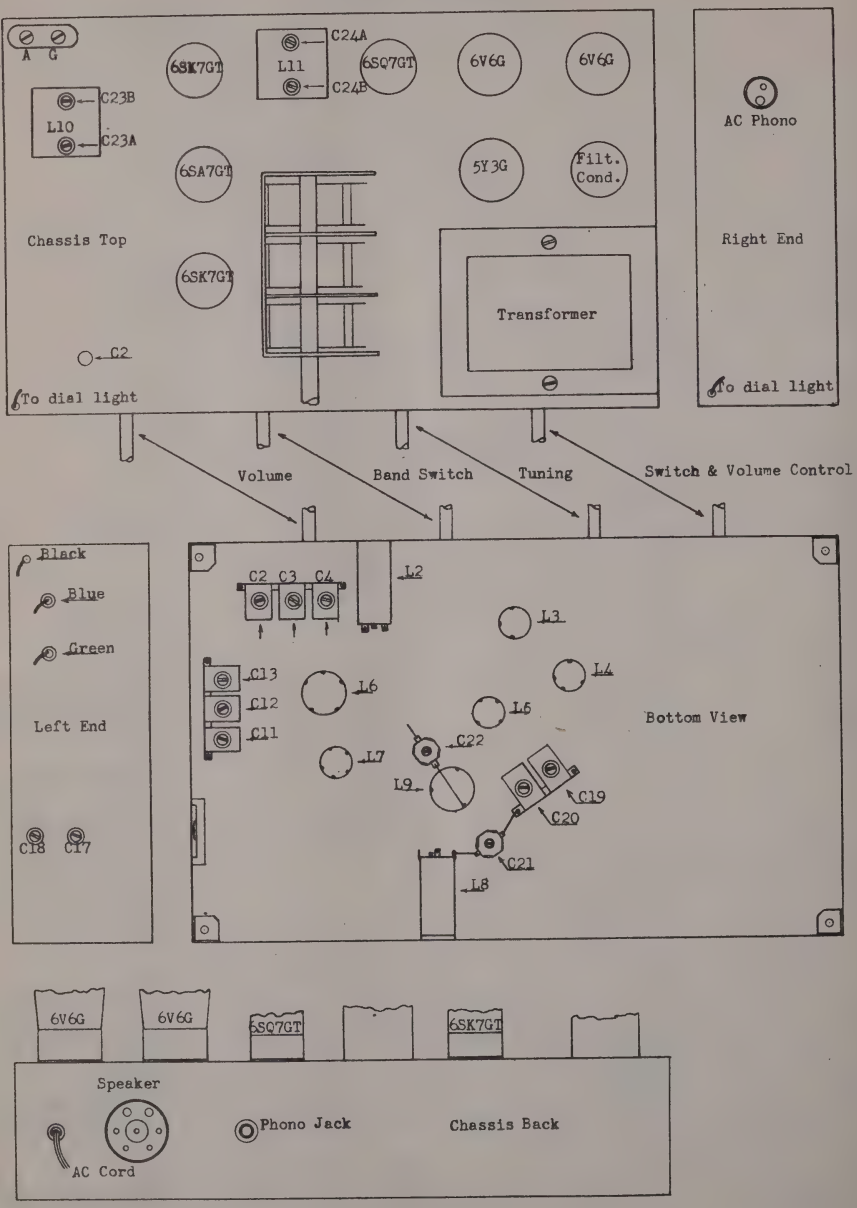
BOTTOM VIEWS OF ALL SOCKET CONNECTIONS

John F. Rider

MODELS 7EW36, 7-36, 8-36

THE SPARKS-WITHINGTON CO.

CHASSIS DIAGRAM



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THE SPARKS-WITHINGTON CO.

MODELS 7EW36, 7-36, 8-36

ALIGNMENT CHART

OPER-ATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING CONDENSER SETTING	TRIMMERS	REMARKS
1	Set dial pointer even with stop line when condenser gang is fully meshed.							
2	I. F.	*	1.mf cond.	456KC	BC	Open	C24 A&B	Peak Accurately
							C23 A&B	" "
3	Broadcast Band	Ant.	See Note	1500 KC	BC	1500 KC	C17 osc.trim	" "
							C11 det.trim	" "
4							C2 ant. trim	" "
				600 KC	BC	600 KC	C18 osc.pad	Rock **
5	Repeat operation 3).							
6	Check Calibration & Sensitivity at 600 KC, 1000 KC & 1500 KC.							
7	Police Band	Ant.	See Note	5 MC	Police Band	5 MC	C19 osc.trim	Peak Accurately
							C12 det.trim	Rock **
							C3 ant.trim	Rock **
							C21 osc. trim	See operation #8
8	Oscillator Padder C21 is precision set at the factory and should not be readjusted in the field.							
9	(Repeat operation 7).							
10	Check Calibration & Sensitivity at 1.8 MC & 5 MC.							
11	SW Band	Ant.	See Note	18 MC	SW Band	18 MC	C20 osc.trim	Peak Accurately
							C13 det.trim	Rock **
							C4 ant. trim	Rock **
							C22 osc. pad	See operation #12
12	Oscillator Padder C22 is precision set at the factory and should not be readjusted in the field.							
13	(Repeat operation 10).							
14	Check Calibration & Sensitivity at 6 MC & 18 MC.							
15	Check operations 1 to 11 inclusive.							

NOTES: Use Dummy Antenna as described on page No. 1 of this bulletin.
* Connect generator to pin #6 on 6SA7GT Osc-conv. tube.
** Rock dial while adjusting for maximum output.

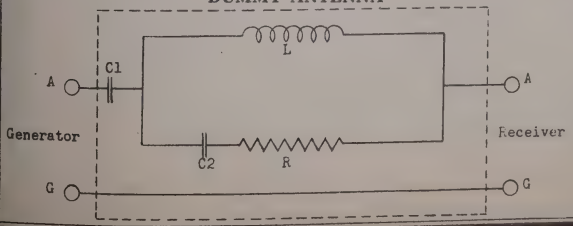
VOLTAGE CHART

Line Voltage: 117 Volts A.C.
Position of Volume Control: Full with dial tuned to Quiet Channel
Position of Band Switch: Broadcast

TUBE	FUNCTION	Voltage of socket prongs to Gnd, See prong on schematic dia.							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
6SK7GT	R. F. Amp.	0	0	3.5	0	3.5	75.1	6.3*	250
6SA7GT	Osc-conv.	0	0	250	75.1	-7	0	6.3*	-1.3
6SK7GT	I. F. Amp.	0	0	5.2	0	5.2	75	6.3*	250
6SQ7GT	Det-AVC-1st Audio	0	-.2	0	-.2	0	103	6.3*	0
6F6G	Push Pull Output	0	0	265	240	0	0	6.3*	30
6F6G	Push Pull Output	0	0	265	250	0	-	6.3*	30
5Y3G	Rectifier	0	355	250	360*	0	360*	0	355

NOTES: Voltage readings are for schematic diagram in this bulletin. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter.
* AC Volts.

DUMMY ANTENNA



Note: When using this dummy antenna the generator output impedance should be 10 ohms or lower.

C1 - 200 mmf. Condenser
C2 - 400 mmf. Condenser
R - 100 ohms Resistor
L - 20 Microhenryies Choke
---- Case Shield

Choke Coil Specifications
Tubing - 3/8" diameter bakelite
Wire - No. 38 Enameled
Turns - 59 closely wound (Impregnated)

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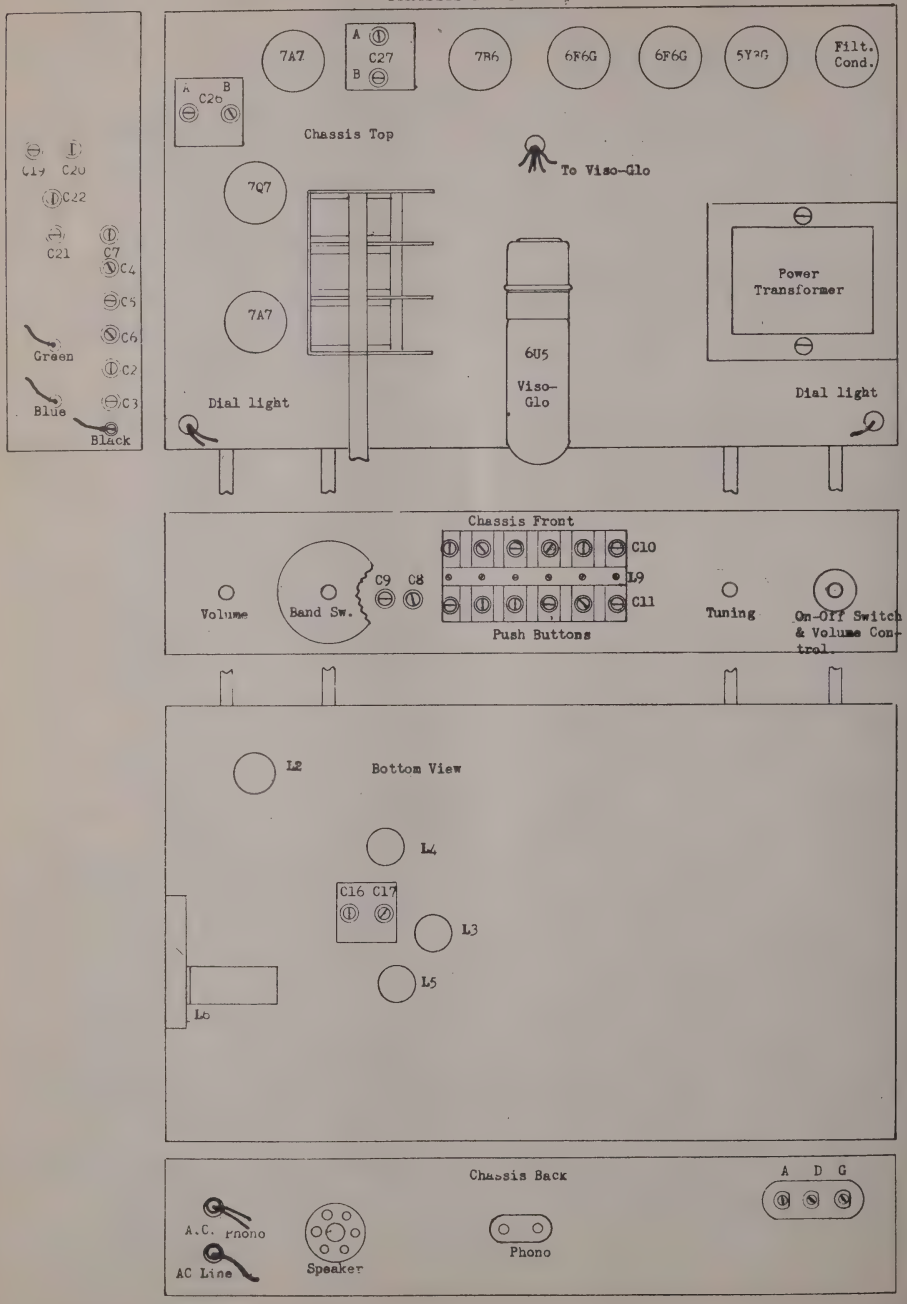
MODELS 8W31,8-61,
8W61,8W71

THE SPARKS-WITHINGTON CO.

CHASSIS DIAGRAM



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THE SPARKS-WITHINGTON CO.

MODELS 8W31, 8-61, 8W61, 8W71

SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 8-61
INTERMEDIATE FREQUENCY 456 K.C.
R.F. AMP 7A7
OSC. & CONV. 7Q7
I.F. AMP. 7A7
DET., A.V.C. & 1ST AUDIO 7B6
PUSH-PULL OUTPUT TWO 6F6G
RECT 5Y3G
VISOGLO 6U5
SPEAKER 10" C-2280-110 12" C-2280-107
800 Ω FIELD COIL
POWER TRANS. A-1436
SWITCH ON TONE CONTROL
POWER CORD A-14891
STATIC SHIELD
DIAL LIGHTS A-1914-2
PHONO
WAVE BAND SWITCH C-3287 SHOWN IN B.C. PUSH-BUTTON POSITION.
SWITCH WAFERS IDENTIFIED BY NUMBERING FROM SHAFT END. FRONT VIEW OF WAFER INDICATED BY LETTER "F" & REAR VIEW BY LETTER "R"
R.F. PUSH-BUTTON SWITCH
BLACK
BLUE
3 M WIRE ANT

MODELS 8W31,8-61,
8W61,8W71

THE SPARKS-WITHINGTON CO.

Sparton Superheterodyne Model 8-Series

VOLTAGE CHART

Models 8W31, 8W71 and 8W61.

Line Voltage: 117 Volts A.C. — Position of Volume Control: Full with Antenna Disconnected
Position of Band Switch: Broadcast

TUBE	FUNCTION	Voltage of Socket Prongs to Gnd. See Prong Nos. on Schematic Diagram								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9
7A7	R-F Amplifier	0	260	65	3	0	0	3	6.2*	-
7C7	Osc - Converter	0	260	65	-4	0	0	0	6.2*	-
7A7	I-F Amplifier	0	245	70	2.5	0	0	2.3	6.2*	-
7B6	2nd Det - AVC - 1st Audio	0	180	0	.8	.4	0	.7	6.2*	-
6F6G	Power Amplifier	0	0	245	240	0	260	6.2*	18	-
6F6G	Power Amplifier	0	0	245	2:5	0	0	6.2*	18	-
6U5	Viso-Glo	6.2*	270	0	280	0	0	-	-	-
5Y3G	Rectifier	0	340	0	345*	0	345*	0	340	-

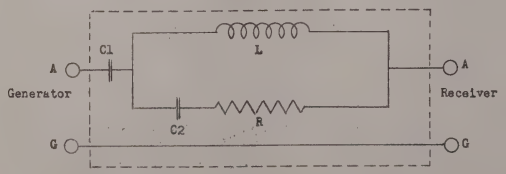
Notes: Voltage readings are for schematic diagram in this bulletin. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20000 ohms per volt voltmeter.
*AC volts.

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND SETTING	TRIMMERS	REMARKS
1	Set dial pointer even with left hand stop line with condenser gang fully meshed.							
2	I.F.	*	.1 MFD	456 KC	B.C.	Open	C27 A&E	Peak Accurately
3							C26 A&B	Peak Accurately
4	Broadcast Band	Ant.	See Note	1500 KC	B.C.	1500 KC	C6 Osc.	" "
							C4 R.F.	" "
							C3 Ant.	" "
5				600 KC	B.C.	600 KC	C19 Pad	Rock **
6	Repeat operation 4.							
7	Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC.							
8	Police Band	Ant.	See Note	7 MC	Police	7 MC	C21 Osc.	Peak Accurately
							C5 R.F.	" "
							C2 Ant.	" "
9				2.5 MC	Police	2.5 MC	C20 Pad	Rock **
10	Check calibration and sensitivity at 7 MC, 4 MC and 2.5 MC.							
11	Short Wave Band	Ant.	See Note	11.7	S.W.	11.7	C70sc. trim	Peak Accurately
							C16 RF. trim	Rock **
							C8 Ant.trim	" **
12				9.3	S.W.	9.3	C22 osc.pad	Peak Accurately
							C17 RF pad	Rock **
							C9 Ant. pad	Rock **
13	Repeat operations 12 as many times as necessary until additional gain cannot be obtained.							
14	Check calibration and sensitivity at 11.7 and 9.3.							
15	Check operations 1 to 14.							

NOTES: Use dummy antenna as described on page 1.
*Connect generator to pin #6 on 7C7 osc. conv. tube.
**Rock dial while adjusting for maximum output.

DUMMY ANTENNA



C1 - 200 mmf. condenser
C2 - 400 mmf. condenser
R - 100 ohms
L - Choke Coil
---- Case Shield

Choke Coil Specification
Tubing - 3/8" diameter bakelite
Wire - No. 38 enameled.
Turns - 59 closely wound (Impregnated)

Note: When using this dummy antenna the generator output impedance should be 10 ohms or lower.

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John F. Rider

SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 642-X
INTERMEDIATE FREQUENCY 456 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS.

WAVE-BAND SWITCH B-8334
SHOWN IN POSITION FOR
585-175 M. BAND.

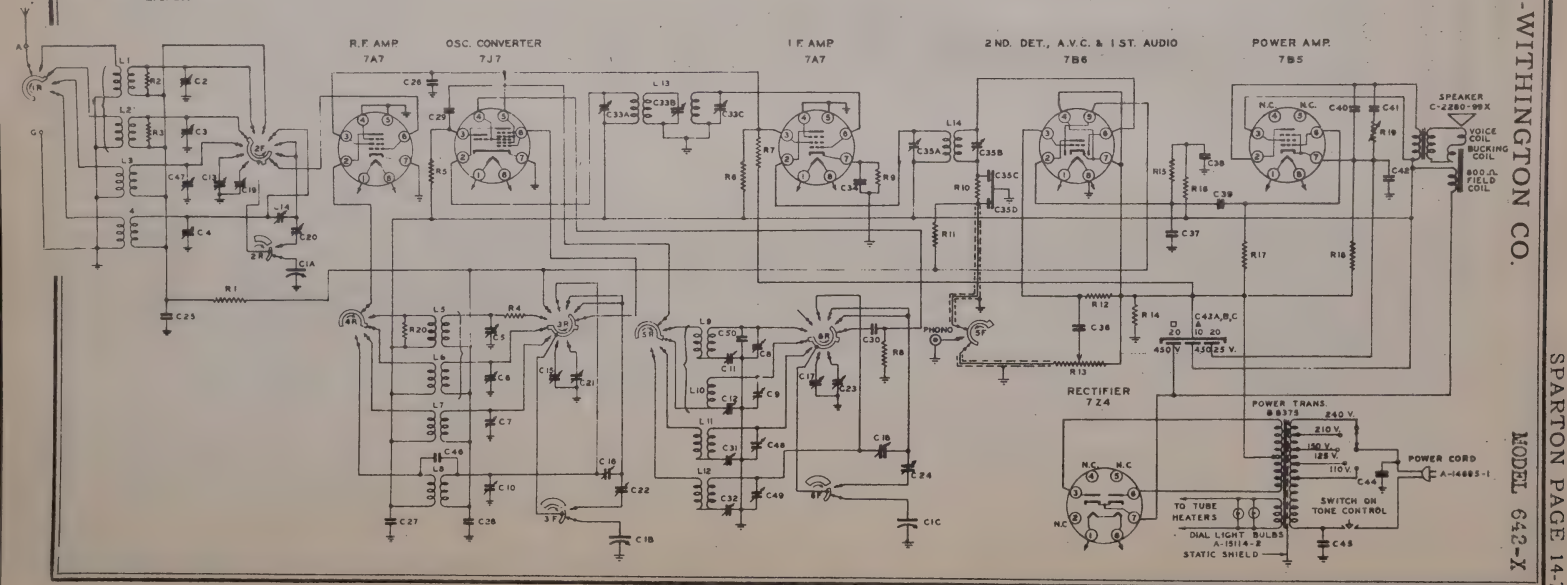
SWITCH WAFERS IDENTIFIED BY NUMBERING FROM SHAFT END.
SCHEMATIC OF FRONT OF WAFER INDICATED BY LETTER "F,"
& OF REAR BY LETTER "R."

C1A,B,& C	3-GANG CONDENSER		B-8013
C2	2200-750 M. BAND ANT. TRIMMER		A-14198-4
C3	585-175 M. " " "		
C4	18-13 M. " " "		
C5	2200-750 M. BAND DET. TRIMMER		A-14198-4
C6	585-175 M. " " "		
C7	119-36 M. " " "		
C8	2200-750 M. BAND OSC. TRIMMER		A-14198-4
C9	585-175 M. " " "		
C10	18-13 M. " DET. "		
C11	2200-750 M. OSC. PADDER		B-7199-DY
C12	585-175 M. " "		
C13	37-30 M. BAND ANT. TRIMMER		A-20308
C14	18-13 M. " " PADDER		
C15	37-30 M. BAND DET. TRIMMER		
C16	18-13 M. " " PADDER		
C17	37-30 M. BAND OSC. TRIMMER		
C18	18-13 M. " " PADDER		
C19	30-18 M. BAND ANT. TRIMMER		
C20	30-18 M. BAND " PADDER		
	37-30 M. BAND " PADDER		
C21	30-18 M. BAND DET. TRIMMER		
C22	30-18 M. BAND " PADDER		
	37-30 M. BAND " PADDER		
C23	30-18 M. BAND OSC. TRIMMER		
C24	30-18 M. BAND " PADDER		
	37-30 M. BAND " PADDER		
C25	.05 MFD. 600 V.		C-3206-285
C26	" " " "		"
C27	" " " "		"
C28	" " " "		"
C29	250 MMF. MICA		C-720-319
C30	25 " "		C-720-369
C31	119-36 M. BAND OSC. COIL PADDER		A-15451-8
	37-30 M.		
C32	30-18 M. BANDS " "		A-15451-9
	18-13 M.		
C33 A,B,&C	FIRST I.F. TRIMMER		A-14782-1
C34	.1 MFD. 200 V.		C-3202-385

C35A,B,C,D	SECOND I.F. TRIMMER		A-20114
C36	.02 MFD. 600 V.		C-3206-225
C37	250 MMF. MICA		C-720-319
C38	.1 MFD. 600 V.		C-3206-385
C39	.02 MFD. 600 V.		C-3206-225
C40	.006 MFD. 600 V.		C-3206-685
C41	.03 MFD. 600 V.		C-3206-245
C42	20 MFD. 25 V. ELECTROLYTIC		A-14782-9
C43 A,B &C	3-SECTION ELECTROLYTIC		A-14884-3
C44	.006 MFD. 600 V.		C-3206-685
C45	.006 MFD. 600 V.		C-3206-685
C46	5 MMF. MICA		C-720-393
C47	119-36 M. BAND ANT. TRIMMER		A-14088-1
C48	119-36 M. BAND OSC. TRIMMER		A-14088-1
C49	18-13 M. " " "		A-14088-7
C50	25 MMF. MICA		C-720-369

R1	100 K.Ω. .25 W.		C-2795-868
R2	470 K.Ω. .25 W.		C-2795-948
R3	270 K.Ω. .25 W.		C-2795-918
R4	8200 Ω. .25 W.		C-2795-738
R5	22 K.Ω. .50 W.		C-2796-78C
R6	10 K.Ω. 3 W.		C-2799-183A
R7	36 K.Ω. 1 W.		C-2797-1868
R8	58 K.Ω. .25 W.		C-2795-838
R9	390 Ω. .25 W.		C-2795-1498
R10	56 K.Ω. .25 W.		C-2795-838
R11	2.2 M.Ω. .25 W.		C-2795-1028
R12	5.6 M.Ω. .25 W.		C-2795-1078
R13	500 K.Ω. VOL. CONTROL		A-15130-7
R14	68 Ω. .25 W.		C-2795-1318
R15	220 K.Ω. .25 W.		C-2795-908
R16	100 K.Ω. .25 W.		C-2795-868
R17	680 K.Ω. .25 W.		C-2795-968
R18	560 Ω. 1 W.		C-2797-1538
R19	250 K.Ω. TONE CONTROL		A-15128-5
R20	130 Ω. .25 W.		C-2795-1388

L1	2200-750 M. BAND ANT. COIL		A-14209-8
L2	585-175 M. " " "		A-15833-3
L3	119-36 M. " " "		
	37-30 M. " " "		A-14960-7
L4	30-18 M. " " "		
	18-13 M. " " "		
L5	2200-750 M. BAND DET. COIL		A-14210-2
L6	585-175 M. " " "		A-15834-1
L7	119-36 M. " " "		
L8	37-30 M. " " "		A-15837-3
	30-18 M. " " "		
L9	2200-750 M. BAND OSC. COIL		A-14213-12
L10	585-175 M. " " "		A-15835-3
L11	119-38 M. " " "		
L12	37-30 M. " " "		A-15233-18
	30-18 M. " " "		
	18-13 M. " " "		
L13	NO. 1 I.F.		A-14794-3
L14	NO. 2 I.F.		A-12064-42



THE SPARKS-WITHINGTON CO.

SPARTON PAGE 14-7

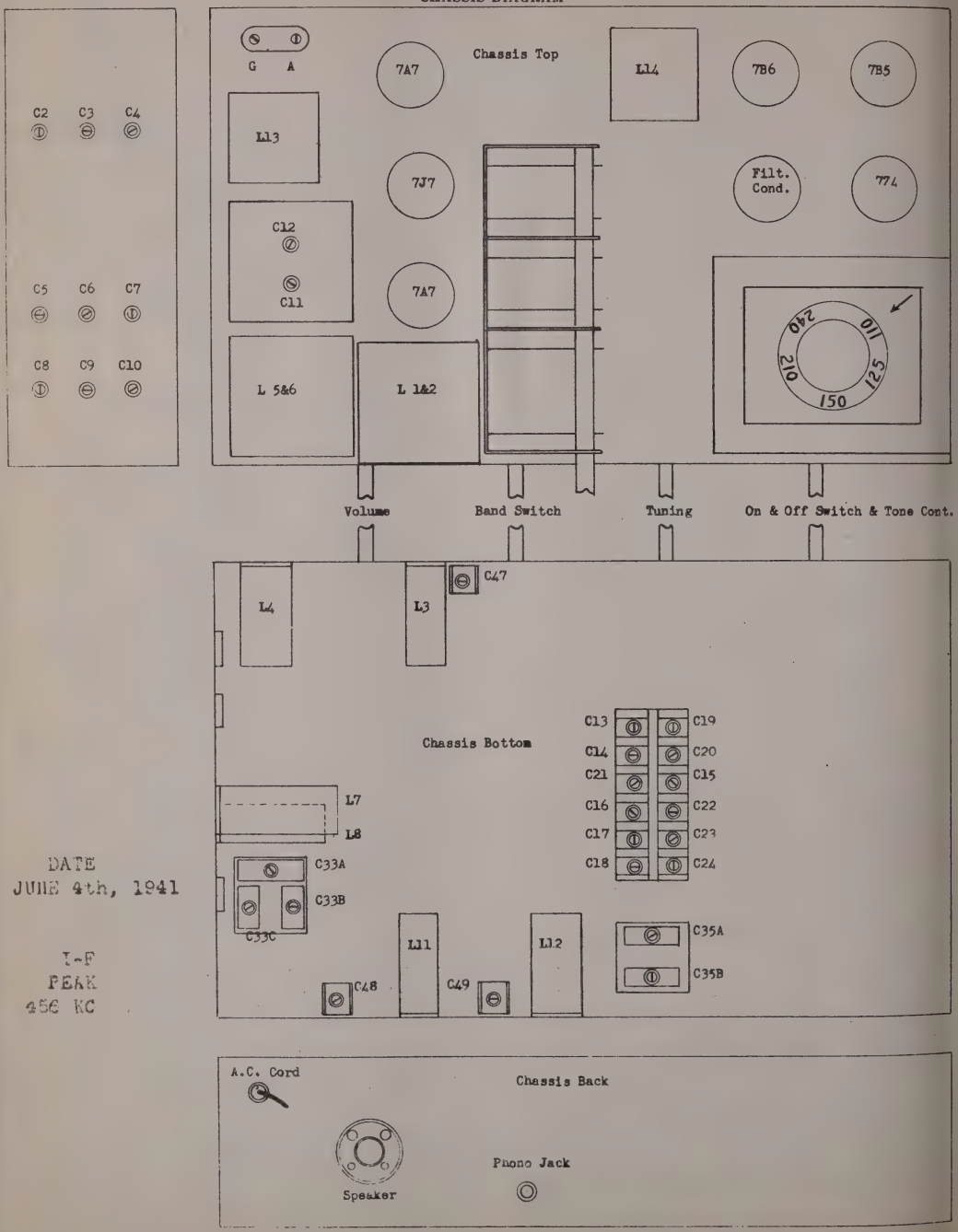
MODEL 642-X

MODEL 642-X

THE SPARKS-WITHINGTON CO.

Sparton Superheterodyne Models 642-X

CHASSIS DIAGRAM



DATE
JUNE 4th, 1941

I-F
PEAK
456 KC

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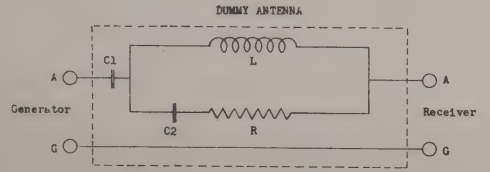
Sparton Superheterodyne Models 642-X

VOLTAGE CHART

Line Voltage: 117 Volts AC — Position of Volume Control: Full with Antenna Disconnected
Position of Band Switch: Broadcast

TUBE	FUNCTION	Voltage of Socket Prongs to Gnd. See Prong Nos. on Schematic Dia.								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9
7A7	R-F Amplifier	6.2*	165	120	0	0	-1.8	0	0	-
7J5	Oscillator-Converter	6.2*	235	130	8.8	120	-2.2	0	0	-
7A7	I-F Amplifier	6.2*	235	120	0	0	0	3.8	0	-
7B6	2nd Det - AVC - 1st Audio	6.2*	90	-2.2	-2.1	-2.2	-2.5	-2.1	0	-
7B5	Power Amplifier	0	225	235	0	185	-.2	13	6.2*	-
7Z4	Rectifier	6.2*	50*	320*	0	0	320*	380	0	-

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.



C1 - 200 mmf. condenser
C2 - 400 mmf. condenser
R - 100 ohms
L - Choke coil
---- Case shield

Choke Coil Specification
Tubing - 3/8" Diameter bakelite
Wire - No. 38 enameled
Turns - 59 closely wound (Impregnated)

Note: When using this dummy antenna the generator output impedance should be 10 ohms or lower.

Sparton Superheterodyne Models 642-X

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	BAND SWITCH SETTING	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1	Set dial pointer even with left hand stop line with condenser gang fully meshed.							
2	I.F.	****	.1 mf.	565 to 175 M	456	Open	C35 A&B	Peak accurately
3							C33 B*	**
4							C33 A &C	Peak accurately
5							C33 B*	" "
6	CAUTION: Do not readjust trimmers C35 A&B and C33 A&C after C33 B has been peaked.							
7	565 to 175 M	ANT	See Note	565 to 175 M	200 M (1500 KC)	200 M	C9 Osc.Trim	Peak accurately
							C6 Det.Trim	" "
8							C3 Ant.Trim	" "
9	Repeat operation 7.				500 M (600 KC)	500 M	C12 Osc.Pad	***
10	Check calibration and sensitivity at 200 M, 300 M and 500 M.							
11	2200 to 750 M	ANT	See Note	2200 to 750 M	800 M (375 KC)	800 M	C8 Osc.Trim	Peak accurately
							C2 Ant. "	" "
12					1900 M (158 KC)	1900 M	C5 Det. "	" "
							C11 Osc.Pad	***
13	Repeat operation 11.							
14	Check calibration and sensitivity at 800 M, 1900 M.							
15	C31 & 32 Osc. Padders are precision set at the factory and should not be moved.							
16	119 to 36 M	ANT	See Note	119 to 36 M	36 M (8.35MC)	36 M	C48 Osc.Trim	Peak accurately
							C47 Ant. "	" "
17							C7 Det. "	" "
						Fixed	C31 Osc.Pad	See Operation 15
18	Repeat operation 16.							
19	Check calibration and sensitivity at 80 and 110 M							
20	All trimmers should be adjusted to the fundamental of the test signal and not to the image.							
21	18 to 13 M	ANT	See Note	18 to 13 M	13 M (23.1MC)	13 M	C49 Osc.Trim	***
							C4 Ant. "	***
							C10 Det. "	***
22	See operation 31.							
23	30 to 18 M	ANT	See Note	30 to 18 M	18.5 M (16.2MC)	18.5 M	C23 Osc. "	***
							C19 Ant. "	***
							C21 Det. "	***
24	See operation 31.							
25	37 to 30 M	ANT	See Note	37 to 30 M	29.5M (10.15MC)	29.5M	C17 Osc. "	***
							C13 Ant. "	***
							C15 Det. "	***
							C24 Osc.Pad	***
26					36 M	36 M	C32 Osc."	See Note A.
							C20 Ant. "	***
							C22 Det. "	***
27	Note A: Do not change setting of padders C24, 20 and 22 after adjusting in operation 26.							
28	30 to 18 M	ANT	See Note	30 to 18 M	Check at 29 M (10.3MC)	Check at 29 M	C24 Osc.Pad	See Note A.
							C32 Osc. "	See Operation 15
							C20 Ant. "	See Note A
							C22 Det. "	See Note A
29	See operation 31.							
30	18 to 13 M	ANT	See Note	18 to 13 M	18.3 M (16.3MC)	18.3 M	C18 Osc. "	***
							C32 Osc. "	See Operation 15
							C14 Ant. "	***
							C16 Det. "	***
31	Repeat operations 21, 23, 25, 26, 28 and 30, as many times as necessary until additional gain cannot be obtained.							

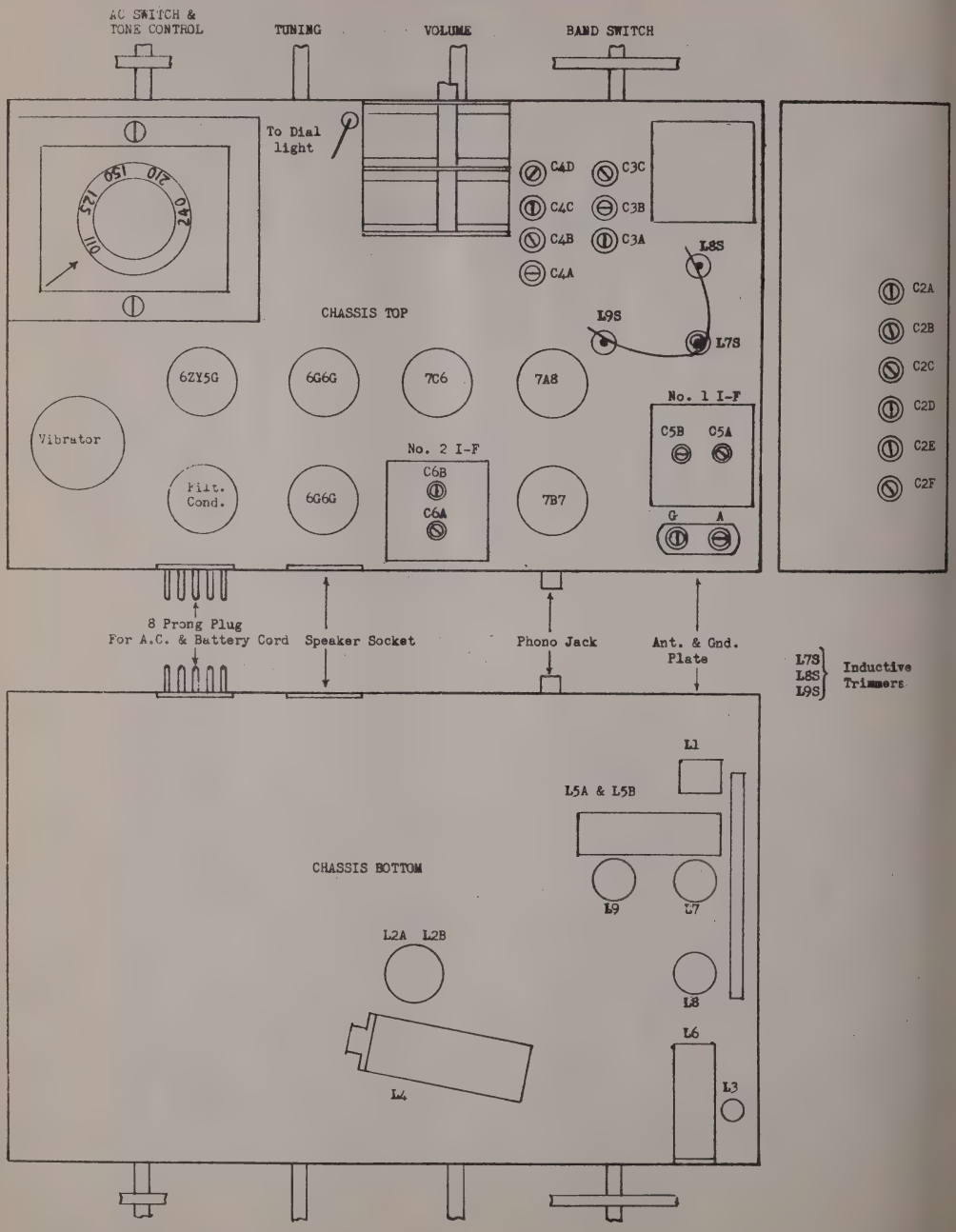
Note: Use dummy antenna as described on page 1.
*Bronze color trimmer screw.
**Turn trimmer screw all way down.
***Rock dial while adjusting for maximum output.
****Generator connected to pin #6 of 7J7 oscillator tube.

THE SPARKS-WITHINGTON CO.

MODELS 672-6XA,672-6XE

THE SPARKS-WITHINGTON CO.

672-6XA and 672-6XE



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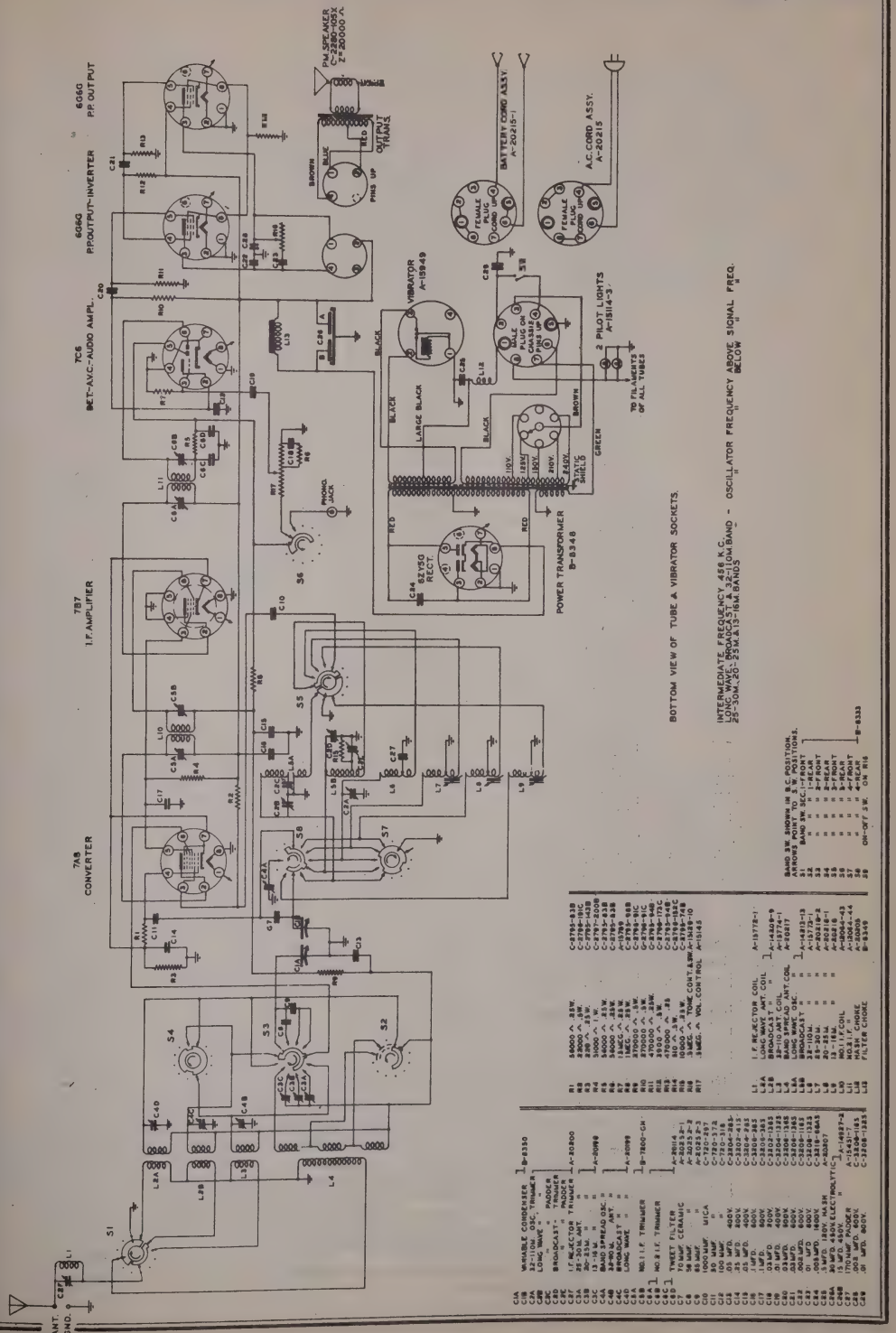
THE SPARKS-WITHINGTON CO. MODELS 672-6XA, 672-6XE


SPARTON SUPERHETERODYNE MODEL 672-6X
6A8 CONVERTER
7B7 I.F. AMPLIFIER
7C6 DET.-AVC.-AUDIO AMPL.
6G6G P.P. OUTPUT-INVERTER
6G6G P.P. OUTPUT
VIBRATOR A-19949
POWER TRANSFORMER B-9348
5Z4/5G RECT.
PHONO JACK
FM SPEAKER C-2280-105X Z-20000-X
BATTERY CORD ASSY. A-20215-1
A.C. CORD ASSY. A-20215
2 PILOT LIGHTS A-1814-3
TO FILAMENTS OF ALL TUBES
BOTTOM VIEW OF TUBE & VIBRATOR SOCKETS.
INTERMEDIATE FREQUENCY 456 K.C.
LONG WAVE: BROADCAST, 1.A 32-110M. BAND - OSCILLATOR FREQUENCY ABOVE SIGNAL FREQ.
25-30M. 20-25M. A 13-16M. BANDS
BAND SW. SHOWN IN B.C. POSITION
ANTENNA TRIMMERS: 11 BAND SW. SEC.-FRONT 12 " " " -REAR 13 " " 2-FRONT 14 " " 2-REAR 15 " " 3-FRONT 16 " " 3-REAR 17 " " 4-FRONT 18 " " 4-REAR 19 ON-OFF SW. ON R16
ANT.
GND.

MODELS 672-6XA,672-6XE

THE SPARKS-WITHINGTON CO.

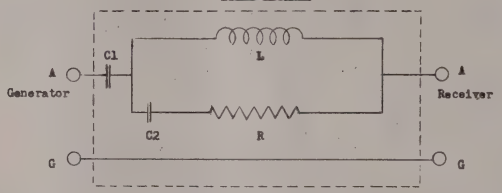
VOLTAGE CHART

Line Voltage: 117 Volts — Position of Volume Control: Full with Antenna Disconnected
Position of Band Switch: Broadcast

TUBE	FUNCTION	Voltage of Socket Prongs to Gnd. See Nos. on Schematic Dia.							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
7A8	Converter	6*	180	125	-1.2	55	0	1.75	0
7B7	I-F Amplifier	6*	180	55	0	0	0	1.75	0
7C6	2nd Detector-AVC-1st Audio	6*	100	0	0	0	0	—	0
6Q6G	Push-Pull Power Output	6*	0	175	180	0	-	0	10
6Q6G	Push-Pull Power Output	6*	0	175	180	0	-	0	10
6Z5G	Rectifier	0	0	170*	-	170*	-	6*	185*

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.

DUMMY ANTENNA



Note: When using this dummy antenna the generator output impedance should be 10 ohms or lower.
C1 - 200 mmf. Condenser.
C2 - 400 mmf. Condenser.
R - 100 ohms.
---- Case Shield
L - Choke Coil

Choke Coil Specification.
Tubing - 3/8" Diameter Bakelite.
Wire - No. 38 Enameled.
Turns - 59 Closely wound (Impregnated.)

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	BAND SWITCH SETTING	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set dial pointer at extreme end of calibration scale with variable condenser fully closed.)							
2	I.F.	Converter Grid (#6)	.1 mf.	BC	456 KC	Open	C6 A&B	2nd I-F **
							C5 A&B	1st I-F **
3	Rejector	ANT.	*	BC	456 KC	Closed	C2F	Adjust to minimum
4	Broadcast Band	ANT.	*	BC	1500 KC	1500 KC	C2D Osc.	**
							C4C Ant.	**
5					600 KC	600 KC	C2E Pad.	**
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 1500 KC, 1000 KC, 750 KC and 600 KC)							
8	Long-Wave Band	ANT.	*	LW	400 KC	400 KC	C3B Osc.	**
							C4D Ant.	**
9					150 KC	150 KC	C2C Pad.	**
10	(Repeat operation 8)							
11	(Check calibration and sensitivity at 400 KC, 250 KC and 150 KC)							
12	32-110 M Band	ANT.	*	32-110 M	9000 KC	9000 KC	C2A Osc.	**
							C4B Ant.	**
13	(Check calibration and sensitivity at 9000 KC and 2500 KC)							
14	20-25 M Band	ANT.	*	20-25 M	17000 KC	17000 KC	C4A Osc.	**
							C3B Ant.	**
15					11600KC	11600KC	L8S Osc.	**
16	(Repeat operation 14 and 15 until calibration is perfect)							
17	(Check calibration and sensitivity at 17000 KC and 11500 KC)							
18	25-30 M	ANT.	*	25-30 M	12000 KC	12000 KC	C3A Ant.	**
19					9500 KC	9500 KC	L7S Osc.	**
20	(Repeat operation 18)							
21	(Check calibration and sensitivity at 12000 KC and 9500 KC)							
22	13-16 M Band	ANT.	*	13-16 M	23000 KC	23000 KC	C3C Ant.	**
23					17500 KC	17500 KC	L9S Osc.	**
24	(Repeat operation 22)							
25	(Check calibration and sensitivity at 23000 KC and 17500 KC)							

Notes: *Use standard dummy antenna. See Page ( ).
**Peak accurately. Make sure adjustments are made on fundamental of signal and not on image. See note at bottom of schematic diagram.

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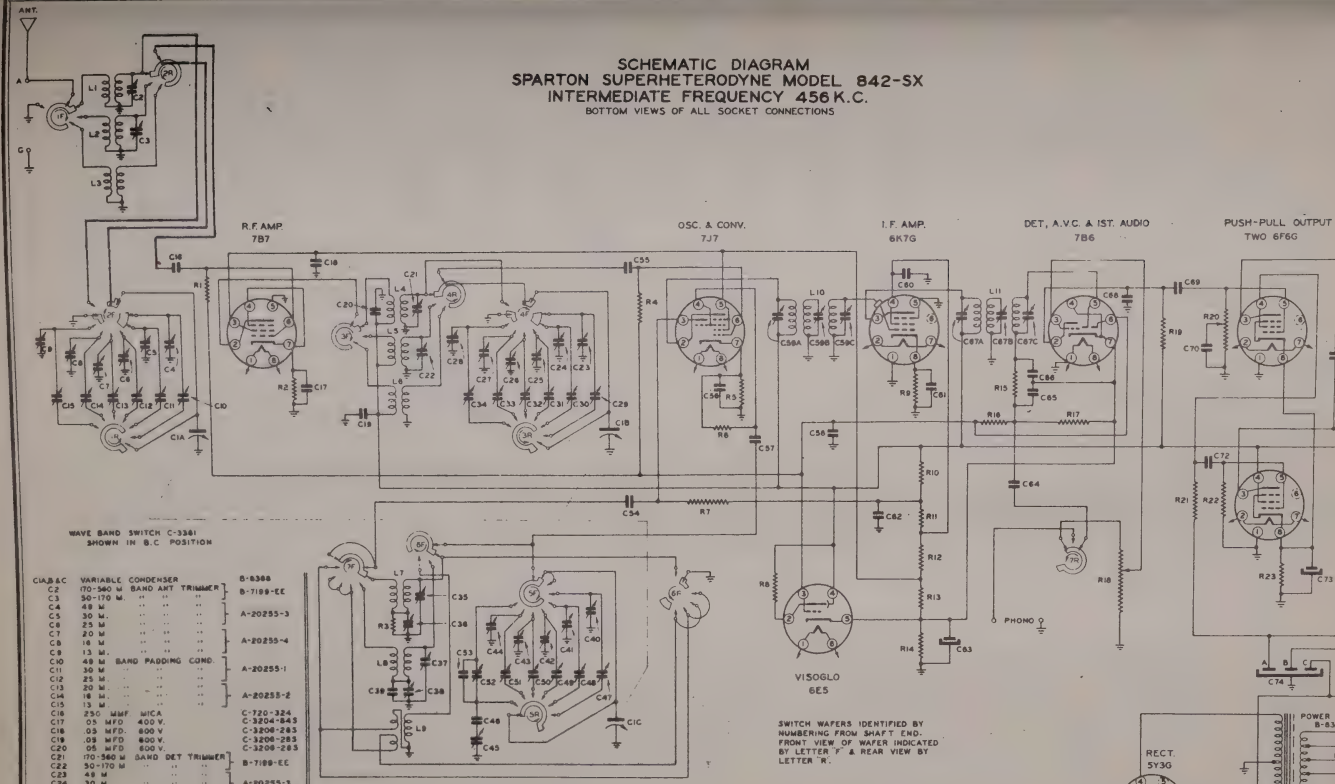
SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 842-SX
INTERMEDIATE FREQUENCY 456 K.C.
BOTTOM VIEWS OF ALL SOCKET CONNECTIONS



WAVE BAND SWITCH C-3381 SHOWN IN B.C. POSITION

SWITCH WAFERS IDENTIFIED BY NUMBERING FROM SHAFT END. FRONT VIEW OF WAFER INDICATED BY LETTER 'F' & REAR VIEW BY LETTER 'R'.

C1A,B,&C	VARIABLE CONDENSER	B-8388
C2	170-560 M BAND ANT TRIMMER	B-7189-EE
C3	50-170 M. " " "	
C4	49 M. " " "	
C5	30 M. " " "	A-20255-3
C6	25 M. " " "	
C7	20 M. " " "	A-20255-4
C8	16 M. " " "	
C9	13 M. " " "	
C10	49 M BAND PADDING COND.	A-20255-1
C11	30 M " " "	
C12	25 M. " " "	
C13	20 M. " " "	A-20255-2
C14	16 M. " " "	
C15	13 M. " " "	
C16	250 MMF MICA	C-720-324
C17	.05 MFD 400 V.	C-3204-845
C18	.05 MFD. 600 V.	C-3206-285
C19	.05 MFD 600 V.	C-3206-285
C20	.05 MFD 600 V.	C-3206-285
C21	170-560 M BAND DET TRIMMER	B-7189-EE
C22	50-170 M " " "	
C23	49 M " " "	
C24	30 M " " "	A-20255-3
C25	25 M " " "	
C26	20 M " " "	A-20255-4
C27	16 M. " " "	
C28	13 M. " " "	
C29	49 M " " " PADDER	A-20255
C30	30 M " " "	
C31	25 M " " "	
C32	20 M " " "	A-20255-2
C33	16 M " " "	
C34	13 M " " "	
C35	170-560 M BAND OSC TRIMMER	B-7189-BY
C36	170-560 M " " PADDER	
C37	50-170 M " " TRIMMER	B-7189-BY
C38	50-170 M " " PADDER	
C39	1100 MMF MICA	C-720-381
C40	49 M BAND OSC TRIMMER	
C41	30 M. " " "	A-20255-3
C42	25 M. " " "	
C43	20 M " " "	
C44	16 M " " "	A-20255-4
C45	13 M " " "	
C46	50 MMF COMPENSATING COND	A-20252-4
C47	49 M BAND OSC PADDER	
C48	30 M " " "	A-20255-1
C49	25 M " " "	
C50	20 M " " "	
C51	16 M " " "	A-20255-2
C52	13 M " " "	
C53	20 MMF COMPENSATING COND.	A-20252-5
C54	250 MMF. COMPENSATING COND.	A-20252-8
C55	250 MMF. MICA	C-720-324
C56	.05 MFD. 400 V.	C-3204-845
C57	100 MMF COMPENSATING COND.	A-20252-7
C58	.05 MFD 400 V.	C-3204-845
C58A,B,C	NO 1 I.F. TRIMMER	A-14782
C60	.05 MFD 600 V	C-3206-285
C61	.05 MFD 400 V	C-3204-845
C62	.01 MFD 600 V.	C-3208-205
C63	50 MFD. 25 V. ELECTROLYTIC	A-14782-10
C64	.02 MFD. 400 V.	C-3204-1345
C65	100 MMF. MICA	C-720-338
C66	100 MMF MICA	C-720-338
C67A,B,C	NO 2 I.F. TRIMMER	A-14782
C68	100 MMF MICA	C-720-339
C69	.05 MFD 600 V.	C-3206-845
C70	.003 MFD 600V	C-3208-625
C71	.003 MFD 600V	C-3208-625
C72	.05 MFD 600 V.	C-3206-845
C73	20 MFD 25V ELECTROLYTIC	A-14782-9
	A 15 MFD 450 V. ELECTROLYTIC	A-14884-7
C74	B 10 MFD 450 V	
	C 15 MFD 450 V	

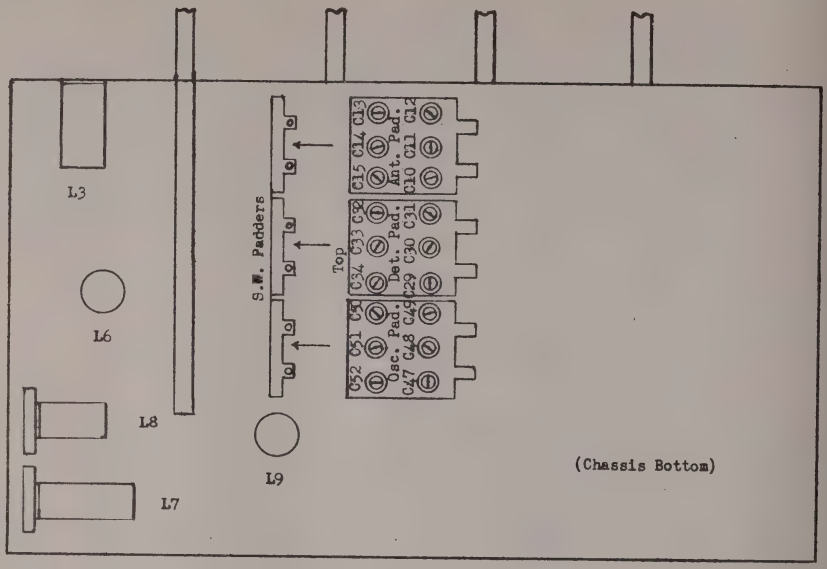
R1	2.2 MEGOHM	.25W	C-2795-102B
R2	1000 Ω	.25W.	C-2795-62B
R3	15,000 Ω	.25W.	C-2795-76B
R4	1 MEGOHM	.25W.	C-2795-98B
R5	1200 Ω	.25W.	C-2795-63B
R6	56,000 Ω	.25W.	C-2795-83B
R7	22,000 Ω	.5W.	C-2798-76C
R8	1 MEGOHM	.25W	C-2795-98B
R9	820 Ω	.25W	C-2795-154B
R10	12,000 Ω	3.W.	C-2799-75A
R11	6800 Ω	1.W.	C-2797-72B
R12	6800 Ω	1.W.	C-2797-72B
R13	18,000 Ω	3.W.	C-2799-68A
R14	220 Ω	.25W.	C-2795-143B
R15	56,000 Ω	.25W	C-2795-83B
R16	1 MEGOHM	.25W.	C-2795-98B
R17	560,000 Ω	.25W.	C-2795-95B
R18	2 MEGOHM VOL CONT		A-15140-1
R19	270,000 Ω	.25W	C-2795-91B
R20	5 MEG TONE CONT & SW.		A-15129-11
R21	2000 Ω	.25W	C-2795-166B
R22	470,000 Ω	.25W.	C-2795-94B
R23	240 Ω	3.W	C-2799-144A

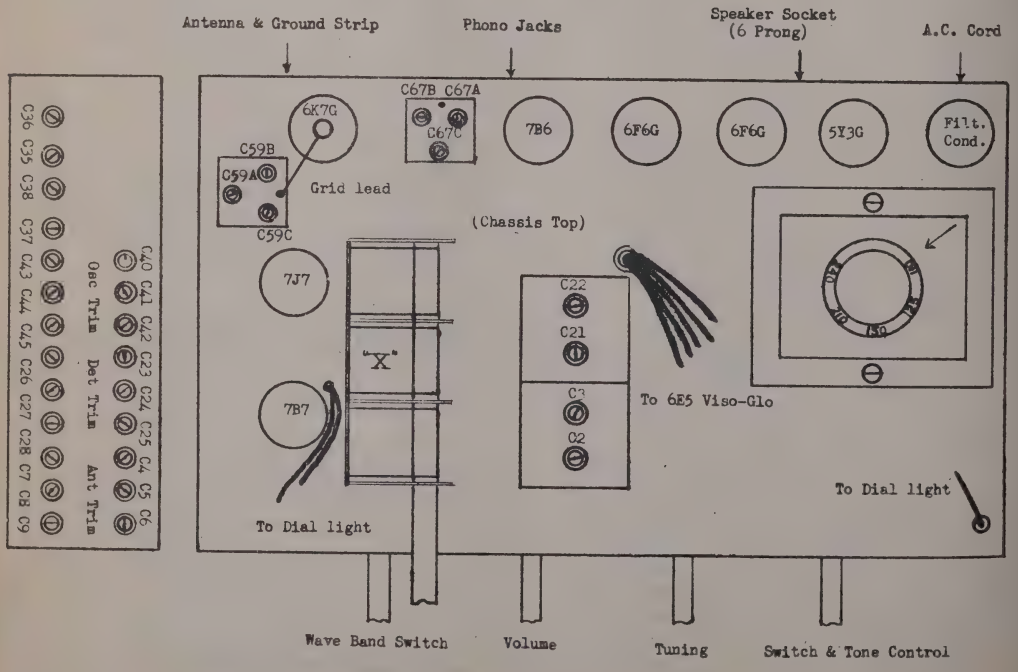
L1	B.C. ANT. COIL	A-14209-10
L2	POL. ANT. COIL	
L3	S.W. ANT. COIL	A-14980-8
L4	B.C. DET. COIL	A-14210-3
L5	POL. DET. COIL	
L6	S.W. DET. COIL	A-15837-2
L7	B.C. OSC. COIL	A-15394-2
L8	POL. OSC. COIL	A-15835-2
L9	S.W. OSC. COIL	A-15233-7
L10	NO. 1 I.F. COIL	A-14784-1
L11	NO. 2 I.F. COIL	A-14784-2
L12	FILTER CHOKE	A-15306-2

MODEL 842-SX

THE SPARKS WITHINGTON CO.

842-SX





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MODEL 842-SX

THE SPARKS WITHINGTON CO.

April 18, 1941

ALIGNMENT CHART

Sparton Superheterodyne Model 842 SX

(Important - Before any adjustments are made be sure to read the special note under Alignment Chart

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	BAND SWITCH SETTING	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set drive wheel so that pointer is at end of calibration scales with condenser gang fully meshed							
2	I.F.	Connect to Stator of Detector Section of C1 (See Chassis Diagram)	.1 mf.	170-560 Meters	(456 KC)	Open	C67B*	**
3							C67A C67C	Peak accurately
4							C67B*	Peak accurately
5							C59B*	**
6							C59A C59C	Peak accurately
7							C59B*	Peak accurately
8	CAUTION: Do not readjust trimmers C67A & C and C59A & C after red spot trimmers C67B & C59B have been peaked)							
9	170-560 Meter Band	ANT	See Note	170-560 Meters	200 M (1500 KC)	200 M	C35 Osc.	Trim.
							C21 Det.	Trim.
							C2 ANT.	Trim.
10					500 M (600 KC)	500 M	C36 Osc.	Pad.
11	(Repeat operation 9)							
12	(Check calibration and sensitivity at 200 M, 300 M and 500 M)							
13	50-170 Meter Band	ANT	See Note	50-170 Meters	55 M (5.46 MC)	55 M	C37 Osc.	Trim.
							C22 Det.	Trim.
							C3 ANT.	Trim.
14					150 M (2.0 MC)	150 M	C38 Osc.	Pad.
15	(Repeat operation 13)							
16	(Check calibration and sensitivity at 55M, 95M and 150M)							
17	49 Meter Band	ANT	See Note	49 Meters	35 M	35 M	C40 Osc.	Trim.
18					48 M	48 M	C47 Osc.	Pad.
19					35 M (8.55 MC)	35 M	C23 Det.	Trim.
							C4 ANT.	Trim.
20					48 M (6.27 MC)	48 M	C29 Det.	Pad.
							C10 ANT.	Pad.
21	(Check carefully all adjustments for 49 meter band. Be sure band limits are covered)							
22	30 Meter Band	ANT	See Note	30 Meters	27 M	27 M	C41 Osc.	Trim.
23					34.5 M	34.5 M	C48 Osc.	Pad.
24					27 M (11.2 MC)	27 M	C24 Det.	Trim.
							C5 ANT.	Trim.
25					34.5 M (8.69 MC)	34.5 M	C30 Det.	Pad.
							C11 ANT.	Pad.
26	(Check carefully all adjustments for 30 meter band. Be sure band limits are covered.							
27	25 Meter Band	ANT	See Note	25 Meters	22 M	22 M	C42 Osc.	Trim.
28					26 M	26 M	C49 Osc.	Pad.
29					22 M (13.6 MC)	22 M	C25 Det.	Trim.
							C6 ANT.	Trim.
30					26 M (11.5 MC)	26 M	C31 Det.	Pad.
							C12 ANT.	Pad.
31	(Check carefully all adjustments for 25 meter band. Be sure band limits are covered.)							

Continued

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MODEL 842-SX

THE SPARKS WITHINGTON CO.

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	BAND SWITCH SETTING	GENERATOR FREQUENCY	TUNING COND. SETTING	TRIMMER	REMARKS
32	20 Meter Band	ANT	See Note	20 Meters	18.5 M	18.5 M	C43 Osc.	Trim.
33					21.1 M	21.1 M	C50 Osc.	Pad.
34					18.5 M (16.2 MC)	18.5 M	C26 Det.	Trim.
							C7 Ant.	Trim.
35					21.1 M (14.2 MC)	21.1 M	C32 Det.	Pad.
							C13 Ant.	Pad.
36	(Check carefully all adjustments for 20 meter band. Be sure band limits are covered.)							
37	16 Meter Band	ANT	See Note	16 Meters	15.7 M	15.7 M	C44 Osc.	Trim.
38					17.7 M	17.7 M	C51 Osc.	Pad.
39					15.7 M (19.1 MC)	15.7 M	C27 Det.	Trim.
							C8 Ant.	Trim.
40					17.7 M (16.9 MC)	17.7 M	C33 Det.	Pad.
							C16 Ant.	Pad.
41	(Check carefully all adjustments for 16 meter band. Be sure band limits are covered.)							
42	13 Meter Band	ANT	See Note	13 Meters	13.8 M	13.8 M	C45 Osc.	Trim.
43					15.2 M	15.2 M	C52 Osc.	Pad.
44					13.8 M (21.7 MC)	13.8 M	C28 Det.	Trim.
							C9 Ant.	Trim.
45					15.2 M (19.7 MC)	15.2 M	C34 Det.	Pad.
							C15 Ant.	Pad.
46	(Check carefully all adjustments for 13 meter band. Be sure band limits are covered.)							

*Bronze color trimmer screw.
**Turn trimmer screw all the way down.
Note - Use dummy antenna described on page (1).

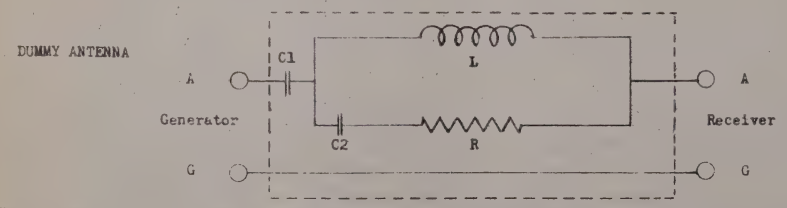
SPECIAL NOTE: All band trimmers should be adjusted to the fundamental of the test signal and not to the image.

VOLTAGE CHART

Line Voltage: 115 Volts
Position of Band Switch Broadcast
Position of Volume Control Full with Antenna Disconnected
Position of Tap Plug - 110 Volts

TUBE	FUNCTION	Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Dia.)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap.
7B7	R.F. Amplifier	0	290	75	4.2	0	0	4.2	6.1*	-
7J7	Osc - Converter	0	290	100	-1	75	4.1	4.5	6.1*	-
6K7G	I-F Amplifier	0	0	290	120	0	-	6.1*	9	0
7B6	2nd Det - AVC - 1st Audio	0	150	0	1.2	.5	0	1.2	6.1*	-
6F6G	Push-Pull Power Output	0	0	290	285	0	295	6.1*	20	-
6F6G	Push-Pull Power Output	0	0	290	285	0	295	6.1*	20	-
5Y3G	Rectifier	0	375*	0	350*	0	375*	0	350*	-
6E5	Viso-Glo	0	250	0	295	0	6.1*	-	-	-

Notes: Voltage readings are for schematic diagram in this bulletin. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter.
*AC volts.



Note: When using this dummy antenna the generator output impedance should be 10 ohms or lower.

C1 - 200 mmf. Condenser
C2 - 400 mmf. Condenser
R - 100 ohms Resistor
L - 20 microhenryies Choke
---- Case Shield

Choke Coil Specifications
Tubing - 3/8" diameter bakelite.
Wire - No. 38 Enameled.
Turns - 59 closely wound (Impregnated)

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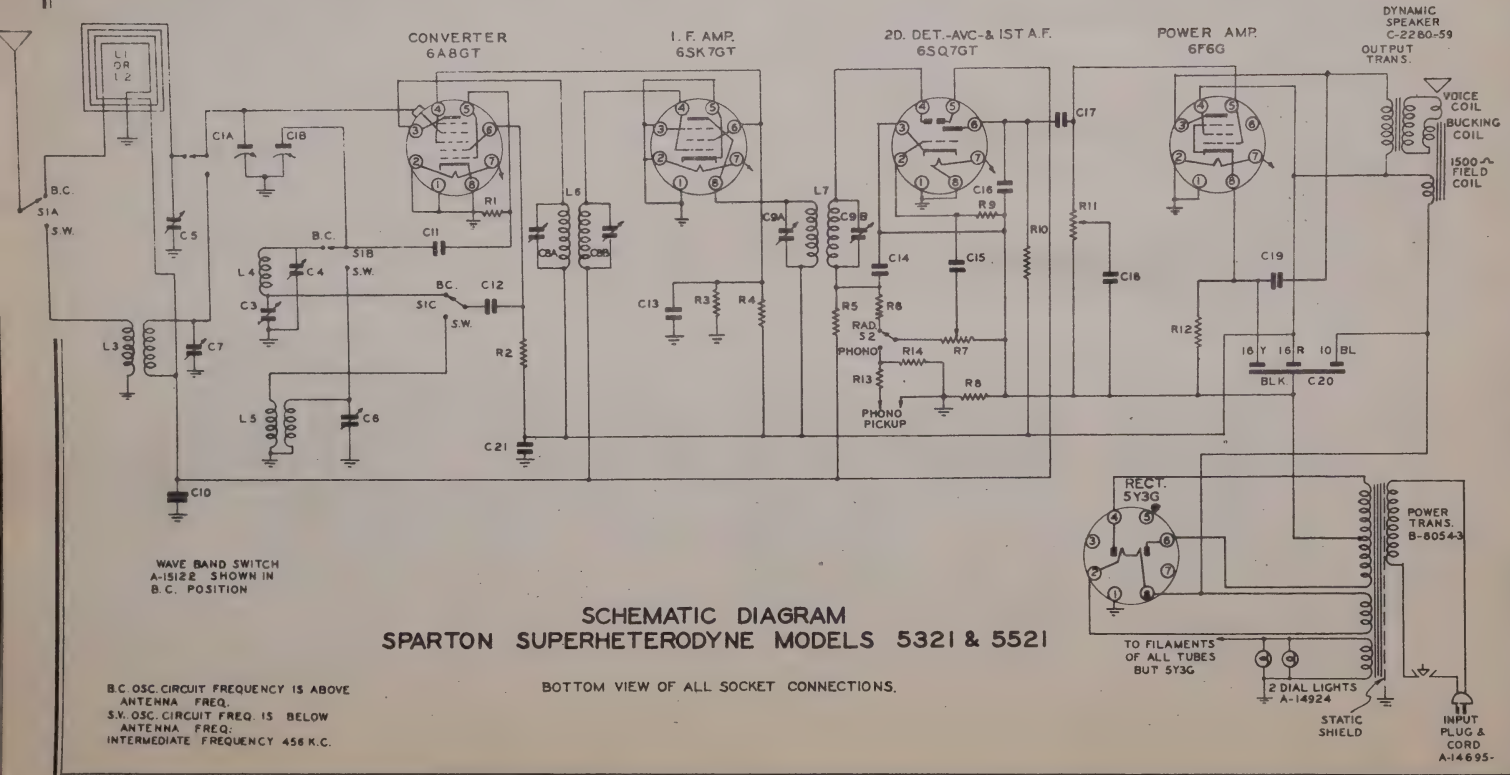
C1A&B	VARIABLE CONDENSER	B-8235
C-3	B.C OSC. PADDER	A-15758-1
C-4	B C OSC. TRIMMER	
C-5	B.C ANT TRIMMER	
C-6	S W OSC TRIMMER	
C-7	S W ANT TRIMMER	A-14088-5
C8A&B	NO.1 I.F. TRIMMER	B-7200-GN
C9A&B	NO.2 I.F. TRIMMER	B-7200-NN
C10	.05 MFD. 600V	C-3206-28C
C11	50 MMFD. MOLDED	C-720-372
C12	.001 MFD. 600 V.	C-3206-58C
C13	.1 MFD. 400V.	C-3204-38C
C14	250 MMFD. MOLDED	C-720-319
C15	.02 MFD. 400 V.	C-3204-22C
C16	100 MMFD. MOLDED	C-720-339
C17	.02 MFD. 600 V.	C-3206-22C
C18	.006 MFD. 400 V.	C-3204-68C
C19	.006 MFD. 600 V.	C-3206-68C
C20	16-16-10 MFD. ELECT.	A-14780-1
C21	.1 MFD. 600 V.	C-3206-38C
R1	33000 Ω .25W.	C-2795-80B
R2	22000 Ω .5W.	C-2796-78C
R3	47000 Ω 1W.	C-2797-82B
R4	22000 Ω 2W.	C-2798-191A
R5	3.3 MEG. .25W.	C-2795-104B
R6	27000 Ω .25W.	C-2795-79B
R7	.5 MEG. Ω VOL. CONT.	A-15130-5
R8	56 Ω .5W.	C-2796-47C
R9	5.6 MEG. .25W.	C-2795-107B
R10	270,000 Ω .25W.	C-2795-91B
R11	.5 MEG. TONE CONT. & SW.	A-15129-2
R12	680 Ω 1W.	C-2797-60B
R13	270000 Ω .25W. 5521 ONLY	C-2795-91B
R14	270000 Ω .25W. 5521 ONLY	C-2795-91B
L1	B.C. ANT. COIL-5521-	C-3290-8
L2	B.C. ANT. COIL-5321-	C-3290-9
L3	S.W. ANT. COIL	A-14682-15
L4	B.C. OSC. COIL	A-15920-1
L5	S.W. OSC. COIL	A-15233-16
L6	NO.1 I.F. COIL	A-12064-39
L7	NO.2 I.F. COIL	A-12064-49
S1A-B-C	WAVE BAND SW.	A-15122
S2	PHONO-RADIO SW.	A-15754-1



WAVE BAND SWITCH A-15122 SHOWN IN B.C. POSITION

SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODELS 5321 & 5521

BOTTOM VIEW OF ALL SOCKET CONNECTIONS.

B.C. OSC. CIRCUIT FREQUENCY IS ABOVE ANTENNA FREQ.
S.W. OSC. CIRCUIT FREQ. IS BELOW ANTENNA FREQ:
INTERMEDIATE FREQUENCY 456 K.C.

MODELS 5321,5521

THE SPARKS WITHINGTON CO.

Sparton Superheterodyne Models 5321 & 5521

VOLTAGE CHART

Line Voltage: 117 Volts A.C. — Position of Volume Control: Full with Dial Turned to Quiet Channel
Position of Band Switch: Broadcast

TUBE	FUNCTION	Voltage of Socket Prongs to Gnd. (See Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
6A8GT	Converter	0	6*	249	95	-8.2	162	0	0	-4.2
6SK7GT	I-F Amplifier	0	0	0	-2	0	95	6*	249	-
6SQ7GT	2nd Det & AVC	0	-1.4	-1.2	-1.6	-1.8	105	6*	0	-
6F6G	Power Amplifier	0	0	230	249	-.4	-1.2	6*	96	-
5Y3G	Rectifier	0	310	0	300*	0	300*	0	310	-

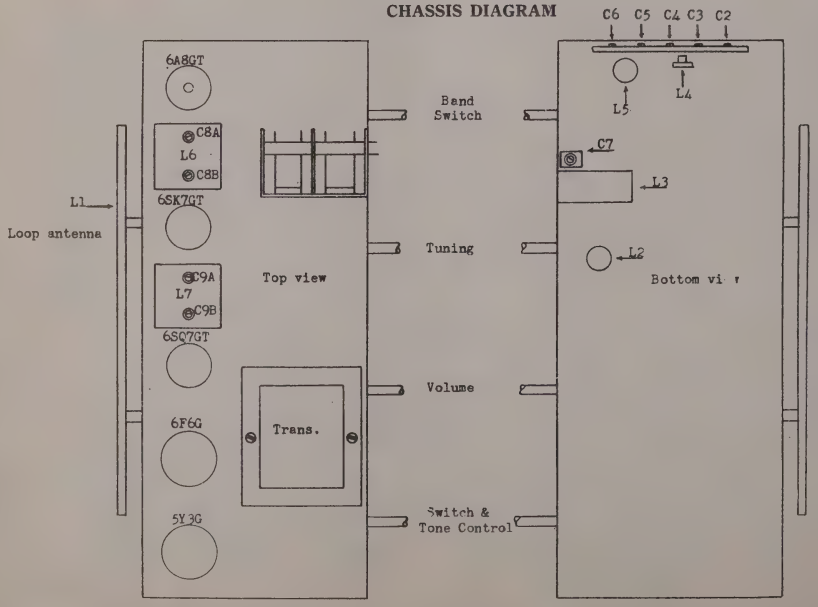
Notes: Voltage readings are for schematic in this Bulletin. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter.
*AC volts.

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	Set dial pointer even with left hand stop line when condenser plates are fully meshed.							
2	I.F.	6A8GT Grid	1mf.Con.	456 KC	Broad cast	Open	C9 A&B	Peak accurately
							C8 A&B	Peak accurately
3	BC	Ant.	200 mf. Cond.	1600 KC	BC	1600 KC	C4 Osc.Trim	Peak accurately
							C5 Ant.Trim	Peak accurately
4				600 KC	BC	1600 KC	C3 Osc. Pad	**
5	Repeat operation 3.							
6	Check calibration and sensitivity at 600 KC, 900 KC and 1600 KC.							
7	SW	Ant.	*	18 MC	SW	18 MC	C6 Osc.Trim	**
							C7 Ant.Trim	**
8	Repeat operation 7.							
9	Check calibration and sensitivity at 7 MC.							

*100 ohms and 200 mf. in series.
**Rock dial while adjusting for maximum output.

CHASSIS DIAGRAM



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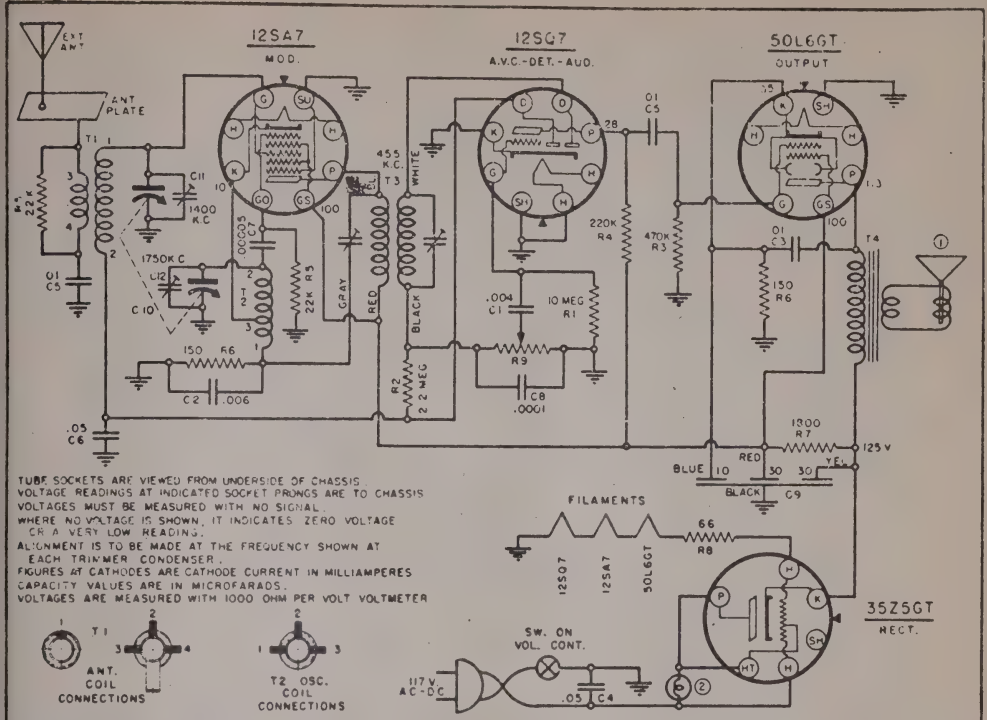
MODEL 1-40

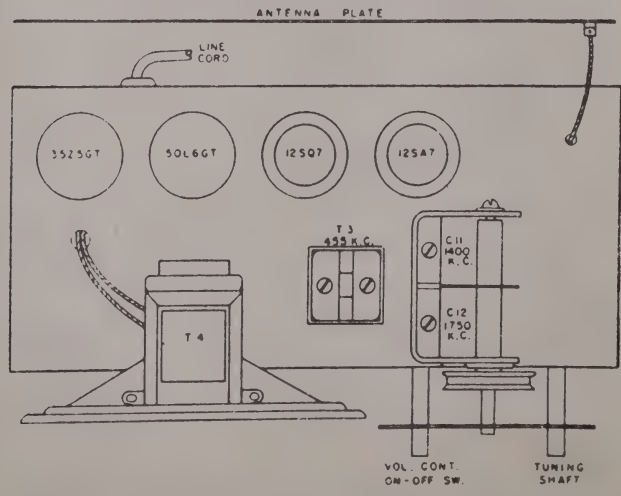


TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
WHERE NO VOLTAGE IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES
CAPACITY VALUES ARE IN MICROFARADS.
VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT VOLTMETER

CODE	PART NO.	DESCRIPTION
R 1	60-193	10 MEGOHM 1/4 W RESISTOR
R 2	60-179	2.2 " " "
R 3	60-178	470K OHM " "
R 4	60-180	220K " " "
R 5	60-185	22K " " "
R 6	60-184	150 " " "
R 7	60-438	1800 " 1/2 W. "
R 8	60-647	66 " 1 1/2 W. "
R 9	24-152	500K " VOL. CONT. & SW.

CODE	PART NO	DESCRIPTION
C 1	16-125	.004 MFD. 400V TUBULAR COND.
C 2	16-148	.006 " " " "
C 3	16-119	.01 " " " "
C 4	1607	.05 " " " "
C 5	16-121	.01 " 200V. "
C 6	1622	.05 " " " "
C 7	1503	.00005 MFD. MICA COND.
C 8	1501	.0001 " " "
C 9	18-265	30 X 30 AT 150V. & 10 AT 25V. ELECT.
C 10	19-169	2 GANG VAR. COND. ALSO C11 & C12

CODE	PART NO	DESCRIPTION
T 1	10-367	ANTENNA COIL
T 2	10-366	OSCILLATOR COIL
T 3	10-368	I.F. TRANSFORMER
T 4	80-205	OUTPUT TRANS. (ON SPKR)
(1)	79-305	5" P.M. SPEAKER
(2)	89-4	* 47 PILOT LIGHT



LOCATION OF PARTS ON TOP OF CHASSIS

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MODEL 512

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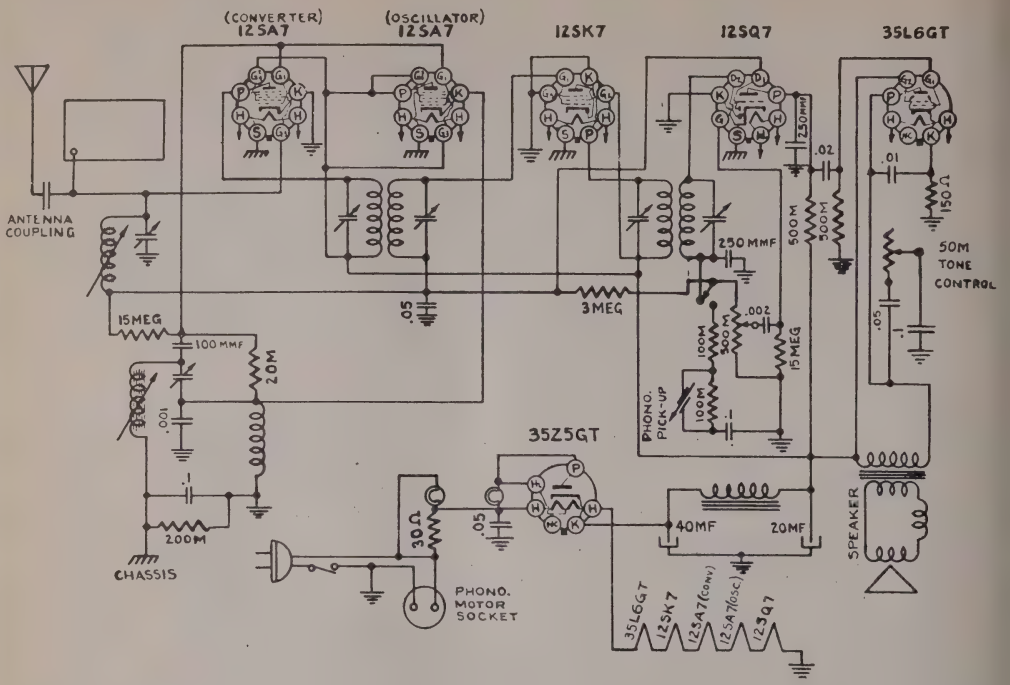

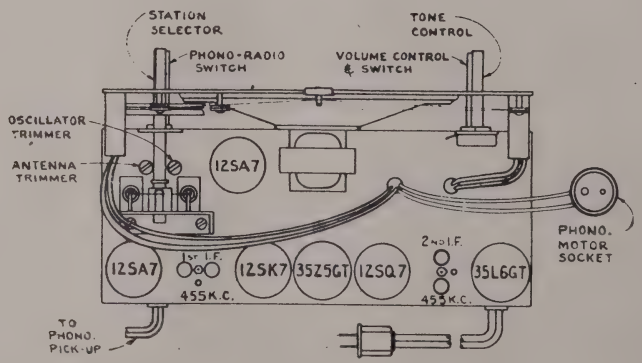

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TRIMMER TO TUNE	REMARKS
I. F. 455 kc	12SA7 Grid	.1 mfd	H. F. end	I. F. Transformers	Tune to Max.
1720 kc	Ext. Ant. Wire	200 mmf	H. F. end	Oscillator Trimmer	Set Limit of band
1400 kc	Ext. Ant. Wire	200 mmf	1400	Antenna Trimmer	Tune to Max.

FOR DATA ON DETROLA MODEL N-100 RECORD CHANGER, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".

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SPIEGEL, INC.

MODEL 572-1M

VOLTAGE CHART

"A" Battery voltage: 1½ volts
"B" Battery voltage: 90 volts

Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast

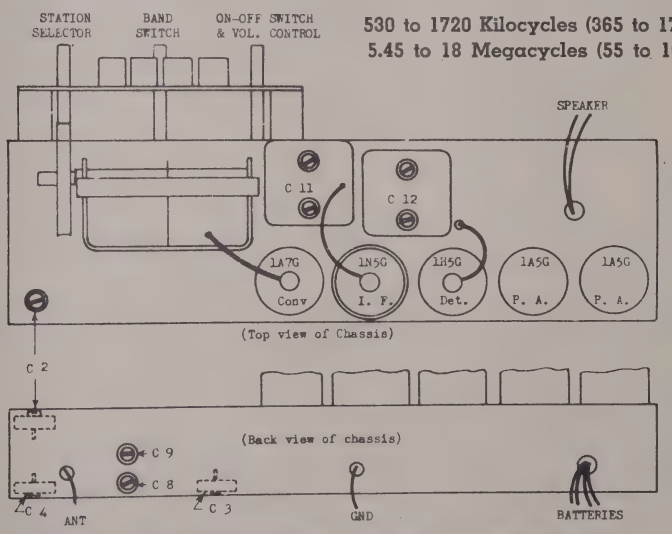
Tube	Function	Voltage of Socket Prongs to Gnd. (See Nos. on Schematic Diagram)								
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	Grid Cap
1A7G	Osc. - Converter	83	1.3	83	18	*	83	0	83	0
1N5G	I.F. Amp.	0	1.3	83	83	-	-	0	0	0
1H5G	Det. AVC-AF	-	1.2	*	-	0	0	0	-	0
1A5G	P.A.	-	1.3	78	83	0	-	0	0	-
1A5G	P.A.	-	1.3	78	82	0	-5	0	0	-

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter.
*Cannot be measured with 1000 ohms per volt voltmeter.

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set pointer even with last calibration mark when condenser gang is closed)							
2	I.F.	1A7G Grid	.1 mf.	456 KC	BC	Open	C12 A&B C11 A&B	
3	I-F Rej.	Ant.	200 mf.	456 KC	BC	Closed	C2	Adjust to minimum
4	Broadcast Band	Ant.	200 mf.	1500 KC	BC	1500 KC	C8 (Osc.) C3 (Ant.)	
5				600 KC	BC	600 KC	C9 (Pad.)	**
6	(Repeat operation 4).							
7	(Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC)							
8	SW Band	Ant.	*	18 MC	SW	18 MC	C4 (Ant.)	**
9	(Check calibration and sensitivity at 6, MC and 18. MC)							
10	(Check operations 1 to 9 inclusive.)							

*100 ohm non-inductive resistor and 200 mmf. condenser in series.
**Rock dial while making this adjustment. Make certain that adjustment is made on fundamental signal and not on image. Peak accurately.



ADJUSTING THE PUSH-BUTTON TUNER

Pull off push-button knobs so that slots in end of shafts are accessible.

Using a small screwdriver or other tool that will fit the slot in the end of the shaft, push the shaft in as far as it will go and turn to the right or left until the dial pointer has moved to the desired station frequency. Be sure the shaft is pushed all the way in and the station is tuned in accurately.

Repeat the procedure for each of the remaining three buttons.

Check all buttons by pushing them in, one at a time, to determine whether desired stations are tuned properly.

Insert proper tab in end of each button knob, and replace knob.

Any of the four stations to which the push-button tuner has been adjusted may now be received simply by pushing the button for the desired station.

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MODEL 572-1M
MODEL 630-6

SPIEGEL, INC.

C1A&B VARIABLE CONDENSER B-8188
C2 I.F. REJECTOR TRIMMER A-14088-2
C3 B.C. ANT TRIMMER A-14088-1
C4 S.W. ANT TRIMMER A-14088-3
C5 S.W. OSC. PADDER C-3202-34C
C6 100 MMF MICA C-720-323
C7 .001 MFD. 200V. C-3202-39C
C8 .05 MFD. 400V. MOLDED A-1567
C9 B.C. OSC. PADDER A-15573
C10 1940 MMF MICA C-720-387
C11A&B NO.1 I.F. TRIMMER B-7200-GG
C12A&B NO. 2 I.F. TRIMMER B-7200-GG
C13 .05 MFD. 200V C-3202-28C
C14 100 MMF MICA
C15 100 MMF MICA A-1567-1
C16 100 MMF MICA
C17 .01 MFD. 400V C-3204-32C
C18 100 MMF MICA C-720-323
C19 .05 MFD. 200V C-3202-39C
C20 8 MFD. 150V. ELECT A-14958
C21 .001 MFD. 1000V C-3210-114C
R1 180,000 Ω. 25W C-2795-89B
R2 1000 Ω. 25W C-2795-65B
R3 2.2 MEGOHMS 25W C-2795-102B
R4 2.2 MEGOHMS 25W C-2795-102B
R5 56,000 Ω. 25W C-2795-83B
R6 1000 Ω. 25W C-2795-65B
R7 10 MEGOHM C-2795-110B
R8 1 MEGOHM C-2795-98B
R9 2.2 MEGOHMS 25W C-2795-102B
R10 560 Ω. 25W C-2795-73B
L1 I.F. REJECT COIL A-14718-1
L2 B.C. ANT COIL A-14974-3
L3 S.W. ANT COIL A-14982-14
L4 B.C. OSC. COIL A-15352-5
L5 S.W. OSC. COIL A-15233-15
L6 NO. 1 I.F. COIL A-12084-35
L7 NO. 2 I.F. COIL A-12084-35
L8 OSC. PLATE CHOKE A-14718-1
C1A&B VARIABLE CONDENSER B-8084
C2 B.C. ANT. TRIMMER A-14199-5
C3 S.W. ANT. TRIMMER
C4 B.C. OSC. PADDER A-14088-5
C5 S.W. ANT TRIMMER A-14088-6
C6 330 MMFD. MOLDED C-720-315
C7 250 MMFD. MOLDED C-720-324
C8 .05 MFD. 200 V. C-3202-34C
C9 .05 MFD. 200 V. C-3202-34C
C10 .1 MFD. 200 V. C-3202-38C
C11 .1 MFD. 200 V. C-3202-38C
C12 .02 MFD. 800 V. C-3205-22C
C13 .02 MFD. MOLDED C-3204-32C
C14 100 MMFD. MOLDED C-720-323
C15 250 MMFD. MOLDED C-720-324
C16 .1 MFD. 200 V. C-3202-38C
C17 .001 MFD. 400 V. C-3204-58C
C18 .02 MFD. 400 V. C-3204-78C
C19-A&C .05-.05 MFD. DCO. ELECT A-14085-1
C20 .01 MFD. 600 V. C-3205-18C
C21 .1 MFD. 200 V. C-3202-38C
C22 .1 MFD. 200 V. C-3202-38C
C23A&B NO.1 I.F. TRIMMER C-2795-89B
C24A&B NO.2 I.F. TRIMMER B-7200-GN
C25 250 MMFD. MOLDED C-720-324
R1 34000 Ω. 25 W. C-2795-83B
R2 18000 Ω. 5W. C-2796-77C
R3 470000 Ω. 25W. C-2795-128
R4 1000000 Ω. 25W. C-2795-139
R5 VOLUME CONTROL A-15301-1
R6 47000 Ω. 25 W. C-2795-23B
R7 47 MEGOHM 25 W. C-2795-98B
R8 2200 Ω. 25W. C-2795-69B
R9 3600 Ω. 25W. C-2795-172B
R10 220000 Ω. 25 W. C-2795-27B
R11 1000 Ω. 25W. C-2795-65B
R12 TONE CONTROL A-15128
R13 330 Ω. 5W C-2796-10C
R14 1000 Ω. 5W C-2796-65C
R15 68 Ω. 5W C-2796-8C
R16 68 Ω. 5W C-2796-8C

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SPIEGEL, INC.

VOLTAGE CHART

Condition of Storage Battery - Good (6 Volts) Position of Volume Control: Full with Antenna Disconnected
Band Switch - Broadcast

Tube	Function	Voltage of Socket Prongs to Gnd. (See Nos. on Schematic Diagram)							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
7A8	Converter	6	110	45	-20	45	0	0	0
7B7	Oscillator	6	110	110	0	0	-20	0	0
7B7	I. F. Amp.	6	110	45	0	0	0	0	0
7A6	2 Det. AVC	6	0	0	0	0	0	0	0
7C6	1st Aud. Amp.	6	16	0	—	0	0	0	0
6G6G	Power Amp.	0	0	110	115	0	—	6	0

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% - or - on all measurements Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter.

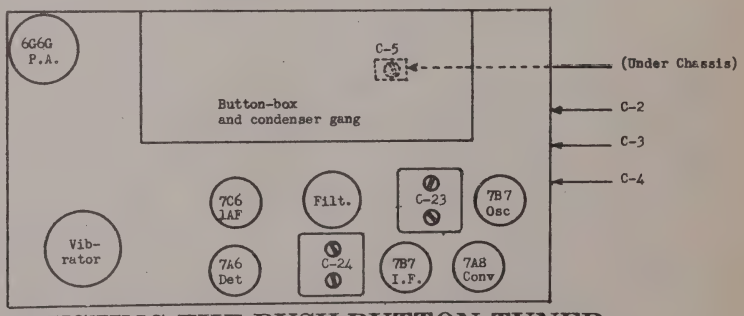
ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	Set dial pointer to last dial mark when condenser plates are flush							
2	I.F.	Ant.	.1	456	BC	Open	C-24 A & B	Peak Accurately
							C-23 A & B	Peak Accurately
3	Broadcast Band	Ant.	200 mmf.	1500	BC	1500	C-3 Osc.	Peak Accurately
							C-2 Ant.	Peak Accurately
4				600	BC	600	C-4 Pad.	Peak Accurately
5	(Repeat operation 3)							
6	(Check calibration and sensitivity at 600KC, 900 KC and 1500 KC)							
7	S.W. Band	Ant.	*	18MC	SW	18MC	C-5 Ant.	**
8	(Check calibration and sensitivity at 6.0 MC and 18.0 MC)							
9	(Check operation 1 to 8 inclusive)							

*100 ohm non-inductive resistor and 200 mmf. condenser in series.
**Rock dial while making this adjustment. Make certain that adjustment is made on fundamental signal and not on image. Peak accurately.

Selector Switch	Dial Scale	Meters	or	Kilocycles	or	Megacycles
"B" Broadcast	Upper	550 to 174		545 to 1725		.54 to 1.7
"S" Short-Wave	Lower	54 to 15		5600 to 20000		5.6 to 20.

(Front of Chassis)



MODEL 630-6

Battery Operated

ADJUSTING THE PUSH BUTTON TUNER

TO ADJUST BUTTONS, loosen selected button by turning one-half turn to the left (counter-clockwise). Push this loosened button in as far as it will go, and while in this position, tune in manually the station desired or indicated by tab in end of button.

Then, with the button still pushed in as far as it will go, tighten by turning button to the right (clockwise) until it can be tightened no more.

Be sure the station is tuned in accurately when pushed in button is tightened.

Repeat the procedure for each of the remaining three buttons and stations.

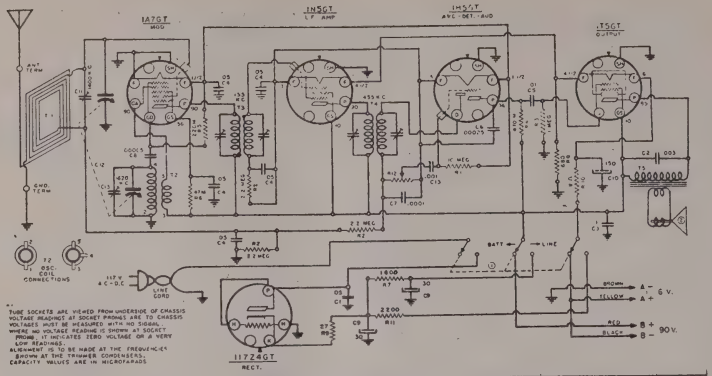
Be sure the buttons have been tightened firmly.

Check all buttons by pushing them in, one at a time, to determine whether desired stations are tuned in properly.

Any of the four stations to which the push button tuner has been adjusted may now be instantly received simply by pushing the button for the desired station.

MODEL EP-2121
MODELS DP-7450,EP-2450

SPIEGEL. INC.



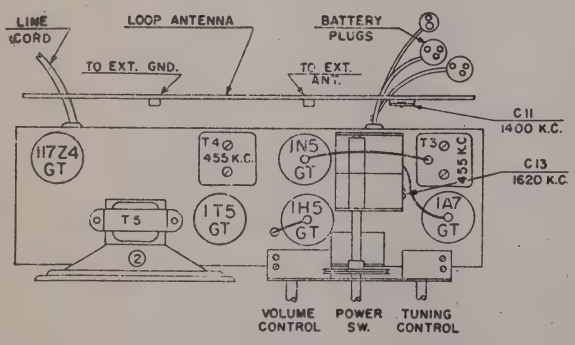
CODE	PART NO	DESCRIPTION
C1	16-139	.05 MFD. 400 V. TUBULAR COND.
C2	16-139	.003 " " " "
C3	16-139	.1 " " " "
C4	1622	.05 " " " "
C5	16-121	.01 " " " "
C6	1504	.00025 MFD. MICA CONDENSER
C7	1501	.0001 " " "
C8	1505	.002 " " "
C9	18-356	30-30 MFD. 150 W.V. ELECTROLYTIC
C10	18-271	150 " 25 W.V. "
C11	20-123	TRIMMER ON LOOP
C12	19-173	2 GANG VARIABLE COND. ALSO C13
C13	16-124	.001 MFD. 400 V. TUBULAR COND.

CODE	PART NO	DESCRIPTION
R1	60-193	10 MEGOHM 1/2 W RESISTOR
R2	60-178	22 " " "
R3	60-193	10 " " "
R4	60-178	470 M OHM "
R5	60-190	2.2 M "
R6	60-187	1 M "
R7	60-157	1800 " "
R8	60-179	680 " "
R9	60-181	27 " "
R10	66-128	5 " 1/2 W "
R11	60-182	2200 " 2 W. "
R12	24-150	1 MEGOHM VOLUME CONTROL

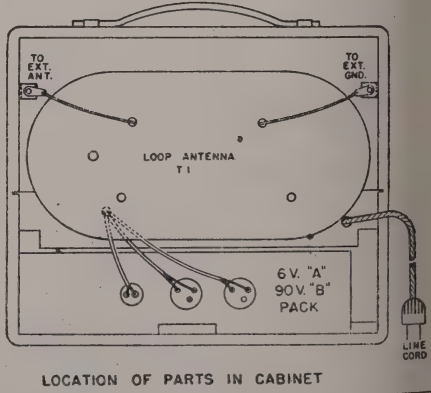
CODE	PART NO	DESCRIPTION
T1	88-83	LOOP ANTENNA
T2	10-310	OSCILLATOR COIL
T3	10-309	1ST I.F. TRANSFORMER
T4	10-343	2 ND " "
T5	.....	OUTPUT TRANSFORMER
P	69-181	POWER SWITCH
Z	78-314-A	5" P M SPEAKER

2-54

MODEL EP-2121



LOCATION OF PARTS ON TOP OF CHASSIS



LOCATION OF PARTS IN CABINET

I. F. ALIGNMENT

MODELS DP-7450 EP-2450 ALIGNMENT

Set the variable condenser at minimum capacity, (dial pointer at 1550 K. C.). Connect the two leads from a good, modulated signal generator, the ground lead to the radio chassis and the other lead through a .1 mfd. condenser, to the grid cap of the 6A8GT with the tube's grid lead still in place.

Connect the leads from a fully charged 6 volt storage battery to the receiver chassis and battery lead, the polarity being reversible.

With the set in operation and the volume control full on, set the signal generator to 456 K. C. and increase its output until the signal is heard in the set's speaker. Starting with the second I. F., adjust the I. F. trimmers for maximum output, decreasing he signal generator output as the receiver output increases.

The generator output in all the alignment adjustments should be adjusted so the meter will read approximately .4 volts continually.

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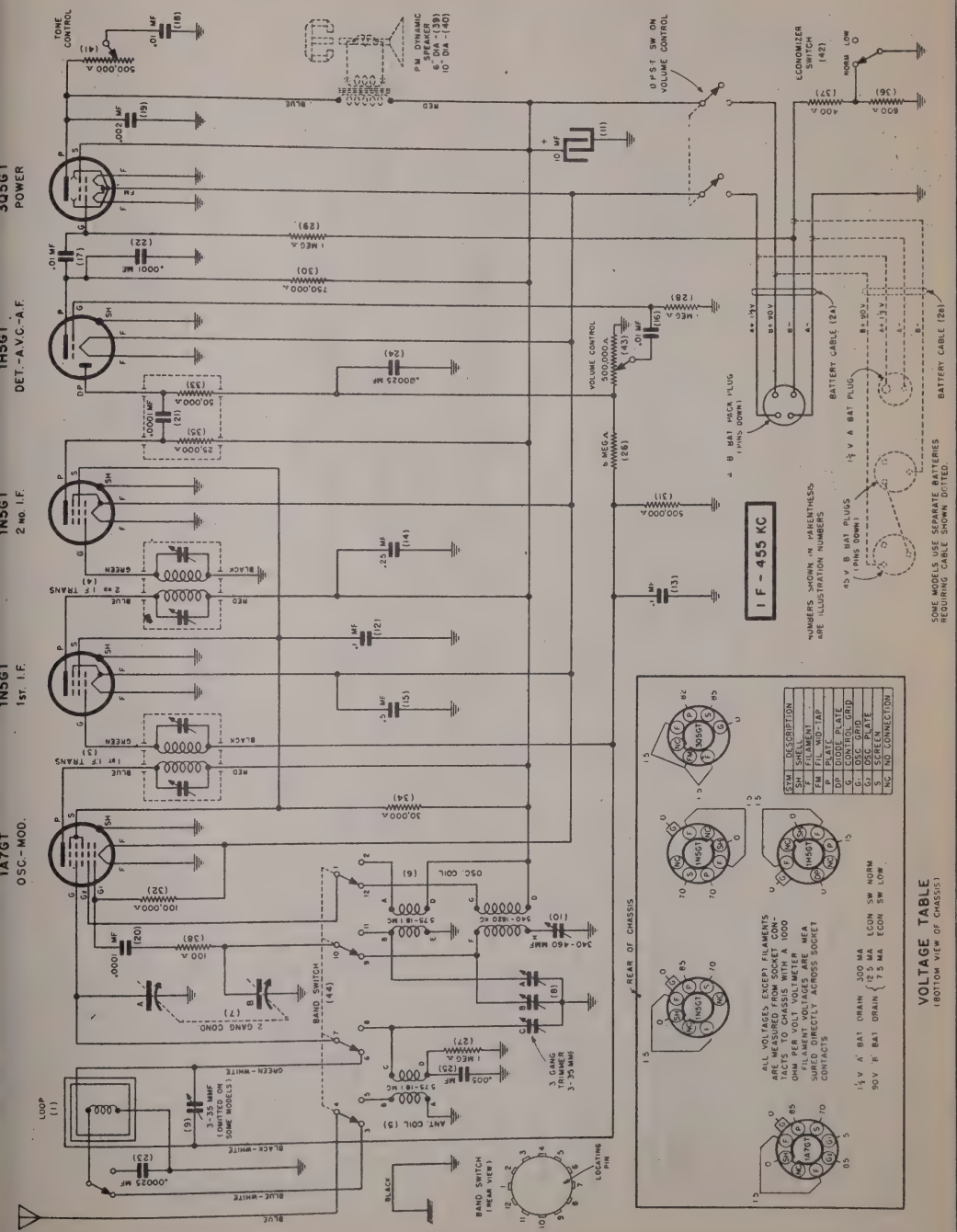
MODEL 604

SPIEGEL, INC.



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5.75-18.1 M. C. — 52.2-16.6 METER BAND
USE SECTION OF THE DIAL that is calibrated from 5.75-18.1 M. C.

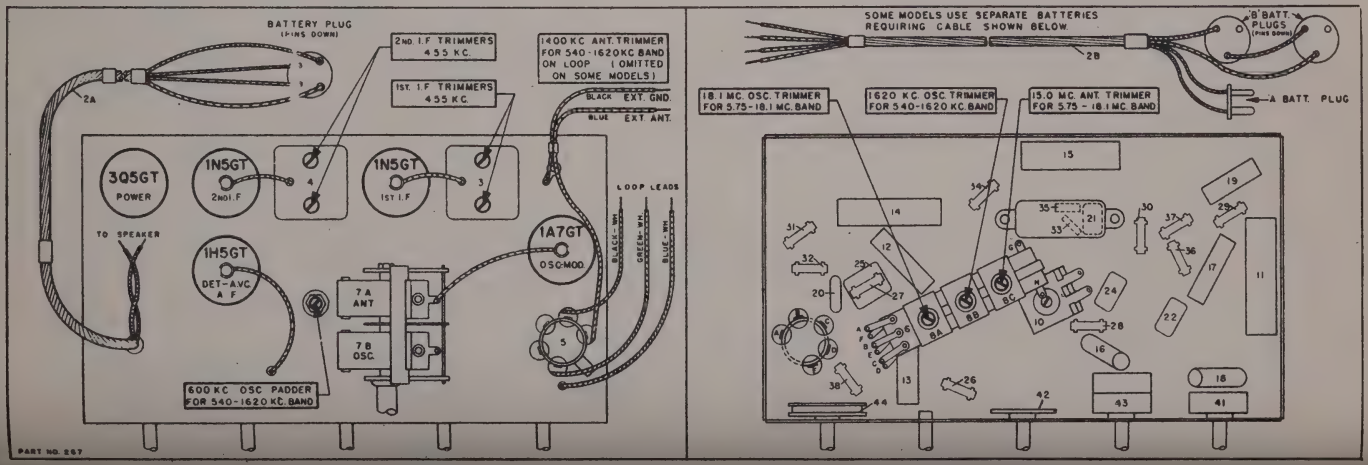
540-1620 K.C.—555-185 METER BAND
USE SECTION OF DIAL THAT IS CALIBRATED FROM 540-1620 K.C.—555-185 METERS.

ALIGNMENT PROCEDURE

For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third. IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME POSITION IT WILL BE IN WHEN THE SET IS IN THE CABINET.

When adjusting 1620 kilocycle oscillator trimmer, 600 K.C. padder, and 1400 kilocycle antenna trimmer, do not connect test oscillator to loop. Couple test oscillator to receiver loop by: (a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator. (b) Place test oscillator loop near set loop—Be SURE THAT NEITHER MOVES WHILE ALIGNING.

Place band switch for operation on:	Set receiver dial to:	TEST OSCILLATOR: Adjust test Oscillator frequency to:	TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of:	TEST OSCILLATOR: Attach output of test oscillator to:	Refer to parts layout diagram for location of trimmers mentioned below:
I. F. alignment use any band position.	Any point where no interfering signal is received	Exactly 455 K.C.	0.2 Mfd. condenser	High side to grid cap of 1A7GT tube. Low side to frame of condenser through .01 Mfd. condenser.	Adjust each of the second I.F. transformer trimmers for maximum output, then adjust each of the first I.F. transformer trimmers for maximum output.
1620 to 540 K.C. Band	1 Exactly 1620 K.C.	Exactly 1620 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of condenser through .01 Mfd. condenser.	Adjust 1600 K.C. oscillator trimmer for maximum output.
	2 Approx. 1400 K.C.	Approx. 1400 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of condenser through .01 Mfd. condenser.	While rocking gang condenser adjust 1400 K.C. loop trimmer for maximum output.
	3 Approx. 600 K.C.	Approx. 600 K.C.	None	Use Small Loop to couple test oscillator to receiver loop. Low side to frame of condenser through .01 Mfd. condenser.	While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output.
5.75 to 18.1 M.C. Band	1 Exactly 18.1 M.C.	Exactly 18.1 M.C.	400 Ohm carbon resistor	High side to Blue Ant. Lead, Low side to black ground lead.	Adjust 18.1 M.C. oscillator trimmer for maximum output.
	2 Approx. 15 M.C.	Approx. 15 M.C.	400 Ohm	High side to Blue Ant. Lead, Low side to black ground lead.	While rocking gang condenser adjust 15 M.C. antenna trimmer for maximum output.


BATTERY PLUG (PINS DOWN)
2ND I.F TRIMMERS 455 KC.
1ST. I.F TRIMMERS 455 KC.
1400 KC ANT. TRIMMER FOR 540-1620 KC. BAND (OMITTED ON SOME MODELS)
BLACK EXT. GND.
BLUE EXT. ANT.
3Q5GT POWER
1N5GT 2ND I.F
1N5GT 1ST I.F
1H5GT DET-AVC A F
1A7GT OSC-MOD
TO SPEAKER
LOOP LEADS
7A ANT
7B OSC.
600 KC OSC PADDER FOR 540-1620 KC. BAND
SOME MODELS USE SEPARATE BATTERIES REQUIRING CABLE SHOWN BELOW.
B BATT. PLUGS (PINS DOWN)
A BATT. PLUG
18.1 MC. OSC. TRIMMER FOR 5.75-18.1 MC. BAND
1620 KC. OSC. TRIMMER FOR 540-1620 KC. BAND
15.0 MC. ANT. TRIMMER FOR 5.75-18.1 MC. BAND
PART NO. 267

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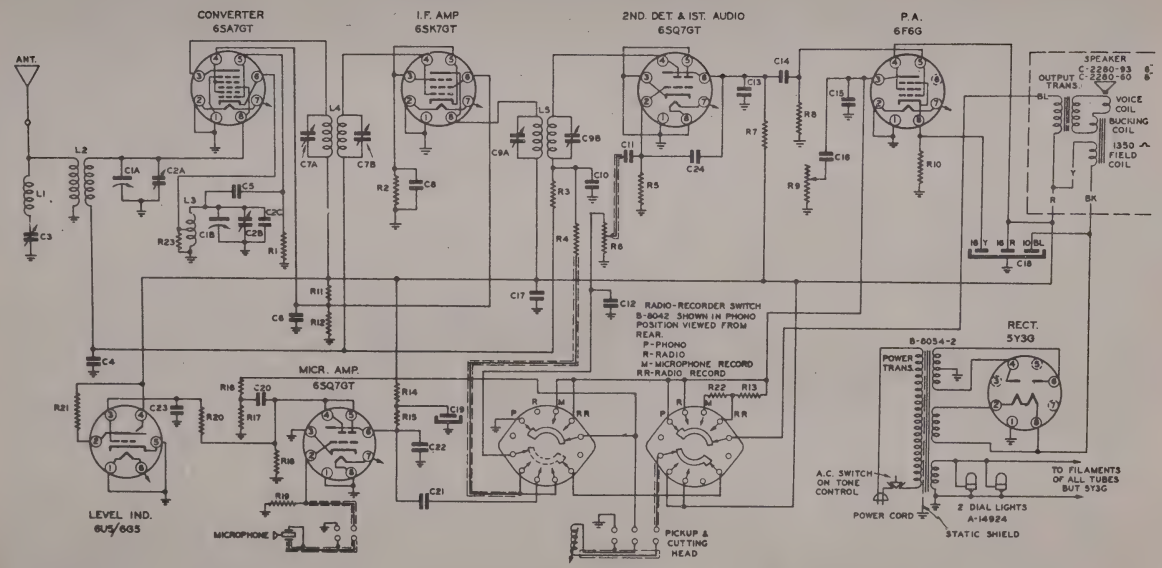
SCHEMATIC DIAGRAM
AIR CASTLE SUPERHETERODYNE MODEL 661
INTERMEDIATE FREQUENCY 456 K.C.

BOTTOM VIEWS OF ALL SOCKET CONNECTIONS



C1A&B	VARIABLE CONDENSER	B-8225	C13	100 MMF. MICA	C-720-339	R1	27,000 Ω .25W.	C-2795-79B	R12	68,000 Ω .25W.	C-2795-84B	L1	I.F. REJECT. COIL	A-14718-1
C2A,B,C	TRIMMERS ON VAR. COND.		C14	.02 MFD. 400 V.	C-3204-22C	R2	330 Ω .25W.	C-2795-56B	R13	22,000 Ω 1W.	C-2797-78B	L2	B.C. ANT. COIL	A-14974-4
C3	I.F. REJECT. TRIMMER	A-14088-2	C15	.003 MFD. 600 V.	C-3204-32C	R3	1 MEGOHM .25W.	C-2795-99B	R14	220,000 Ω .25W.	C-2795-90B	L3	B.C. OSC. COIL	A-15232-4
C4	.05 MFD. 200 MFD.	C-3202-28C	C16	.03 MFD. 600 V.	C-3208-80C	R4	27,000 Ω .25W.	C-2795-79B	R15	100,000 Ω .25W.	C-2795-86B	L4	NO. 1 I.F. COIL	A-12064-41
C5	50 MMF. MICA	C-720-372	C17	.05 MFD. 400 V.	C-3204-28C	R5	5.6 MEGOHM .25W.	C-2795-107B	R16	1.5 MEGOHM .25W.	C-2795-100B	L5	NO. 2 I.F. COIL	A-12064-17
C6	.05 MFD. 400 V.	C-3204-28C	C18	16-16-10 MFD. ELECT.	A-14780-2	R6	500,000 Ω VOL. CONT.	A-15130-5	R17	1.2 MEGOHM .25W.	C-2795-99B			
C7A&B	NO. 1 I.F. TRIMMER	B-7200-GN	C19	8 MFD. 250 V.	A-14782-1	R7	220,000 Ω .25W.	C-2795-90B	R18	10 MEGOHM .25W.	C-2795-110B			
C8	.05 MFD. 200 V.	C-3202-28C	C20	.01 MFD. 400 V.	C-3204-76C	R8	560,000 Ω .25W.	C-2795-93B	R19	5.6 MEGOHM .25W.	C-2795-107B			
C9A&B	NO. 2 I.F. TRIMMER	B-7200-GN	C21	.02 MFD. 400 V.	C-3204-22C	R9	TONE CONTROL & SW.	A-15128	R20	1 MEGOHM .25W.	C-2795-99B			
C10	100 MMF. MICA	C-720-339	C22	.01 MFD. 400 V.	C-3204-76C	R10	470 Ω 1W.	C-2797-56B	R21	220,000 .25W.	C-2795-90B			
C11	.02 MFD. 200 V.	C-3202-22C	C23	.01 MFD. 400 V.	C-3204-76C	R11	15,000 Ω 2W.	C-2798-76A	R22	56,000 Ω .25W.	C-2795-83B			
C12	250 MMF. MICA	C-720-324	C24	12 MMF. MICA	C-720-356				R23	330 Ω .25W.	C-2795-56B			

1. **DESCRIPTION:** Table Model Radio-Phonograph and Record Maker Combination featuring full vision, illuminated Dial for extended Broadcast Band; Automatic Volume Control; Interference Rejector; Continuously Variable Tone Control; high quality Microphone; Selector Switch, enabling the user to make home recordings of radio programs or by means of the microphone, to play records and to use the set as a regular Radio Receiver; Level Indicator Tube ("Eye") for Recording; and six-inch Dynamic Speaker.

BROADCAST BAND
540 to 1700 Kilocycles
555 to 176 Meters

MODEL 661

SPIEGEL, INC.

Superheterodyne Model 661

VOLTAGE CHART

Line voltage: 117 volts

Position of Volume Control; Full with Ant. disconnected

Position of Band Switch: Broadcast

Tube	Function	Voltage of socket prongs to Gnd. (See prong no's. on diagram)							
		No 1	No 2	No 3	No 4	No 5	No 6	No 7	No 8
6SA7GT	Oscillator-Converter	0	0	220	77	-7.2	0	6.1*	0
6SK7GT	I-f Amplifier	0	0	2.7	0	2.7	77	6.1*	220
6SQ7GT	Det-AVC-1st Audio	0	**	0	0	0	58	6.1*	0
6F6G	Power Amplifier	0	0	200	220	0	57	6.1*	15
6SQ7GT	Microphone Amplifier	0	**	0	**	**	45	6.1*	0
6U5/6G5	Record. Level Indicator	6.1*	19	0	220	0	0	-	-
5Y3G	Rectifier	0	320*	-	280*	-	280*	-	320*

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless otherwise designated, voltages in table are + DC voltages.

* AC volts

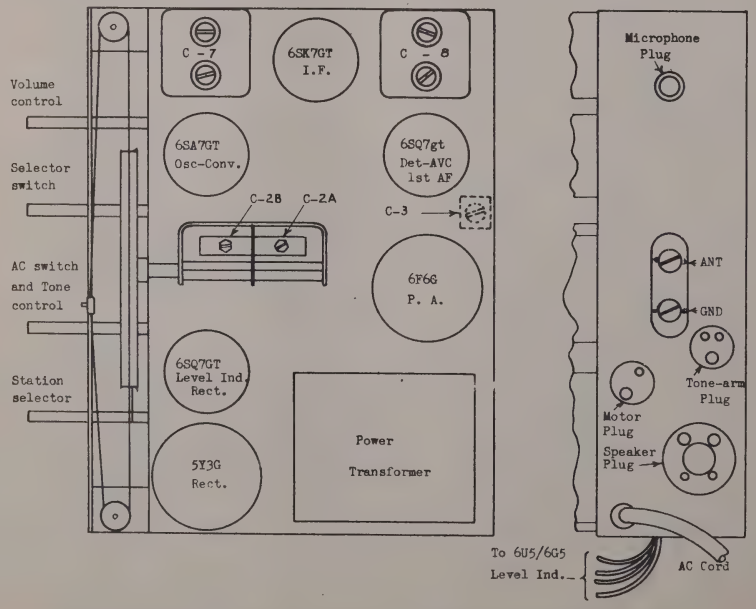
** Cannot be measured with 1000 ohms/volt voltmeter.

Check cutting head voltage with cutting head connected using signal generator (1000 KC 30% modulated) connected to "Ant" and "Gnd". With Selector switch in "Record Radio" position, advance gain until Level Indicator (6U5/6G5 tube) closes without over-lapping. AC voltage as measured from 6F6G plate to ground (AC meter in series with .1 mf. 400 volt condenser) should be approximately 52 volts.

ALIGNMENT CHART

OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	(Set pointer to last calibration mark at low end of dial with condenser gang fully closed)							
2	I. F.	Ant.	.1 mf.	456 kc	*	open	C8 A & B	2nd. I.F.
							C7 A & B	1st. I.F.
3	Rejector	Ant.	200 mmf.	456 kc	*	closed	C3	Adjust to minimum
4	Broadcast Band	Ant.	200 mmf.	1500 kc	*	1500 kc	C2B	oscillator
5				1500 kc	*	1500 kc	C2A	antenna
6	(Repeat operation 4)							
7	(Check calibration and sensitivity at 600 kc, 900 kc, and 1500 kc.)							
8	(Check operations 1 to 7 inclusive)							

* "RECEIVE RADIO"



WARNING: Do not, under any circumstances, connect this Combination to any other alternating current (a. c.) power supply source than as specified above, nor to a direct current (d. c.) power supply system, as it will be damaged

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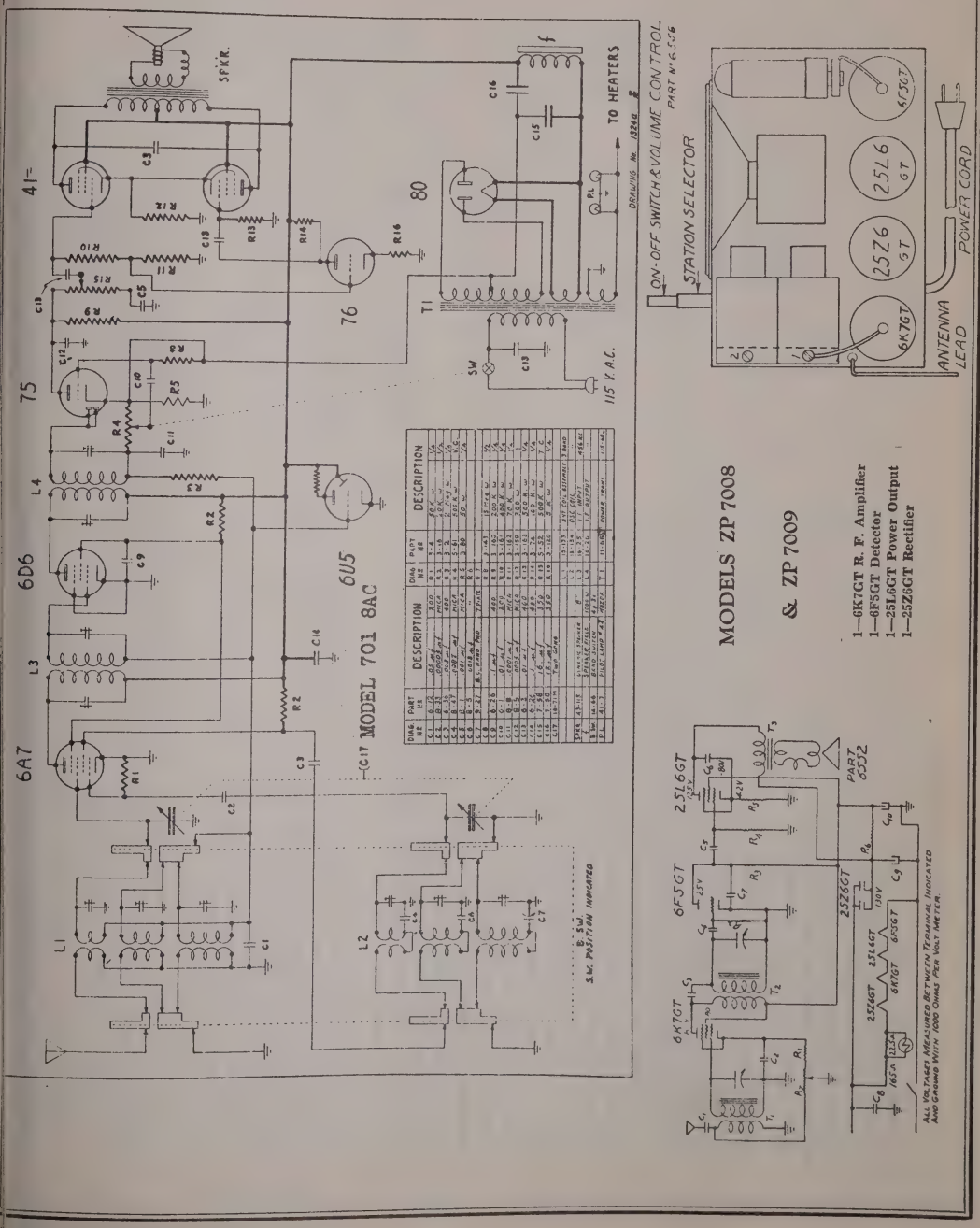
SPIEGEL, INC.

MODEL 701 8AC
MODELS ZP-7008,
ZP-7009



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ALIGNMENT DATA

ALIGNMENT: The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies: 456, 1400, 600, 5100, 1800 and 15,000 KC, and an output meter which is to be connected across the output transformer on the speaker. All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect reading during alignment.

INTERMEDIATE FREQUENCY: Set oscillator to 456 KC. Feed this to the grid of the (6A7) tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

BROADCAST BAND: Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the **broadcast padding** condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

INTERMEDIATE BAND: For a dummy antenna use a .0002 mfd. mica condenser in series with a 400 ohm carbon resistor. Set band switch to the intermediate band position and feed a 5100 KC signal from the oscillator. Set dial pointer at 5100 KC. Adjust intermediate antenna and intermediate oscillator trimmers for maximum output.

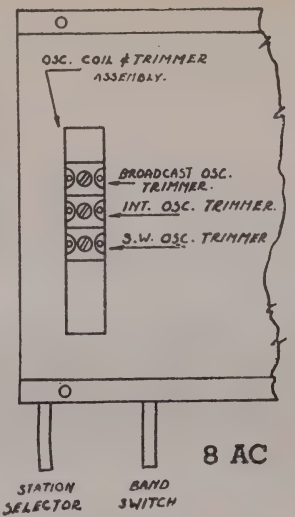
No other adjustments are necessary for aligning this Band.

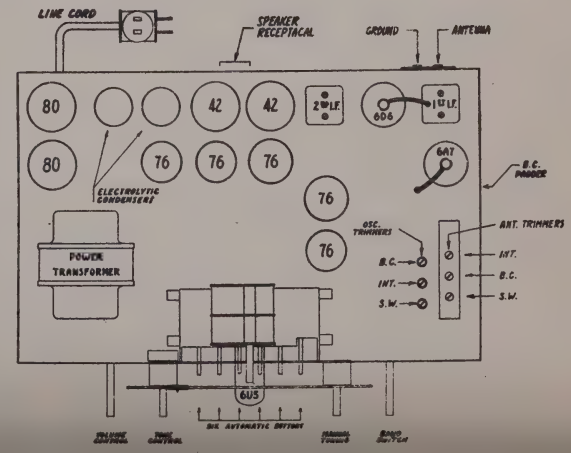
SHORT WAVE: Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

It is advisable to check the sensitivity at 6000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0087 mica condenser for short circuit.

SWITCH POSITION	BAND	RANGE IN KILOCYCLES
Left	Broadcast	535—1620 KC
Center	Intermediate	1620—5350 KC
Right	Short Wave (foreign)	5200—16600 KC

The short wave range includes the five important short wave channels 19, 25, 31, 39 and 49 meters.





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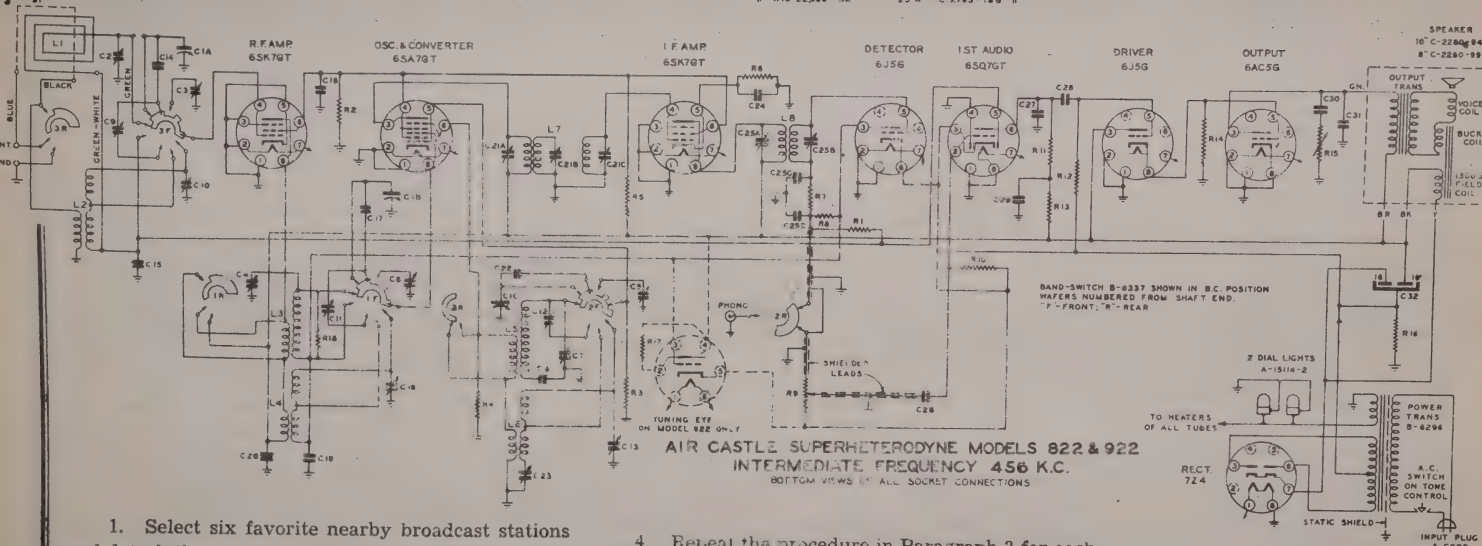
C1A,B&C	3-GANG VARIABLE CONDENSER	B-8398
C2	B.C. ANT. TRIMMER	A-14088-7
C3	5.7-7.8 & 7.4-10.0 MC. ANT. TRIMMER	
C4	B.C. DET. TRIMMER	
C5	5.7-7.8 & 7.4-10.0 MC. OSC. " "	A-20343
C6	5.7-7.8 & 7.4-10.0 MC. DET. "	
C7	B.C. OSC. TRIMMER	
C8	" " PADDER	
C9	9.9-13.4 & 12.6-16.8 MC. ANT. PADDER	
C10	9.9-13.4 & 12.6-16.8 MC. " TRIMMER	
C11	9.9-13.4 & 12.6-16.8 MC. DET. PADDER	A-20343-1
C12	9.9-13.4 & 12.6-16.8 MC. OSC. "	
C13	9.9-13.4 & 12.6-16.8 MC. " TRIMMER	
C14	5.7-7.8 & 7.4-10.0 MC. ANT. PAD., 195 MMF.	B-8265-5
C15	.1 MFD. 400 V.	C-3204-38C
C16	.1 MFD. 400 V.	C-3204-38C
C17	5.7-7.8 & 7.4-10.0 MC. DET. PAD., 195 MMF.	B-8265-5
C18	9.9-13.4 & 12.6-16.8 MC. DET. TRIMMER	A-14088-7
C19	.1 MFD. 400 V.	C-3204-38C
C20	.1 MFD. 400 V.	C-3204-38C
C21	NO.1 I.F. TRIMMER	A-14182-1
C22	5.7-7.8 & 7.4-10.0 MC. OSC. PAD., 195 MMF.	B-8265-5
C23	5 W. OSC. CIRCUIT PADDER	A-15451-10
C24	.1 MFD. 200 V.	C-3202-38C
C25	NO. 2 I.F. TRIMMER	A-20114
C26	.02 MFD. 400 V.	C-3204-22C
C27	250 MMF. MICA	C-720-324
C28	.05 MFD. 400 V.	C-3204-14GC
C29	.1 MFD. 400 V.	C-3204-38C
C30	.03 MFD. 600 V.	C-3206-80C
C31	.008 MFD. 600 V.	C-3206-68C
C32	16-16 MFD. ELECTROLYTIC	A-20188

R2	27,000 Ω.	1 W.	C-2797-193B
R3	15,000 Ω.	.25 W.	C-2795-167B
R4	470 Ω.	.25 W.	C-2795-151B
R5	9,100 Ω.	1 W.	C-2798-182A
R6	300 Ω.	.25 W.	C-2795-148B
R7	56,000 Ω.	.25 W.	C-2795-183B
R8	2.2 MEG.	.25	C-2795-102B
R9	VOL. CONTROL	.5 MEG.	A-15130-2
R10	4.7 MEG.	.25 W.	C-2795-106B
R11	270,000 Ω.	.25 W.	C-2795-181B
R12	470,000 Ω.	.25 W.	C-2795-945
R13	100,000 Ω.	.25 W.	C-2795-868
R14	22,000 Ω.	.25 W.	C-2795-768
R15	TONE CONTROL	.25 MEG.	A-18128-7
R16	47 Ω.	.25 W.	C-2795-468
R17	220,000 Ω.	.25 W.	C-2795-808
	(ON MODEL 922 ONLY)		
R18	22,000 Ω.	.25 W.	C-2795-768

L1	LOOP ANTENNA	C-3280-7 / D-1588-10 TABLE MODEL CONSOLE
L2	5.7-7.8, 7.4-10.0, 9.9-13.4 & 12.6-16.8 MC. ANT. COIL	A-14960-9
L3	B.C. DET. COIL	A-15836-1
L4	5.7-7.8, 7.4-10.0, 9.9-13.4 & 12.6-16.8 MC. DET. COIL	A-15837-4
L5	B.C. OSC. COIL	A-15394-3
L6	5.7-7.8, 7.4-10.0, 9.9-13.4 & 12.6-16.8 MC. OSC. COIL	A-15233-19
L7	NO. 1 I.F. COIL	A-14784-3
L8	NO. 2 I.F. COIL	A-12064-4Z



1. Select six favorite nearby broadcast stations and detach the corresponding call letter tabs from the station call letter tab sheets supplied.

2. Any tab may be used for any button

3. Using a small screw driver furnished with radio, or other tool that will fit the screw in the end of the button, push the first button in as far as it will go, and turn to the right or left until the dial pointer has moved to the correct point on the dial for receiving that same station. Be sure the button is pushed all the way in and the station is tuned in accurately.

4. Repeat the procedure in Paragraph 3 for each of the remaining five buttons.

5. Check all six buttons by pushing them in, one at a time, to determine whether the desired stations are all tuned in properly.

6. Insert the proper station call letter tab in each button by pressing it in position.

7. Any of the six stations to which the automatic push button tuner has been adjusted may now be received simply by pushing the button all the way in for the desired station.

The tuning range of each band

Position of Switch	Meters	Kilocycles
1 Broadcast	548 to 186	547 to 1,610
2 Short-wave	18 to 24	16,800 to 12,600
3 Short-wave	22.5 to 30	13,400 to 9,900
4 Short-wave	30 to 40	10,000 to 7,400
5 Short-wave	40 to 53	7,600 to 5,700
6 Phone—Use Tip Jack at Back of Chassis.		

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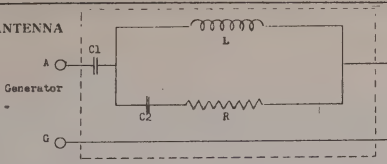
DUMMY ANTENNA

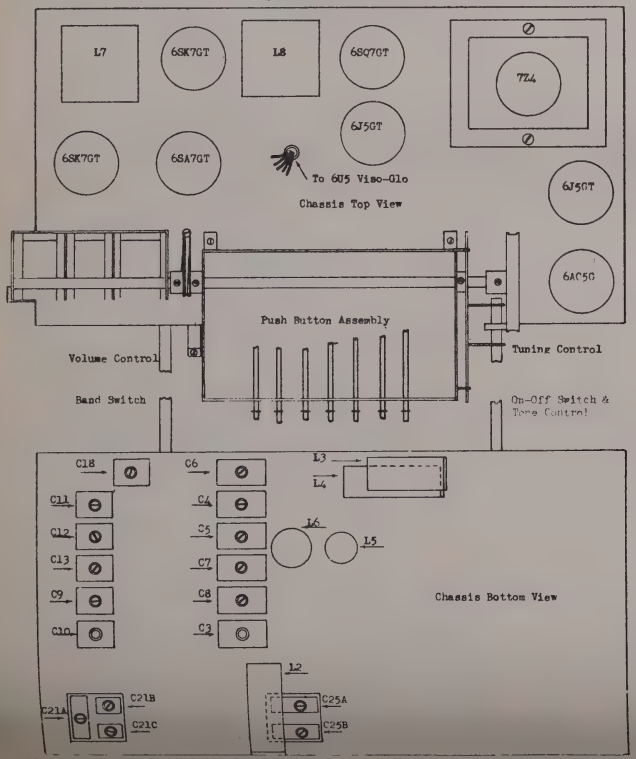


C1 - 200 mmf. Condenser
C2 - 400 mmf. Condenser
R - 100 ohms
L - Choke Coil
---- Case Shield

Choke Coil Specifications
Tubing - 3/8" Diameter Bakelite
Wire - No. 38 Enameled
Turns - 59 closely wound (Impregnated)

Note: When using this dummy antenna the generator output impedance should be 10 ohms or lower.

CHASSIS DIAGRAM



VOLTAGE CHART

Line Voltage: 117 Volts A.C. Position of Volume Control: Full with dial turned to quiet channel. Position of Band Switch: Broadcast

TUBE	FUNCTION	Voltage of Socket Prongs to Gnd. See Schematic Diagram							
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8
6SK7GT	R-F Amplifier	0	0	0	-2.3	0	85	6.2*	225
6SA7GT	Osc - Converter	0	0	225	85	-3.2	0	6.2*	-2.2
6SK7GT	I.F. Amplifier	0	0	0	0	3	85	6.2*	225
6J5G	Detector	□	0	-2.2	-2.1	-3	182	6.2*	-2.1
6SQ7GT	1st Audio	0	-2.3	-2.1	0	-2.3	80	6.2*	0
6J5G	Driver	0	0	220	85	0	0	6.2*	8.3
6AC5G	Power Amplifier	0	0	210	0	8.3	-2.1	6.2*	0
7Z4	Rectifier	6.2*	0	290*	0	0	290	0	0
6U5	Viso-Glo	6.2*	220	-.3	225	-2.2	0	-	-

Notes: Voltage readings are for schematic diagram in this bulletin. Allow 15% - or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 20,000 ohms per volt voltmeter.
*AC volts.

ALIGNMENT CHART

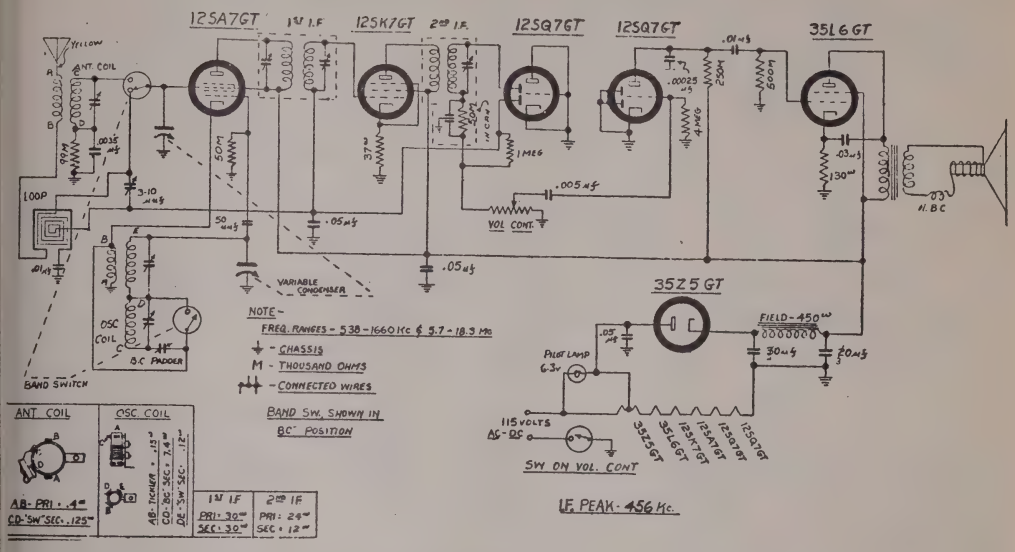
OPERATION	ALIGNMENT OF	GENERATOR CONNECTED TO	DUMMY ANTENNA	GENERATOR FREQUENCY	BAND SWITCH SETTING	TUNING COND. SETTING	TRIMMER	REMARKS
1	Set dial pointer even with left hand stop line when condenser gang is fully meshed.							
2	I.F.	#4 Pin 6SA7GT	.1 MFD Cond.	456 KC	BC	Open	C25 A&B	Peak accurately
3							C21 B*	**
4							C21 A&C	Peak accurately
5							C21 B	Peak accurately
6	BC	Ant.	See Note	1600 KC	BC	1600 KC	C7 Osc. Tr	Peak accurately
							C2 Ant. "	Peak accurately
							C4 Det. "	Peak accurately
7				600 KC	BC	600 KC	C8 Osc.Pad	***
8	Repeat operations 6 and 7.							
9	Check calibration and sensitivity at 600 KC, 1000 KC and 1600 KC.							
10	#5 Band	Ant.	See Note	16.5 MC	#5 Band	16.5 MC	C13 Osc.Tr.	Peak accurately
							C10 Ant. "	Peak accurately
							C18 Det. "	Peak accurately
11				12.6 MC	#5 Band	12.6 MC	C12 Osc.Pad	***
							C9 Ant.Pad	***
							C11 Det. "	***
12	Repeat operations 10 and 11.							
13	Check calibration and sensitivity at 12.6 MC and 16.5 MC.							
14	#4 Band	Ant.	See Note		#4 Band	Check calibration and sensitivity at 13 MC, 11 MC and 10 MC.		
15	#3 Band	Ant.	See Note	9.75 MC	#3 Band	9.75 MC	C5 Osc.Tri.	***
							C3 Ant. "	***
							C6 Det. "	***
16	Check calibration and sensitivity of #3 band at 7.6 MC.							
17	#2 Band	Ant.	See Note	7.6 MC	#2 Band	7.6 MC	Check calibration and sensitivity at 7.6 MC.	
18	Repeat operations on bands #5, 4, 3 and 2 in this sequence as many times as necessary until additional gain can not be obtained.							

*Bronze color trimmer screw.
**Turn trimmer screw all the way down.
***Rock dial while adjusting for maximum output.
Note: Use Dummy Antenna as described on page 2.

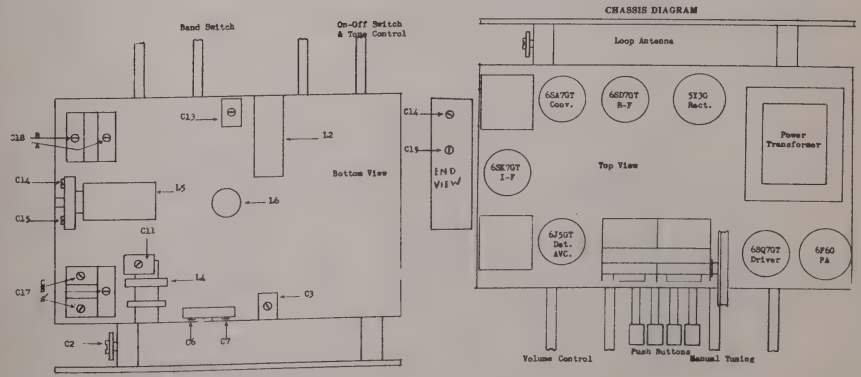
SPIEGEL, INC.

MODELS DP-7006, DP-7007
MODELS DP-7012-50-60
EP-2016

MODELS DP-7006, DP-7007



MODELS EP-2016, DP-7012-50-60



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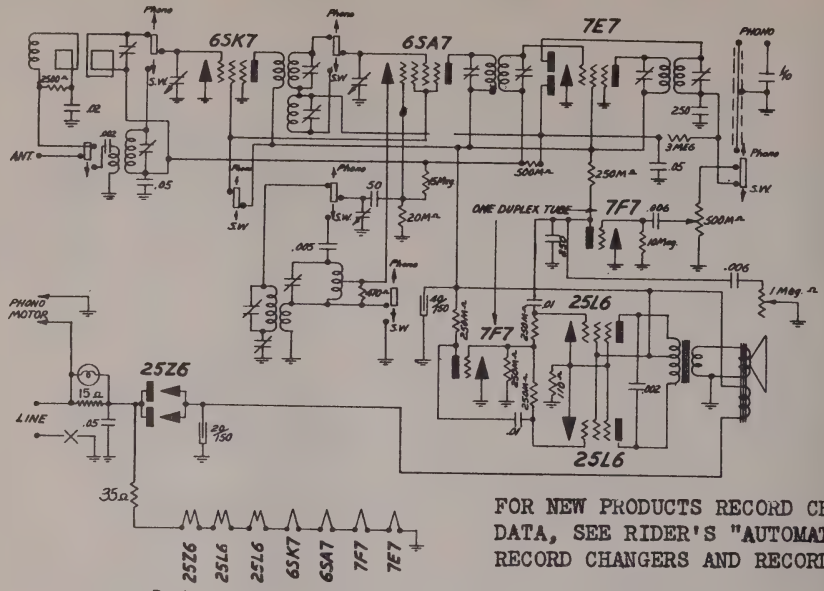
MODEL DP-7016

SPIEGEL, INC.



FOR NEW PRODUCTS RECORD CHANGER DATA, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS"

Band switch sections shown in Broadcast setting.

POWER SUPPLY:

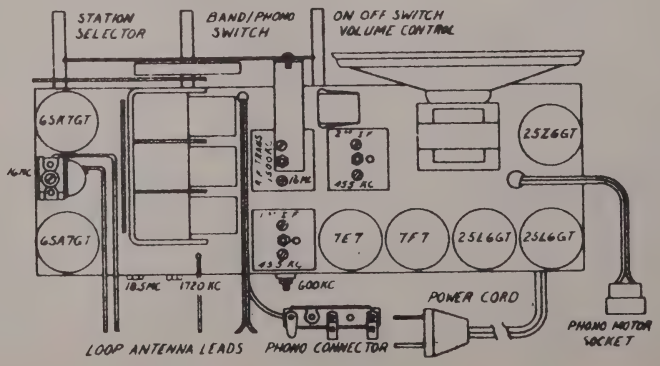
This radio receiver is to be used only with 105-125 volt alternating current (AC) 60 cycles supply, as printed on the red warning tag attached to the line cord. Use with 50 cycle alternating current is permissible only if specified on the line cord tag.

To prevent serious damage to the phonograph motor, do not operate this receiver from a direct current (DC) power supply. Your local power company representative, or engineer in charge of maintenance for your residence will provide information regarding the type of power used.

TUBES:

With the cabinet back removed, the receiver's tubes will also be visible. Be sure that each of the tubes is pushed all the way down in its proper socket, as indicated in the following illustration.

Replace the cabinet back.



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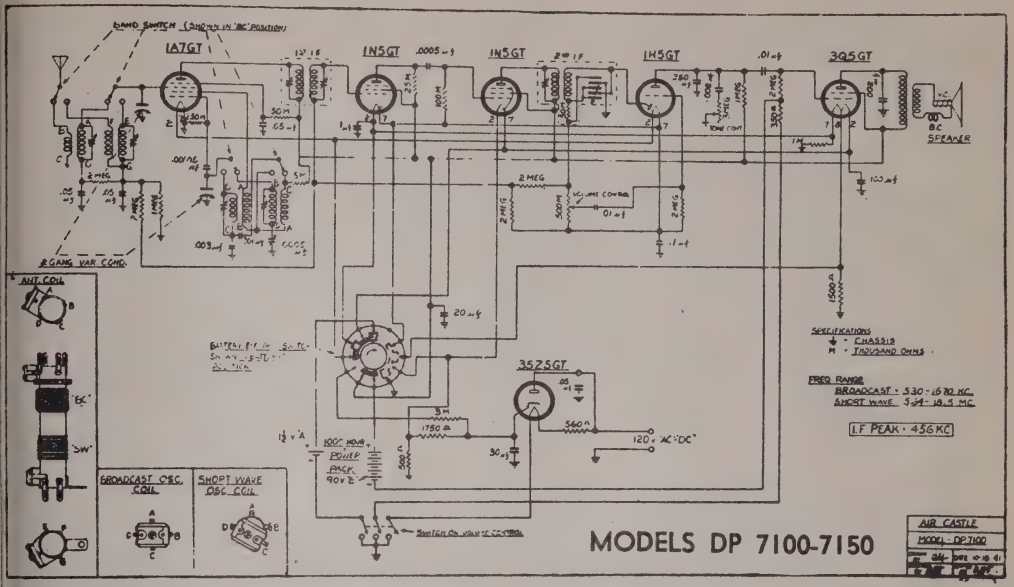
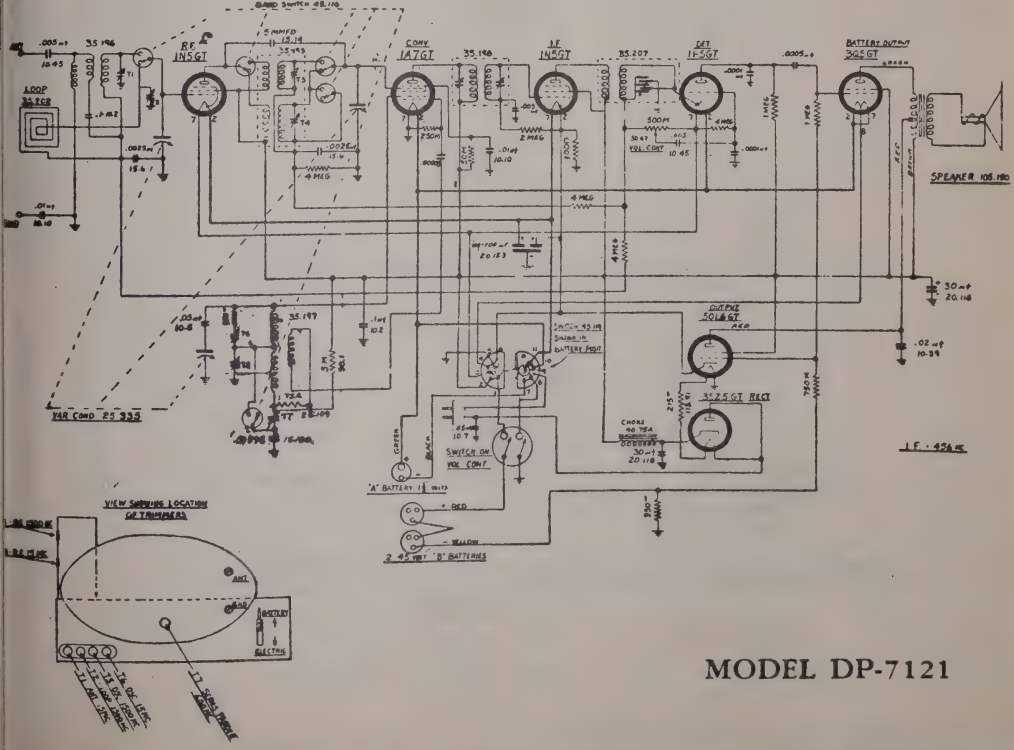
SPIEGEL, INC.

MODELS DP-7100,7150
MODEL DP-7121 Series



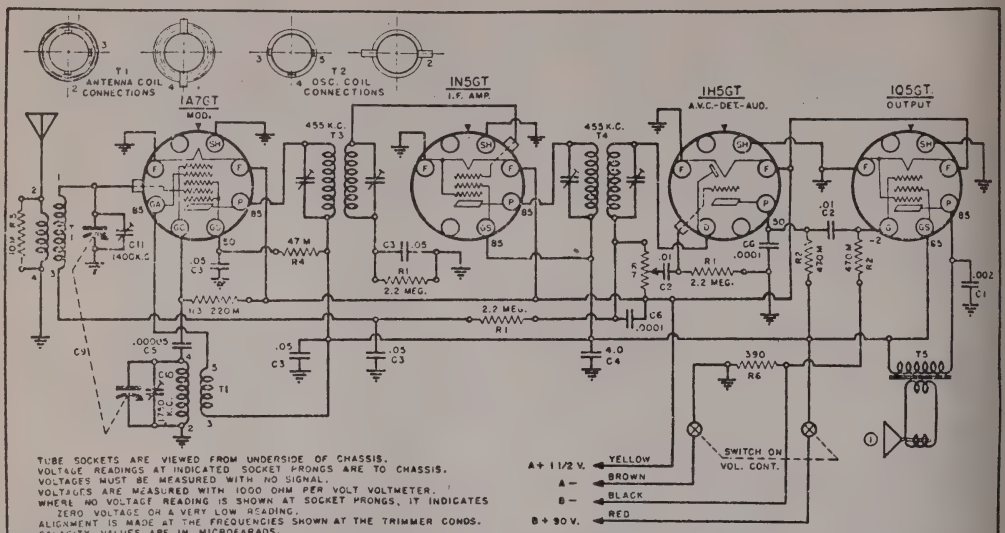
MODELS DP 7100-7150



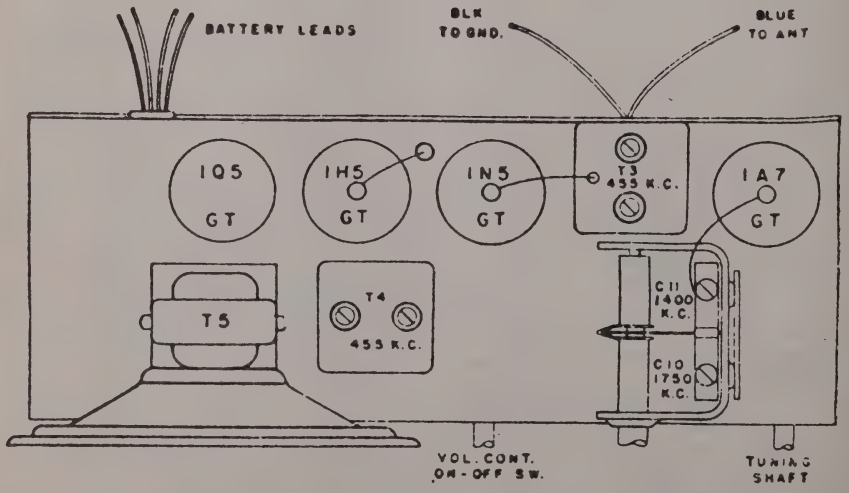
MODEL DP-7121

MODEL DP-7112(1-421)

SPIEGEL INC.



CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION	CODE	PART NO.	DESCRIPTION 2-40
R1	60-179	2.2 MEGOHM 1/4 W. RESISTOR	C1	16-138	.002 MFD. 400V. TUBULAR COND.	T1	10-396	ANTENNA TRANSFORMER
R2	60-178	470M OHM " "	C2	16-121	.01 " 200V. " "	T2	10-395	OSCILLATOR " "
R3	60-180	220M " " "	C3	1622	.05 " " " "	T3	10-342	1ST. I.F. "
R4	60-177	47M " " "	C4	18-250	4.0 " 150W.V. ELECTROLYTICS	T4	10-343	2ND. I.F. "
R5	60-215	10M " " "	C5	1503	.00005 MFD. MICA CONDENSER	T5	------	OUTPUT TRANS. (ON SPKR.)
R6	60-221	390 " " "	C6	1501	.0001 " " "			
R7	24-154	1 MEGOHM VOLUME CONTROL	C9	19-177	2 GANG VAR. COND. ALSO C10 & C11	1	79-322	4" P.M. SPEAKER



LOCATION OF PARTS ON TOP OF CHASSIS

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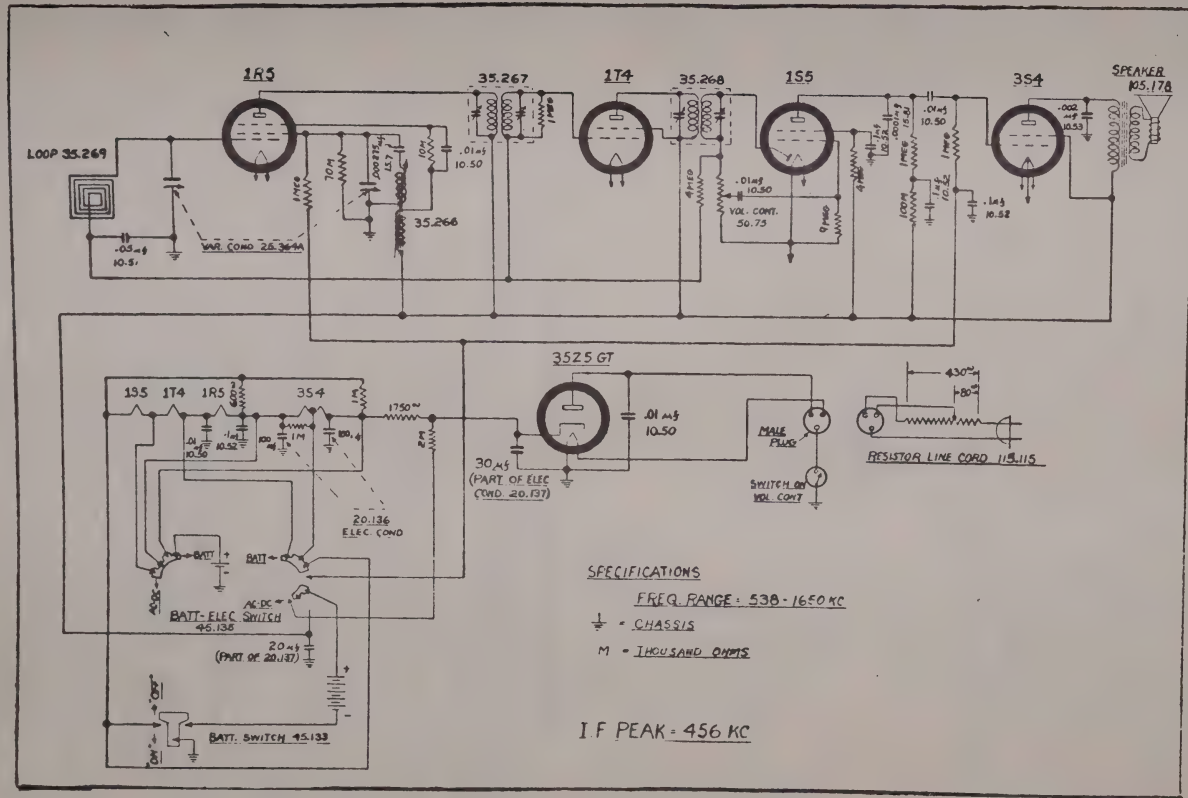
SCHEMATIC DIAGRAM MODEL DP7122

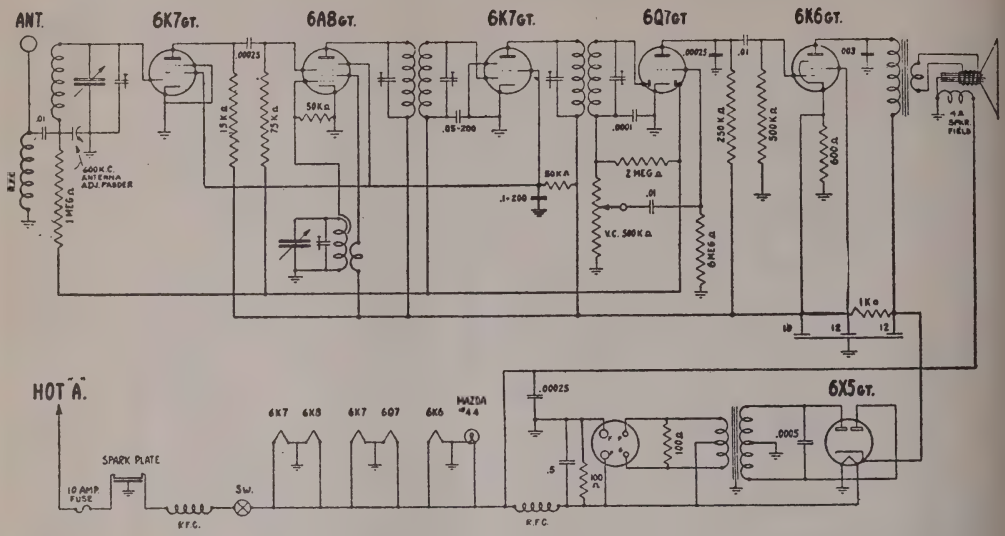


This 5 tube Receiver is designed to operate on self-contained Battery Power Unit or 105-125 Volts, 40-60 Cycles Alternating Current (AC) or 105-125 Volts Direct Current. (DC).

TUNING RANGE: 535 to 1650KC (560 to 182 Meters) covers Standard American Broadcast and some State Police. The manufacturer assumes no liability for police call transmission which is intended for authorized police use only and is confidential.

MODELS DP-7450, EP-2450

SPIEGEL, INC.



6-TUBE PUSH BUTTON SUPERHETERODYNE AUTO RADIO

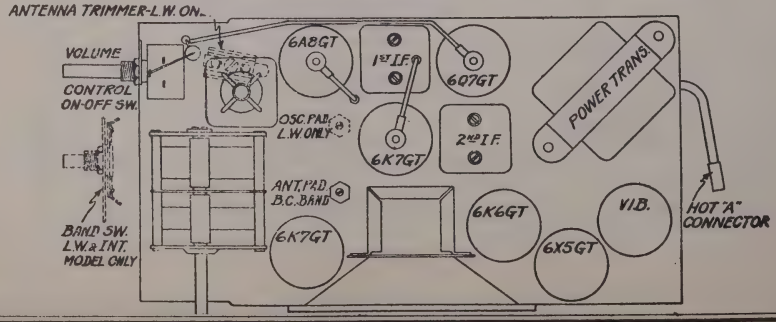
This radio is designed to operate on 6 volts D.C. *only*. A special model is built to operate on 12 volts D.C. and it will carry a tag plainly marked so. The tuning range covers the Standard Broadcast Band from 538 to 1550 kilocycles.

R. F. ALIGNMENT

With the variable condenser still full open, set the generator to 1550 K. C. Connect the generator lead to the antenna lead through a .0001 mfd. condenser as dummy antenna Adjust the oscillator trimmer for maximum output. Set the receiver dial and the generator to 1400 K.C. so the signal comes through, and adjust the antenna trimmer for maximum output.

Set the receiver dial and generator to 600 K.C. and adjust the oscillator padder for maximum output by rocking the variable condenser (with the tuning knob) as the padder is adjusted.

Return the dial and generator setting to 1400 K.C. and check for alignment.



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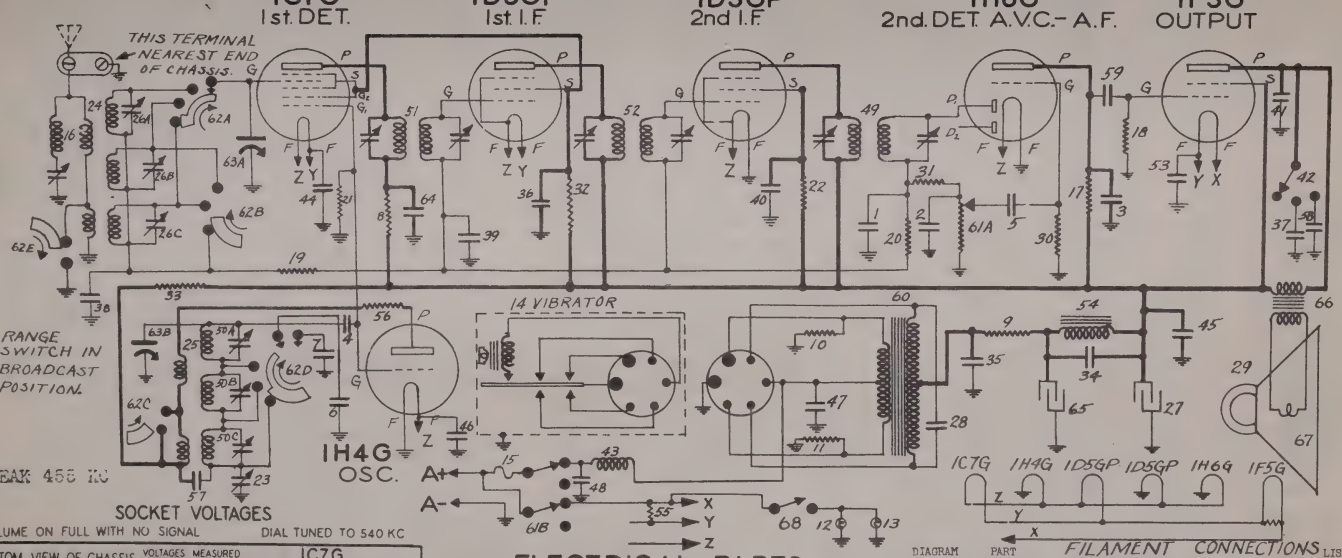
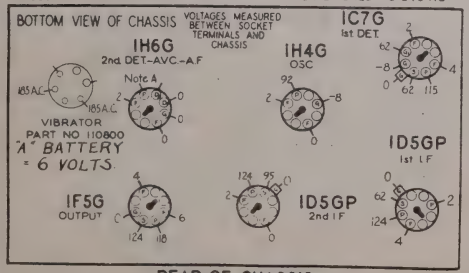
STEWART-WARNER 06-6H CHASSIS (MODEL 06-6HI)





ELECTRICAL PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1-2-3	83539	Condenser - mica 260 mmfd.	.20
4	83783	Condenser - mica 110 mmfd.	.20
5	81185	Condenser - ceramic tube .006 mfd. 600 volt-	.25
6	8[illegible]	Condenser - mica .00123 mfd. (3%)	.25
7	88861	Condenser - mica .00255 mfd. (3%)	.30
8	110557	Resistor - carbon 4700 ohms 1/4 watt	.12
9-10-11	110560	Resistor - carbon 100 ohms 1/4 watt	.12
12-13	110226	Dial lamp - 6.3 volt - .25 amps.	.15
14	110800	Vibrator - synchronous	4.25
15	110795	Fuse - 4 amp. 250 volt	.12
16	112796	Coil - wave trap (with trimmer)	.50
17	112970	Resistor - insulated 330,000 ohms 1/4 watt	.15
18-19	112971	Resistor - insulated 470,000 ohms 1/4 watt	.15
20	112972	Resistor - insulated 1 megohm 1/4 watt	.15
21	112965	Resistor - insulated 68,000 ohms 1/4 watt	.15
22	112976	Resistor - 100,000 ohms 1/4 watt-1/4 watt	.12
23	113083	Condenser - padder	.36
24	113096	Coil - antenna	.94
25	113071	Coil - oscillator	1.20
26A to 26C	114095	Condenser-trimmer(3 section)for antenna coil	1.25
27	113422	Condenser-electrolytic 8 mfd. 200 volt	.42
28	114277	Condenser - oil filled .01 mfd. 2000 volts	.24
29	M-115092	Speaker - P.M. 6"	7.00
30	116063	Resistor - insulated 10 meg. 1/4 watt	.12
31	116058	Resistor - insulated 47,000 ohms 1/4 watt	.12
32	116059	Resistor - insulated 22,000 ohms 1/4 watt	.12
33	116063	Resistor - carbon 10,000 ohms 1/4 watt	.15
34-35-36	116825	Condenser - .1 mfd. 600 volt	.25
37	116847	Condenser - .004 mfd. 600 volt	.15
38-39-40	116819	Condenser - .05 mfd. 600 volt	.20
41	117022	Condenser - .002 mfd. 600 volt	.15
42	117025	Switch - tone control	.60
43	117332	Choke coil in "A" line	.30
44-45	118208	Condenser - .25 mfd. 600 volt	.35
46-47-48	118225	Condenser - .5 mfd. 50 volt	.45
49	118442	Transformer - 3rd I.F.	1.00
50A to 50C	118446	Condenser-trimmer(3 section)for oscillator	.42
51-52	118447	Transformer - 1st and 2nd I.F.	1.10
53	118452	Condenser - electrolytic 100 mfd. 8 volt	.55
54	118453	Filter choke	1.00
55	118806	Resistor - 45 ohms 1/2 watt W.W.	.12
56	118807	Resistor - 30 ohms 1/4 watt	.10
57-58-59	119193	Condenser - .01 mfd. 600 volt	.15
60	119233	Transformer - power - 6 volt	4.60
61A - 61B	119357	Volume control 1/4 meg. with switch	1.30
62A to 62D	119358	Range switch	1.40
63A - 63B	119359	Condenser - variable tuning	2.40
64	119414	Condenser - .02 mfd. 600 volt	.15
65	119428	Condenser - electrolytic 20 mfd. 200 volt	.60
66	M-119467	Transformer - output for M-115092 speaker	1.80
67	M-119468	Cone & Voice coil for M-115092 speaker	1.80
68	119470	Switch for dial light	.45

FILAMENT CONNECTIONS

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODEL 06-6H1
Chassis 06-6H

STEWART-WARNER CORP.

06-6H CHASSIS (RECEIVER MODEL 06-6HI)

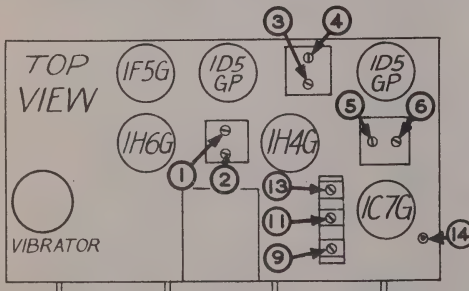
ALIGNMENT EQUIPMENT & PROCEDURE

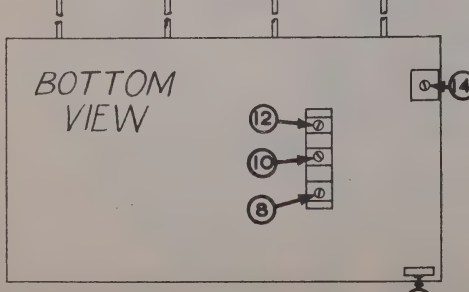
For alignment, an output meter and an accurately calibrated signal generator with a tuning range from 455 KC to 20 MC are required.

1. Connect the output meter across the voice coil or between the plate of the 1F5G tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh set the pointer 1¾" from left end of brown dial plate. This may be accomplished by releasing the clip on the pointer slider; where it attaches to the dial cord.

IMPORTANT:—THE BROADCAST BAND MUST BE ALIGNED AFTER THE SHORT-WAVE BAND AND POLICE BAND.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	RANGE SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	CONTROL GRID OF 1C7G TUBE	455 KC	BROALCAST (Clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2-3 4-5-6	I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	455 KC	BROADCAST (Clockwise)	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	7	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	20 MC	SHORT-WAVE (Counter-clockwise)	20 MC 7¼" FROM LFT END OF BROWN DIAL PLATE	8	SHORT-WAVE OSCILLATOR	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 19.1 MC IF IMAGE DOES NOT APPEAR REALIGN AT 20 MC WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	20 MC	SHORT-WAVE (Counter-clockwise)	TUNE TO 20 MC GENERATOR SIGNAL	9	SHORT-WAVE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	6 MC	INTERMEDIATE (Center)	6 MC 7 1/8" FROM LEFT END OF BROWN DIAL PLATE	10	INTERMEDIATE OSCILLATOR	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 5.1 MC IF IMAGE DOES NOT APPEAR REALIGN AT 6 MC . WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE
400 OHM CARBON RESISTOR	ANTENNA TERMINAL	6 MC	INTERMEDIATE (Center)	TUNE TO 6 MC. GENERATOR SIGNAL	11	INTERMEDIATE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
200 MMFD CONDENSER	ANTENNA TERMINAL	1500 KC.	BROADCAST (Clockwise)	7 1/8" FROM LEFT END OF BROWN DIAL PLATE	12	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
200 MMFD CONDENSER	ANTENNA TERMINAL	1500 KC.	BROADCAST (Clockwise)	TUNE TO 1500 KC. GEN.SIG.	13	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
200 MMFD CONDENSER	ANTENNA TERMINAL	600 KC.	BROADCAST (Clockwise)	TUNE TO 600 KC. GENERATOR SIGNAL	14	BROADCAST OSCILLATOR (Series Pad)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.





MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
113424	"A" Cable & Clip Assembly	1.45
114955	Clamp - for dial cord	.01
117057	Cord - drive supplied in 3 ft. lengths	.15
116948	Cord - pointer drive supplied in 6 ft. lengths	.18
117029	Drive drum & bushing	.50
119461	Escutcheon & dial assembly	1.60
119167	Knob - tuning or volume	.10
12349	Nut - 8-32 for speaker mounting	Per C
119434	Pointer	.30
117019	Reflector - for pilot light	.04
81145	Retaining ring - for drive shaft	Per C .50
83624	Screw - self tapping 8 X 1/4	.01
85827	Set Screw - 8-32 Square head	.02
112874	Screw - #10 X 1 1/8 Chassis Mtg.	.01
119218	Screw - escutcheon mounting	.02
110794	Shield cup clips-for retaining vibrator shield	.20
112864	Shield - for tubes	.08
117832	Socket - dial lamp (for lamp) ungrounded	.15
119472	Socket - dial lamp (grounded)	.10
85427	Socket - octal base (standard)	.15
81834	Socket - 6 prong (for vibrator)	.10
113177	Spring - dial cord tension	.09
116981	Spring - for pointer	.02
117033	Tuning shaft	.12
111456	Washer - spring washer	Per C .50
110829	Washer - flat steel, for mtg. chassis	.01
116530	Washer (paper) for back of knobs	.005

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

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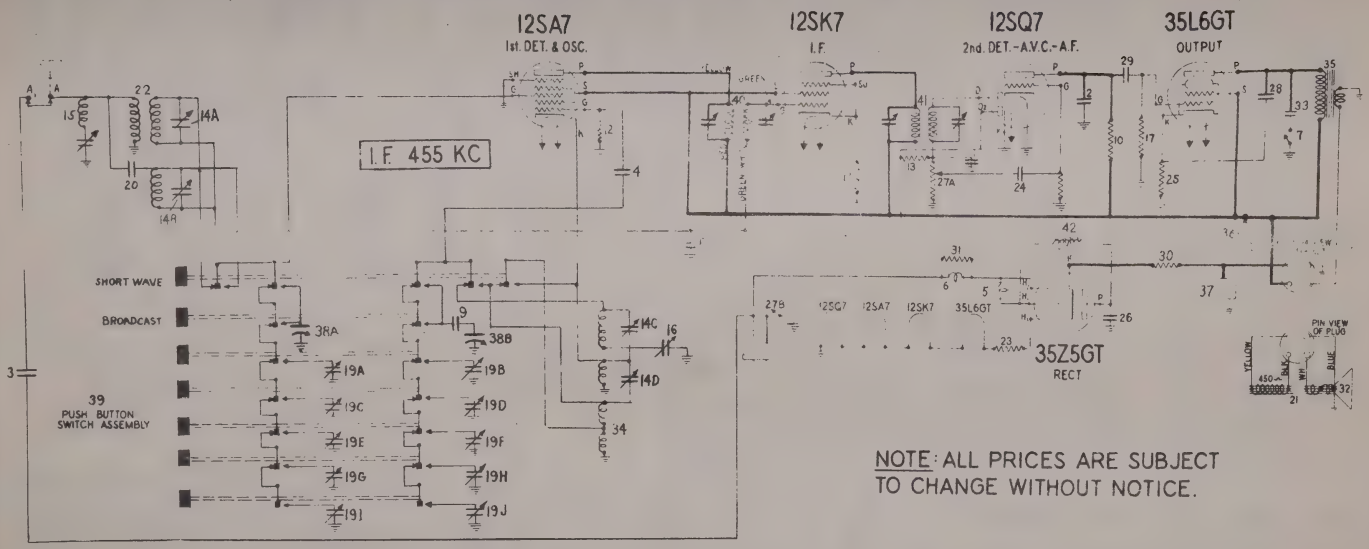
STEWART-WARNER MODEL 07-5EX CHASSIS

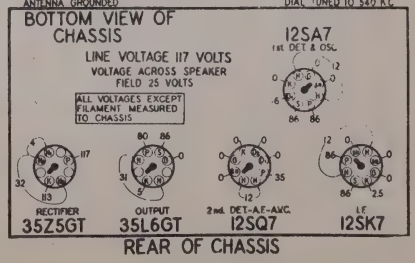


NOTE: ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

ELECTRICAL PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1-2-3-4----	78[illegible]	Condenser - mica .05 mmfd.----------	.20
4-------	1[illegible]	Condenser - mica 5a mmfd.----------	.15
5-6-----	85[illegible]	Lamp - 2[illegible] 8 to 8 volt (Mazda 51)--	.15
[illegible]	[illegible]	Switch - tone control----------	.30
8-------	88189---	Condenser - paper .05 mfd. 200 volt-	.25
9------	86587---	Condenser - mica .0042 mfd.----------	.35
10------	11[illegible]	Resistor - carb. 220,000 ohms ½ watt	.12
11------	1[illegible]	Resistor - carb. 100 ohms 1/1 watt--	.12
12------	120898-	Resistor - carb. 33,000 ohms 1/4 W.-	.12
13------	110480-	Resistor - carb. 3.3 meg. 1/4 watt--	.12
14A to 14J-	112792-	Trimmer - trimmer 4 section-------	.60
15------	12[illegible]	Coil - wave trap (with trimmer)-----	.50
16------	12[illegible]	Condenser - padder (530 to 630 mmfd)	.36
17------	112[illegible]	Resistor - insul. 470,000 ohm ½ watt	.15
18------	12[illegible]	Resistor - carb. 10 meg. 1/4 watt---	.12
19A to 19J-	1[illegible]	Trimmer condenser strip - for push buttons----------	2.25
20------	1140[illegible]	Condenser - mica 15 mmfd.----------	.12
21------	1[illegible]	Speaker - dynamic 5"----------	.48
22------	1[illegible]	Coil - antenna - B.C. & S.W.--------	.90
23------	116527--	Resistor - 100 ohms 10% 3 W. W.W.---	.20
24------	116347--	Condenser - .004 mfd. 600 volt------	.15
25------	116702--	Resistor - 140 ohms 10% 2 W. W.W.---	.12
26------	116819--	Condenser - .05 mfd. 600 volt-------	.20
27A - 27B-	12[illegible]	834--Volume control - 1 meg. (with switch)	1.10
28-29---	116893--	Condenser - .02 mfd. 600 volt-------	.15
30------	113967--	Resistor - 25 ohm 1 W. 10% W.W.-----	.16
31------	116968--	Resistor - 40 ohm 2 W. 10% W.W.-----	.16
32------	116982--	Cone & Voice coil for U-115058 spkr.	1.50
33------	116984--	Condenser - .04 600 volts----------	.20
34------	117517--	Coil - oscillator----------	1.00
35------	117621--	Transformer - output----------	1.00
36------	117622--	Condenser - elec. 16 mfd. 150 volt--	.55
37------	117623--	Condenser - elec. 40 mfd. 150 volt--	.85
38A - 38B-	117625--	Condenser - tuning with drum--------	3.00
39------	117668--	Push button switch----------	2.60
40------	117673--	Transformer - 1st I. F.----------	1.20
41------	117674--	Transformer - 2nd I. F.----------	1.20
42------	116232--	R. F. Choke----------	.48

SOCKET VOLTAGES



Use a high resistance voltmeter of 1000 ohms per volt

MODEL 07-5EX
MODEL 07-5NX

STEWART-WARNER CORP.

ALIGNMENT PROCEDURE

For alignment, an output meter and an accurately calibrated signal generator are required.

1- Connect the output meter across the voice coil or between the plate of the 35L6GT output tube and chassis through a .1 mfd. condenser, depending upon the type of meter. The more sensitive type should be connected across the voice coil.

2- Connect the ground lead of the signal generator to the chassis of the receiver through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as the signal generator may be connected to one side of the power line, or it may be grounded externally. A .1 mfd. non-inductive condenser, should be connected in series with the antenna lead from the signal generator and the dummy antenna given in the table.

3- Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

4- The pointer should be in a horizontal position when the gang condenser is in full mesh. If it is not, it will be necessary to remove the dial window by pushing out the clips holding it in place and setting the pointer to the correct position. Be sure that the dial face is in the correct position when this is done.

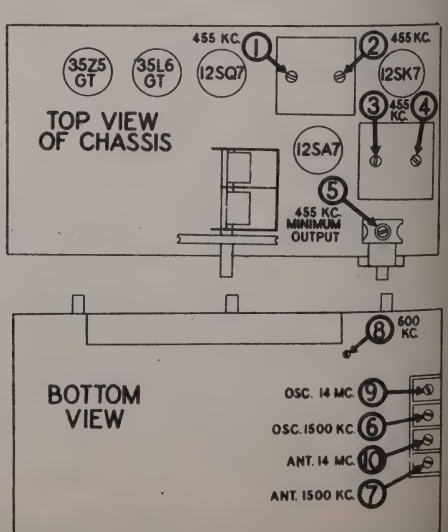
5- Remove the connector from between the A and A_1 terminals.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	PUSH BUTTON POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD. CONDENSER	FRONT LUG OF GANG CONDENSER	455 KC	"BROADCAST" PUSHED IN	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	2ND I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3-4	1ST I.F.	
200 MMFD. MICA CONDENSER	"A" TERMINAL	455 KC	"BROADCAST" PUSHED IN	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	5	WAVE TRAP	ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL.
200 MMFD. MICA CONDENSER	"A" TERMINAL	1500 KC	"BROADCAST" PUSHED IN	1500 KC	6	BROADCAST OSCILLATOR (Shunt)	ADJUST TRIMMER TO BRING IN SIGNAL.
200 MMFD. MICA CONDENSER	"A" TERMINAL	1500 KC	"BROADCAST" PUSHED IN	TUNE TO 1500 KC GENERATOR SIGNAL	7	BROADCAST ANTENNA	ADJUST FOR MAXIMUM OUTPUT
200 MMFD MICA CONDENSER	"A" TERMINAL	600 KC	"BROADCAST" PUSHED IN	TUNE TO 600 KC GENERATOR SIGNAL	8	BROADCAST OSCILLATOR (Series Pad)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	"A" TERMINAL	14 MC	"SHORT WAVE" PUSHED IN	14 MC	9	SHORT WAVE OSCILLATOR (Shunt)	ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 13.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 14 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	"A" TERMINAL	14 MC	"SHORT WAVE" PUSHED IN	14 MC	10	SHORT WAVE ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.

DIAL & MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
116940	--Back - cabinet	.22
83552	--Bolt - chassis mtg. (#10 X 7/8)	.03
116900	--Cabinet	6.55
117762	--Call tabs and instruction sheets	.48
114955	--Clamp - for dial cord	.01
112745	--Clip - coil mounting	.01
112764	--Clip - dial scale retaining	.01
112798	--Clip - for mtg. wave trap coil	.01
85321	--Connector - for internal antenna	.01
116948	--Cord-dial drive (supplied in 6 ft. lengths)	.18
116810	--Dial window	.35
117753	--Dial scale	.25
113589	--Felt Pad - (cabinet feet)	.06
116556	--Insulator Pilot Light	.10
116773	--Knob - tuning or volume	.10
116883	--Pointer	.16
113102	--Push Button - only	.08
81145	--Retaining ring - for drive shaft	.50
83624	--Screw - self tapping #8 X 1/4	.01
85040	--Screw - #6 Hex. Hd. Per C	.35
116831	--Shaft - tuning	.12
116793	--Socket - for pilot light	.40
85427	--Socket - octal base (standard)	.15
110501	--Socket - 4 prong (for speaker)	.16
111090	--Spacer - steel, mechanism mounting to chassis	.02
114968	--Spring - dial cord tension	.03
113189	--Tab - celluloid - for push button	.09
116223	--Terminal strip - for antenna (A-A_1)	.12
111456	--Washer - spring washer	.50
116530	--Washer - (paper) for back of knobs	.005

PRICES SUBJECT TO CHANGE WITHOUT NOTICE



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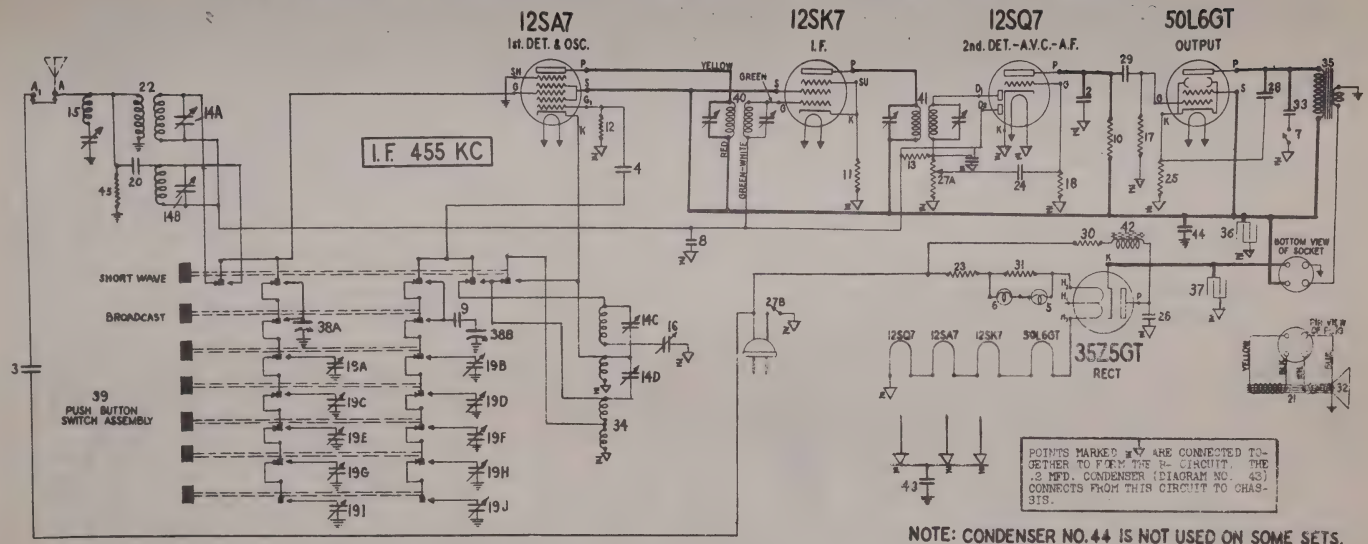
STEWART-WARNER MODEL 07-5NX CHASSIS

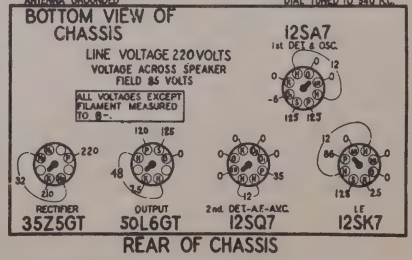


NOTE: CONDENSER NO. 44 IS NOT USED ON SOME SETS.

ELECTRICAL PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1-2-3	83539	Condenser - mica 260 mmfd.	.20
4	85061	Condenser - mica 51 mmfd.	.15
5-6	85298	Lamp - dial 6 to 8 volt (Mazda 51)	.16
7	88054	Switch - tone control	.30
8	88189	Condenser - paper .05 mfd. 200 volt-	.25
9	88587	Condenser - mica .0042 mfd.	.35
10	110591	Resistor - carb. 860,000 ohms ½ watt	.12
11	110560	Resistor - carb. 100 ohms 1/4 watt	.12
12	110566	Resistor - carb. 33,000 ohms 1/4 W.	.12
13	110580	Resistor - carb. 3.3 meg. 1/4 watt	.12
14A to 14D	112792	Condenser - trimmer 4 section	.60
15	112795	Coil - wave trap (with trimmer)	.50
16	112799	Condenser - padder (530 to 630 mmfd)	.36
17	112971	Resistor - insul. 470,000 ohm ½ watt	.15
18	110560	Resistor - carb. 3.3 meg. 1/4 watt	.12
19A to 19J	114984	Trimmer condenser strip - for push buttons	2.25
20	114969	Condenser - mica 15 mmfd.	.12
21	R-115076	Speaker - dynamic 5"	3.50
22	116421	Coil - antenna - B.C. & S.W.	.90
23	118149	Power cord (with resistor)	1.00
24	116847	Condenser - .004 mfd. 800 volt	.15
25	116092	Resistor - 140 ohms 1 watt W.W.	.15
26	116819	Condenser - .05 mfd. 600 volt	.20
27A - 27B	115634	Volume Control - 1 meg. (with switch)	1.10
28-29	116893	Condenser - .02 mfd. 600 volt	.15
30	69771	Resistor - 90 ohms 2 watts W.W.	.12
31	111514	Resistor - 170 ohms 2 watts W.W.	.15
32	R-116209	Cone & Voice coil assembly for R-115076 speaker	1.40
33	116964	Condenser - .04 600 volts	.20
34	117517	Coil - oscillator	1.00
35	117621	Transformer - output	1.00
36	117622	Condenser - elec. 18 mfd. 150 volt	.55
37	118248	Condenser - elec. 30 mfd. 400 volts	1.00
38A - 38B	117625	Condenser - tuning with drum	3.00
39	117668	Push button switch	2.60
40	117673	Transformer - 1st I.F.	1.20
41	117674	Transformer - 2nd I.F.	1.20
42	118232	R. F. Choke	.48
43	118708	Condenser - .2 mfd. 600 volt	.35
44	69532	Condenser - .25 mfd. 200 volt	.32
45	110576	Resistor - carb. 10,000 ohms ½ watt	.12

SOCKET VOLTAGES



Use a high resistance voltmeter of 1000 ohms per volt

ALIGNMENT PROCEDURE AND TRIMMER LOCATIONS FOR MODEL 07-5NX ARE THE SAME AS THOSE FOR MODEL 07-5EX

RETURN SIGNAL GENERATOR AND OUTPUT METER GROUND LEADS TO B- INSTEAD OF CHASSIS ON THIS MODEL.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

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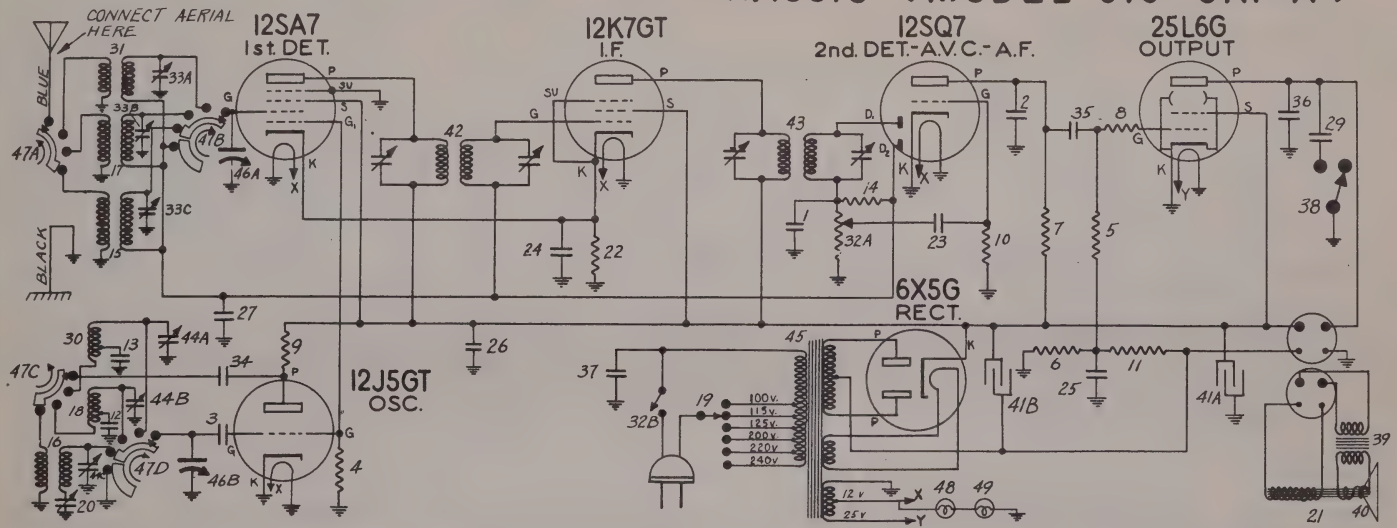
STEWART WARNER 010-6KX CHASSIS (MODEL 010-6K1-X)



IF PEAK 455 KC

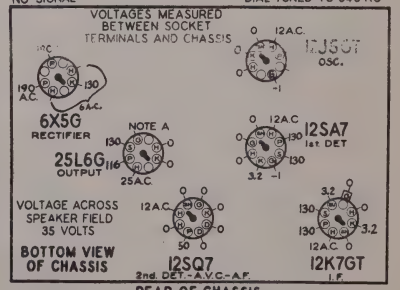
ELECTRICAL PARTS

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION	LIST PRICE
1-2	83539	Condenser - mica 260 mmfd.	.20
3	88173	Condenser - mica 50 mmfd.	.20
4	110562	Resistor - carbon 47,000 ohms 1/4 watt.	.12
5-6	110563	Resistor - carbon 220,000 ohms 1/4 watt.	.12
7	110559	Resistor - carbon 470,000 ohms 1/4 watt.	.12
8	110560	Resistor - carbon 100 ohms 1/4 watt.	.12
9	110565	Resistor - carbon 22,000 ohms 1/4 watt.	.12
10	110566	Resistor - carbon 3.5 meg. 1/4 watt.	.12
11	110591	Resistor - 680,000 ohms 1/4 watt.	.12
12	112426	Condenser - mica 1650 mmfd.	.30
13	112427	Condenser - mica 4050 mmfd.	.40
14	112973	Resistor - insulated 1.5 megohm 1/4 watt.	.15
15	113295	Coil - antenna (R. C.).	1.20
16	113297	Coil - oscillator (B. C.).	.48
17	113298	Coil - antenna (Police).	.50
18	113412	Coil - oscillator (Police).	1.20
19	114168	Rotor - voltage switch (on power transformer).	.50
20	114269	Condenser - padding.	.48
21	U-115088	Speaker - dynamic 8".	5.50
22	116062	Resistor - 150 ohms 1/4 watt.	.12
23	116647	Condenser - .004 mfd. 600 volt.	.15
24-25-26	116706	Condenser - .2 mfd. 600 volt.	.35
27-28	116819	Condenser - .05 mfd. 600 volt.	.20
29	116864	Condenser - .04 mfd. 600 volt.	.20
30	117530	Coil - oscillator (Short Wave).	.80
31	117819	Coil - antenna (Short Wave).	.65
32A - 32B	119066	Volume control - 1 meg. (with switch).	1.00
33A to 33C	119174	Condenser - trimmer 3 section.	.45
34 to 37	119193	Condenser - .01 mfd. 600 volt.	.15
38	119214	Switch - tone control.	.48
39	U-119228	Transformer-output for U-115088 speaker.	1.80
40	U-119229	Cone & Voice Coil for U-115088 speaker.	1.80
41A - 41B	119343	Condenser - electrolytic 20-40 mfd. 200 volt.	1.40
42	119460	Transformer - 1st I.F.	1.40
43	119492	Transformer - 2nd I.F.	1.30
44A to 44C	119485	Condenser - trimmer 3 section.	.38
45	119498	Power transformer.	7.50
46A - 46B	119492	Condenser - tuning - with drum.	3.00
47A to 47D	119483	Range switch.	1.35
48-49	110629	Lamp - 6.3 volt - .25 amps.	.15

Prices subject to change without notice.

SOCKET VOLTAGES

NO SIGNAL — DIAL TUNED TO 540 KC



Use a voltmeter of at least 1000 ohms per volt.

NOTE A: The bias on the grid of the 25L6G output tube is -8.5 volts but due to the high resistances of resistors 8 & 11 there will be only a small deflection on an ordinary meter.

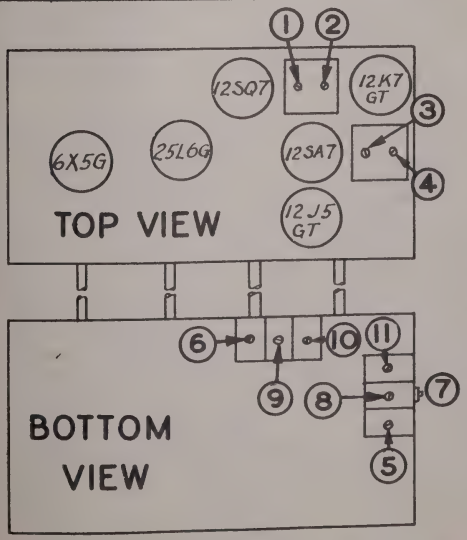
STEWART-WARNER CORP.

MODEL 010-6K1-X
Chassis 010-6KX

ALIGNMENT DATA FOR 010-6KX CHASSIS

1. Connect the output meter across the voice coil or from the plate of the 25L6G output tube to ground through a .1 mfd. condenser. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the black wire coming from the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the alignment procedure.
4. The pointer should be in a horizontal position with the gang condenser in full mesh.

DUMMY ANT. IN SERIES WITH SIG. GEN.	CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POSITION	RECEIVER DIAL SETTING	TRIMMER NUMBER	TRIMMER DESCRIPTION	TYPE OF ADJUSTMENT
.1 MFD CONDENSER	LUG ON REAR SECTION OF GANG COND.	455 KC	BROADCAST	ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL	1-2	2nd I.F.	ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT.
					3-4	1st I.F.	
200 MMFD. MICA CONDENSER	BLUE WIRE COMING FROM CHASSIS	1500 KC	BROADCAST	1500 KC	5	BROADCAST OSCILLATOR (SHUNT)	ADJUST FOR MAXIMUM OUTPUT.
200 MMFD. MICA CONDENSER	BLUE WIRE COMING FROM CHASSIS	1500 KC	BROADCAST	TUNE TO 1500 KC GENERATOR SIGNAL	6	BROADCAST DETECTOR	ADJUST FOR MAXIMUM OUTPUT
200 MMFD. MICA CONDENSER	BLUE WIRE COMING FROM CHASSIS	600 KC	BROADCAST	TUNE TO 600 KC GENERATOR SIGNAL	7	BROADCAST OSCILLATOR (SERIES)	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.
400 OHM CARBON RESISTOR	BLUE WIRE COMING FROM CHASSIS	5 MC	INTERMEDIATE	5 MC	8	INTERMEDIATE OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 4.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 5 MC WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	BLUE WIRE COMING FROM CHASSIS	5 MC	INTERMEDIATE	TUNE TO 5 MC GENERATOR SIGNAL	9	INTERMEDIATE ANTENNA	ADJUST FOR MAXIMUM OUTPUT.
400 OHM CARBON RESISTOR	BLUE WIRE COMING FROM CHASSIS	20 MC	FOREIGN	20 MC	10	FOREIGN OSCILLATOR	ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 19.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 20 MC WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE.
400 OHM CARBON RESISTOR	BLUE WIRE COMING FROM CHASSIS	20 MC	FOREIGN	TUNE TO 20 MC GENERATOR SIGNAL	11	FOREIGN ANTENNA	ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED.



MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
114955	Clamp - for dial cord	.01
112745	Clip - coil mounting	.01
116948	Cord - dial drive (supplied in 6 ft. lengths)	.18
119494	Dial scale	.28
119208	Escutcheon - dial	.80
119167	Knob	.10
116883	Pointer	.16
81145	Retaining ring - for drive shaft	Per C .50
119218	Screw - escutcheon mounting	.02
112874	Screw - #10 X 1 1/8 chassis mtg	.01
119204	Shaft - tuning	.10
114968	Spring - dial cord tension	.03
113122	Socket - dial lamp (ungrounded)	.12
111008	Socket - dial lamp (grounded)	.12
85427	Socket - octal base (standard)	.15
110501	Socket - 4 prong (for speaker)	.15
110829	Washer - flat steel, for mtg. chassis	.01
116530	Washer (paper) for back of knobs	.005
111456	Washer - spring washer on tuning shaft	Per C .50

Prices subject to change without notice.

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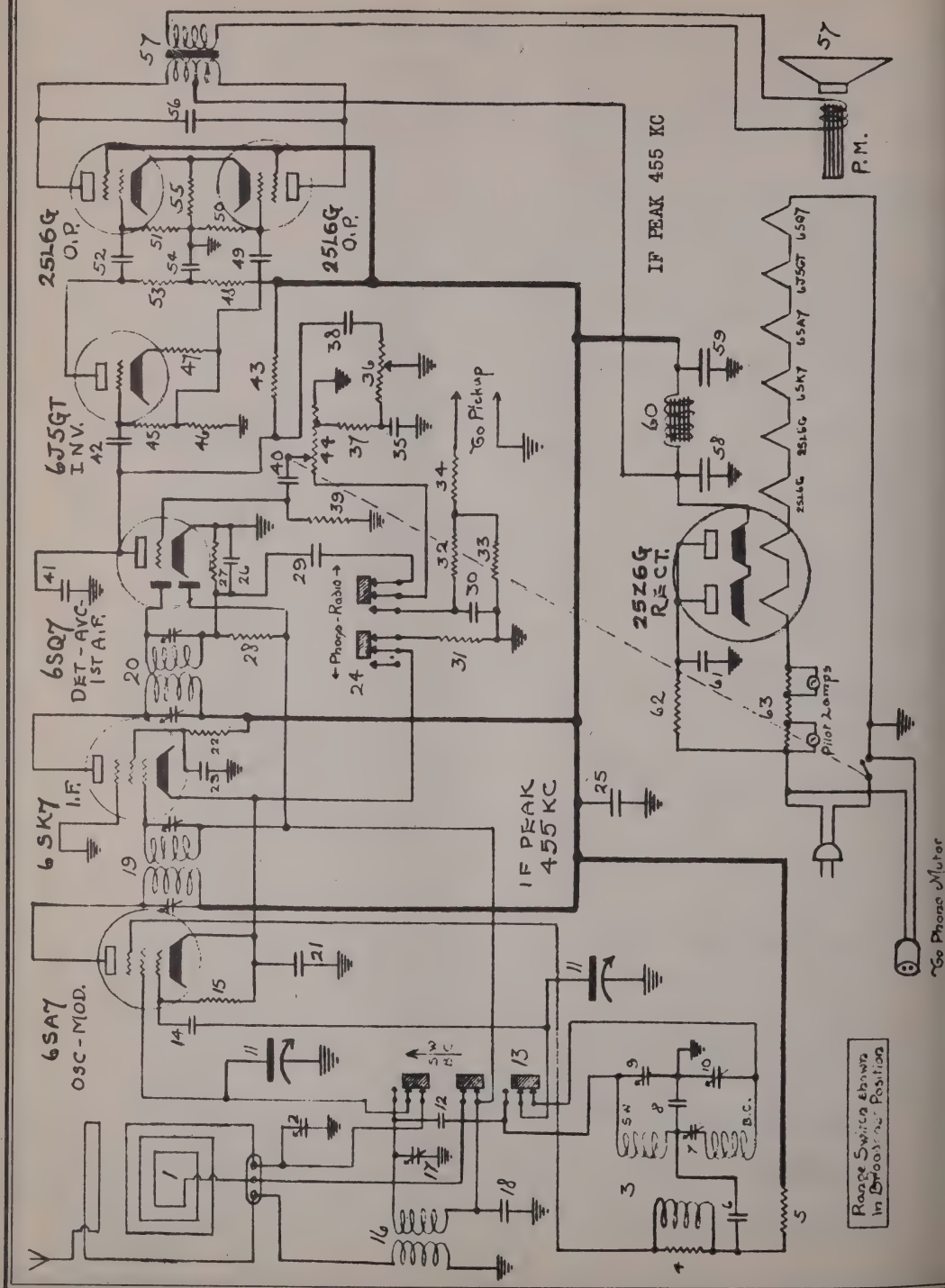
MODEL 17-7B

STEWART-WARNER CORP.



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PARTS LIST

Item	Part No.	Description
1	160381	Loop antenna assembly
2	119345	Loop antenna trimmer
3	160128	Osc. coil assembly
4	110573	Carbon resistor 2200 ohms ± 20% 1/4 watt
5	112964	Carbon resistor 1500 ohms ± 20% 1/4 watt
6	119193	Paper condenser .01 mf 600 V.
7	119934	Variable padding condenser
8	88587	Mica condenser .0042 mf ± 3%
9	160344	S.W. osc. trimmer condenser - 3-strip
10	160344	B.C. osc. trimmer condenser - 3-strip
11	160247	Variable tuning condenser, 2-gang
12	110850	Wire capacitor, 7 mmf
13	160334	Range Switch
14	85061	Mica condenser .000051 mf
15	110564	Carbon resistor 100,000 ohms ± 20% 1/4 watt
16	160227	S.W. antenna coil assembly
17	160344	S. W. antenna trimmer condenser, 3-strip
18	116819	Paper condenser .05 mf 600 V.
19	119758	1st I. F. coil assembly
20	119759	2nd I. F. coil assembly
21	116706	Paper condenser .2 mf 600 V.
22	110563	Carbon resistor 10,000 ohms ± 10% 1/4 watt
23	116819	Paper condenser .05 mf 600 V.
24	160237	Phono-Radio switch
25	116625	Paper condenser .1 mf 600 V.
26	83539	Mica condenser .00026 mf
27	110584	Carbon resistor 330,000 ohms ± 20% 1/4 watt
28	110570	Carbon resistor 2.2 megohms ± 20% 1/4 watt
29	119414	Paper condenser .02 mf 600 V.
30	83539	Mica condenser .00026 mf
31	110590	Carbon resistor 180 ohms 10% 1/4 watt
32	110553	Carbon resistor 220,000 ohms ± 20% 1/4 watt
33	110564	Carbon resistor 100,000 ohms ± 20% 1/4 watt
34	110564	Carbon resistor 100,000 ohms ± 20% 1/4 watt
35	119817	Paper condenser .004 mf 600 V.
36	160361	Tone control, 1 megohm
37	110552	Carbon resistor 47,000 ohms ± 20% 1/4 watt
38	119417	Paper condenser .006 mf 600 V.
39	112975	Carbon resistor 10 megohms ± 20% 1/4 watt
40	119817	Paper condenser .004 mf 600 V.
41	83539	Mica condenser .00026 mf
42	119414	Paper condenser .02 mf 600 V.
43	110553	Carbon resistor 220,000 ohms ± 20% 1/4 watt
44	160238	Volume control, 1 megohm
45	110559	Carbon resistor 470,000 ohms ± 20% 1/4 watt
46	110565	Carbon resistor 22,000 ohms ± 20% 1/4 watt
47	110573	Carbon resistor 2200 ohms ± 20% 1/4 watt
48	110565	Carbon resistor 22,000 ohms ± 20% 1/4 watt
49	119414	Paper condenser .02 mf 600 V.
50	110559	Carbon resistor 470,000 ohms ± 20% 1/4 watt

PARTS LIST(Continued)

Item	Part No.	Description
51	110559	Carbon resistor 470,000 ohms ± 20% 1/4 watt
52	119414	Paper condenser .02 mf 600 V.
53	110565	Carbon resistor 22,000 ohms ± 20% 1/4 watt
54	116706	Paper condenser .2 mf 600 V.
55	118810	Wire-Wound resistor 110 ohms ± 10% 1 watt
56	119417	Paper condenser .006 mf 600 V.
57	115124	Speaker assembly
58	116470	Electrolytic condenser dual 20 mf 150 V.
59	113472	Electrolytic condenser 40 mf 150 V.
60	161266	Filter Choke
61	116819	Paper condenser .05 mf 600 V.
62	116752	Wire-wound resistor 33 ohms ± 10% 1 watt
63	161238	3 section wire-wound resistor 30-50-30 ohms

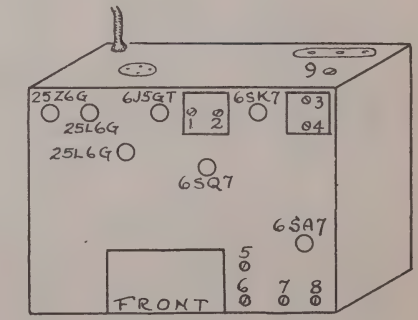
ALIGNMENT FREQUENCIES

1,2 - 2nd I-F trimmers - 455 kc
3,4 - 1st I-F trimmers - 455 kc
5 - Padder - 600 kc
6 - S-W Osc.trimmer - 1.6 mc
7 - BC Osc.trimmer -1500 kc
8 - S-W R-F trimmer - 1.6 mc
9 - BC R-F(loop) " -1500 kc

VOLTAGES

Tube	E_p	E_{sg}	E_c	E_g
6SA7	110	95	2.5	--
6SK7	110	85	2.5	--
6SQ7	60			
6J5GT	65		1.7*	
25L6GT	110	110	8.0	

*- Across 2200-ohm resistor



I-F ALIGNMENT: Connect 455-kc signal to 6SA7 grid. Adjust trimmers 1,2,3,and 4 for maximum output.

R-F ALIGNMENT: BC- with loop antenna connected (or dummy coil simulating it), adjust trimmers 7 and 9 at 1500 kc and 5 at 600 kc. Check at 1000 kc.

S-W- Adjust trimmer 6 and 8 at 1.6 mc. Check at 6000 kc.

After complete cabinet installation, trimmer 9 should be re-adjusted for maximum output,using 1500 kc radiated signal.

MODEL 206HA

STEWART-WARNER CORP.

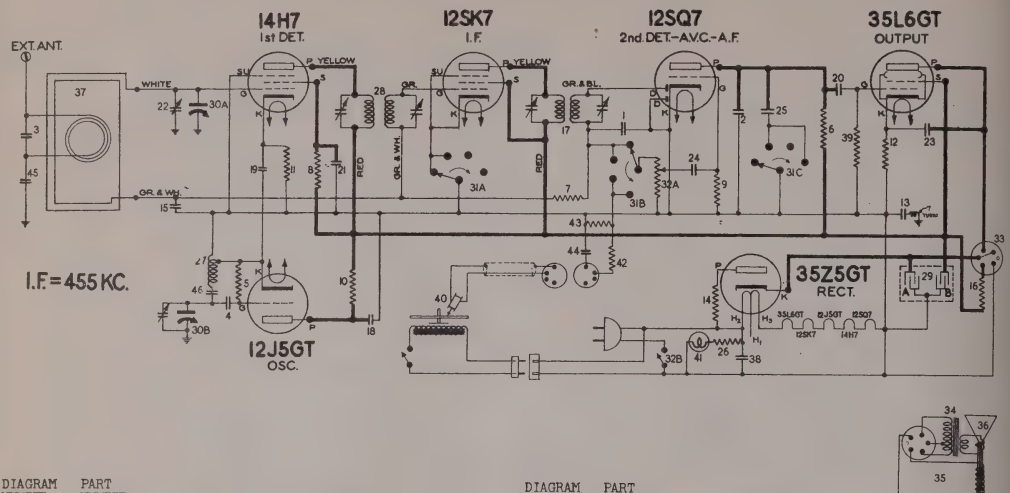


DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1-2---	83539	Condenser, Mica. 260 mmfd.
3-4---	83783	Condenser, Mica. 110 mmfd.
5-----	110552	Resistor, carbon, 47,000 ohms ½ watt
6-----	110553	Resistor, carbon, 220,000 ohms ½ watt
7-----	110570	Resistor, carbon, 2.2 meg. ½ watt
8-----	110578	Resistor, carbon, 68,000 ohms ½ watt
9-----	112975	Resistor, carbon, 10 meg. ½ watt
10----	116068	Resistor, carbon 680 ohms ½ watt
11----	116079	Resistor, insulated, 1200 ohms ½ watt
12----	116092	Resistor, 140 ohms 1 watt, W.W.
13----	116706	Condenser, .2 mfd. 600 V
14----	116752	Resistor, 33 ohm, 1 watt, W.W.
15----	116819	Condenser, .05 mfd. 600 volts
16----	118835	Resistor, insulated, 1500 ohms 1 watt
17----	119024	Transformer, 2nd I.F.
18 to 21	119193	Condenser, .01 mfd. 600 volts
22----	119345	Condenser, trimmer (loop)
23----	119414	Condenser, .02 mfd. 600 volt
24----	119817	Condenser, .004 mfd. 600 volt
25----	119875	Condenser, .002 mfd. 600 volt
26----	160078	Resistor, carbon 220 ohms 1 watt
27----	500408	Coil, oscillator
28----	500801	Transformer, 1st I.F.
29----	501213	Condenser, electrolytic - A - 40 Mfd. 150V B - 20 Mfd. 150V
30A-30B	501403	Condenser, tuning
31A-31B-31C---	501404	Switch - tone & phono
32A-32B	501405	Volume control, 1 meg. (with switch)
33----	501448	Speaker cable & plug
34----	U-501459	Transformer, output for U-501460 spkr.
35----	U-501460	Speaker, dynamic (6")
36----	U-501461	Cone & voice coil for U-501460 spkr.
37----	501981	Loop antenna & cabinet back
38----	116819	Condenser, .05 mfd. 600 volts
39----	110559	Resistor, carbon, 470,000 ohms ½ watt
40----	500725	Crystal cartridge
41----	500897	Lamp - dial (Mazda C7)
42----	112970	Resistor, carbon, 330,000 ohms ½ watt
43----	110559	Resistor, carbon, 470,000 ohms ½ watt
44----	116625	Condenser, .1 mfd. 600 volts
45----	119193	Condenser; .01 mfd. 600 volts
46----	116819	Condenser, .05 mfd. 600 volts

MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION
114955	Clamp, for dial cord
112745	Clip, coil mounting
117057	Cord, drive
501406	Dial scale
501462	Knob
501463	Knob (with marker)
81145	Retaining ring for tuning shaft
116690	Socket, octal base
160392	Socket, octal (rectifier)
160171	Socket, (4 prong)
160294	Socket, for 14H7 (8-prong)
500896	Socket, pilot lamp for Mazda C7
161327	Tuning shaft
111456	Washer, spring washer for tuning shaft Per C
501395	Window, dial

ALIGNMENT PROCEDURE

Connect the output meter across the voice coil or from the plate of the 35L6GT output tube to B - through a .25 mfd. condenser.

Connect the ground lead from signal generator to B - through a .25 mfd. condenser for all alignment steps.

Turn the center control on the receiver to a radio position and set the volume control to the maximum position.

Set dial pointer to last marking on dial with gang in full mesh.

Connect hot lead from signal generator to stator on rear section of gang using 200 mmfd. in series as dummy.

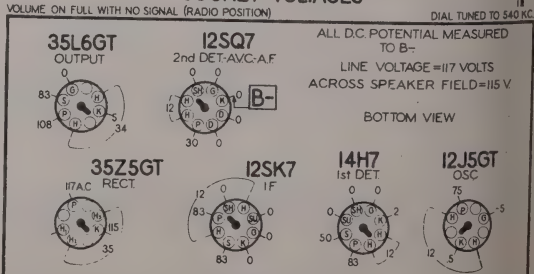
Set generator to 455 KC. and adjust trimmer screws on top of I.F. transformer cans for maximum output.

Connect hot lead to antenna terminal on loop through a 200 mmfd. condenser as a dummy. Set dial to 1400 KC. and adjust trimmer on front section of gang for maximum output on a 1400 KC. generator signal.

Place chassis in cabinet and using connections in "7," place loop in position and adjust loop trimmer at rear of chassis for maximum output while tuning dial to maximum signal.

SOCKET VOLTAGES

VOLUME ON FULL WITH NO SIGNAL (RADIO POSITION) — DIAL TUNED TO 540 KC.



ALL VOLTAGES MEASURED IN RADIO POSITION. USE A HIGH RESISTANCE VOLTMETER OF AT LEAST 1000 OHMS PER VOLT.

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ADJUSTING TONE ARM INDEXING ON 10" & 12" RECORDS

When adjusting tone arm indexing, it is only necessary to make the adjustment for one size of record. Proceed as follows:

1. With the switch knob in the "off" position, move the TONE ARM to the "rest" position so that its outer edge is approximately lined up with the extreme outside edge of the record changer panel.
2. Loosen the two set screws on the under side of the record changer panel (see Fig. V, point "t").
3. Line up the outer edge of the TONE ARM with the outer edge of the record changer panel by eye.
4. Place a 12 inch record on the turntable, put the machine into automatic operation by pulling the SWITCH KNOB to the "Reject" position and releasing it. Note the point at which the needle FIRST strikes the margin of the 12 inch record. (The word "first" is used to indicate the fact that after the needle has touched the record, the booster spring will attempt to move the needle in toward the center. Proper setting of the tone arm indexing position is concerned only with the point at which the needle first makes contact with the record).
5. If the needle did not strike the record approximately an eighth of an inch in from the outside edge, move the TONE ARM in the desired direction a slight amount by slipping the TONE ARM LEVER (see Fig. IV, Item 24) which has been previously loosened at two set screws (see Fig. V. point "t").
6. After obtaining a correct indexing of the TONE ARM on the 12 inch diameter records, check the indexing on a 10 inch diameter record and tighten the two set screws firmly.

NOTE: Incorrect action of the booster spring or TONE ARM RETARD LEVER may produce the effect of improper TONE ARM indexing. (See Section VIII).

"AUTOMATIC" TRIP ADJUSTMENTS

This changer incorporates a dual trip to insure positive cut-off on various types of records.

A. MINIMUM CIRCLE DIAMETER TRIP

After the TONE ARM has played in far enough so that the distance of the needle from the center spindle is approximately 1-7/8 inches, the record changer will trip regardless of whether or not there is a cut-off or eccentric groove on the record. This type of trip is known as "a minimum circle diameter trip."

The diameter of this minimum circle is set at the factory to be approximately 3-3/4 inches.

Variations in adjustment or readjustment of this operation can be obtained by moving the TRIP SHOE (see Fig. IV, Item 23) slightly. The TRIP SHOE is locked in position by means of a screw when the adjustment has been satisfactorily completed. This screw can be adjusted thru a hole cut in the main drive gear, when the machine is not in a change cycle.

B. ECCENTRIC GROOVE TRIP

A second tripping device has been included which operates due to any outward movement of the TONE ARM after it has played to within approximately 2-1/2 inches of the center spindle. This trip is actuated by a small dog, (Fig. IV, point k) engaging the fine toothed ratchet, and is adjusted at the factory.

TONE ARM ADJUSTMENTS (OTHER THAN INDEXING)

A. NEEDLE PRESSURE

The needle pressure is controlled by means of the counter-balance spring (see Fig.II, Item 10) at the rear of the arm. The spring tension has been set to provide the needle pressure necessary for correct operation of the pickup. Do not change the tension of this spring unless record or needle wear is excessive.

B. TONE ARM HEIGHT ADJUSTMENTS

The TONE ARM HEIGHT ADJUSTMENT SCREW (Fig. II, Item 8) controls only the height of the TONE ARM when it is in the playing position with no record on the turntable. The correct setting of this adjustment screw is that which, under the above condition, allows the TONE ARM to descend until the needle point is very slightly below the level of the turntable surface.

The TONE ARM HEIGHT ADJUSTMENT SCREW should not be used to adjust the height to which the TONE ARM rises during a change cycle; this height is controlled solely by the length of the TONE ARM LIFT PIN (Fig. II, Item 9).

"BOOSTER" SPRING ADJUSTMENTS

A BOOSTER SPRING SETTING

The function of the booster spring (Fig. V, Item 11) is to move the needle from the margin of the record into the first groove automatically. This booster spring is built into the TONE ARM LOCATOR LEVER (see Fig. IV, Item 25) and consists of a single piece of light spring wire (see Fig. V, Item 11). The side pressure exerted by this spring should be just sufficient so that the needle will move across the margin of a record which contains no lead-in groove. After any adjustment of this booster spring, check its operation on both 10 inch and 12 inch records to make sure that it functions properly.

Do not increase the operating pressure of the booster spring to such a point that it tends to make the needle slide across the first few record grooves. Access to the booster spring can be obtained when the TONE ARM is in the "Rest" position, with the SWITCH KNOB turned "off", by moving the TONE ARM LOCATOR LEVER assembly out toward the edge of the changer sub-panel with the finger.

B. TONE ARM RETARD LEVER ADJUSTMENTS

The function of the TONE ARM RETARD LEVER (Fig. V, Item 4) is to provide a smooth motion of the tone arm as it moves from the outer edge of the panel in towards the edge of the record to be played, during an automatic change cycle.

An additional function of the TONE ARM RETARD LEVER is to prevent action of the BOOSTER SPRING (Fig. V, Item 11) until the needle has lowered onto the outer edge of the record to be played. Insufficient tension of the TONE ARM RETARD LEVER SPRING (Fig. V, Item 3) will permit action of the BOOSTER SPRING before the needle comes to rest on the record, giving the effect of incorrect tone arm indexing. Excessive pressure of the TONE ARM RETARD LEVER SPRING will cause rough, jerky action of the TONE ARM as it moves from the outer edge of the changer panel.

ACTION OF THE SWITCH KNOB

A. "OFF" POSITION

With the SWITCH KNOB in the "Off" position, the TONE ARM will lock at the extreme outside edge of the changer panel. This locked position of the TONE ARM results from the engagement of the TONE ARM LATCH LEVER (Fig. IV, Item 1) with the projection on the TONE ARM LEVER (Fig. IV, Item 24, point d).

B. "MANUAL" POSITION

When the SWITCH KNOB is thrown to the "Manual" position, the electrical switch circuit is closed and the TONE ARM is freed from its locked position due to the action of the projection on the MAIN CONTROL SLIDE (Fig. IV, Item 21) which partially disengages the TONE ARM LATCH LEVER by striking it on its projection at point "s" (Fig. V). At the same time the TONE ARM LOCATOR LEVER (Fig. IV, Item 25) is held at point "r" (Fig. V) by the upper slide. In this position, it is essential that the engagement between the upper slide and TONE ARM LOCATOR LEVER be positive as shown in Fig. V. The purpose of the spring (Fig. V, left, Item 9) attached to the upper slide is to provide a means whereby the engagement at point "r" (Fig. V) may be made should the SWITCH KNOB be moved to the "Manual" position when the TONE ARM LEVER (Fig. IV, Item 24) is not in the outward position. (Such an action would occur when the SWITCH KNOB is moved from the "Automatic" position to the "Manual" position while a record is being played). The TONE ARM LOCATOR LEVER (Fig. IV, Item 25) would then be against either the 10 inch or 12 inch indexing stop, and as the TONE ARM is swung into the outside rest position, the TONE ARM LOCATOR LEVER (Fig. IV, Item 25) must be able to catch at point "r" (Fig.V).

When the TONE ARM is in the "Rest" position and the SWITCH KNOB is thrown to "Manual", it is essential that the sequence be carefully observed between the action of the LATCH LEVER (Fig. IV, Item 1) and the upper slide (Fig. V, point "r"). The upper slide should be in a position to provide a positive stop for the TONE ARM LOCATOR LEVER (Fig. IV, Item 25) BEFORE the LATCH LEVER (Fig. IV, Item 1) releases the tone arm lever (Fig. IV, Item 24); otherwise the TONE ARM will be scraped across the turntable. Also, it is essential that the engagement at "r" be such that there is a hooking action at this point in order to prevent the TONE ARM LOCATOR LEVER (Fig. IV, Item 25) and the TONE ARM from sweeping toward the center when the switch is moved out of the "Manual" position.

The SWITCH KNOB performs the additional function of preventing the trip mechanism from operating when the SWITCH KNOB is in the "Manual" position. The motion of the MAIN CONTROL SLIDE (Fig. IV, Item 21) is transmitted through the CONNECTING LINK (Fig. V, Item 12) to the MANUAL AND REJECT LEVER (Fig. IV, Item 17). The projection on this lever at point "w" (Fig. V) engages the upper end of the CLUTCH ENGAGEMENT LEVER (Fig. III, Item 6) at point "h" (Fig. IV) and so prevents the CLUTCH ENGAGEMENT LEVER from engaging the lower projections of the continuously rotating pinion gear thus preventing the start of a change cycle.

C. "AUTOMATIC" POSITION

With the SWITCH KNOB in the "Automatic" position, the TONE ARM LATCH LEVER (Fig. IV, Item 1) will lock the TONE ARM LEVER at point "d" (Fig. IV) at any time when the TONE ARM is moved to the outside position. This tone arm latch is released during a change cycle through its engagement at point "s" (Fig. V) with the main drive gear. As noted above under Section B, the TONE ARM LOCATOR (Fig. IV, Item 25) and the upper slide (Fig. IV, point "p") hook together at point "r" (Fig. V) during "Manual" operation. When the SWITCH KNOB is thrown into "Automatic" or "Reject" position, these two parts completely disengage during the next change cycle due to the cam action of the main drive gear which forces the tone arm lever to the outer edge of the sub-panel and allows the upper slide (Fig. IV, point "p") to clear the TONE ARM LOCATOR LEVER at point "r".

The TONE ARM LOCATOR LEVER provides the 10 inch and 12 inch indexing for the TONE ARM during automatic operation by its engagement with the 12 INCH RESET LEVER (Fig. IV, point "g", Item 18). The 12 INCH RESET LEVER must hook securely behind the projecting tip on the TONE ARM LOCATOR LEVER (as shown at point "r" on Fig. IV)

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when the 12 inch record is being played. This is to prevent the TONE ARM LOCATOR LEVER and the TONE ARM from sweeping toward the center should the 12 inch setting of the selector arms be changed to 10 inch while the TONE ARM is playing a 12 inch record. (See Section X also).

D. "REJECT" POSITION

When the SWITCH KNOB is pushed into the "Reject" position, the motion of the SWITCH KNOB is transmitted to the MANUAL AND REJECT LEVER (Fig. IV, Item 17)(as described under Section B). The projection at "u" (Fig. V) engages the projecting stud on the TRIP LEVER near point "k" (Fig. IV). The TRIP LEVER releases the CLUTCH ENGAGEMENT LEVER (Fig. III, Item 6) at point "n" (Fig. IV). The SWITCH KNOB should not remain in the "Reject" position. The SWITCH KNOB is returned to the "Automatic" position due to the tension in the SWITCH SPRING (Fig. V, Item 10) acting on the SWITCH LEVER (Fig. V, Item n).

E. "A.C." SWITCH OPERATION

In Figure IV the SWITCH KNOB is in the "off" position. The electrical motor switch is open. If the switch knob and the MAIN CONTROL SLIDE (Fig. IV, Item 21) are moved downwards, referring to Fig. IV, into the "Automatic" position, the right end of the SWITCH LEVER (Fig. IV, Item n) will rest against the panel stud located just to the lower right of the A.C. SWITCH (Fig. IV, Item 22). The SWITCH LEVER (Fig. IV, Item n) will then move the A.C. SWITCH to the "on" position.

Through its engagement with the projection on the MAIN CONTROL SLIDE (Fig. IV, Item 21), the DETENT LEVER (Fig. IV, Item m) prevents the SWITCH SPRING (Fig. V, Item 10) tension from pulling the MAIN CONTROL SLIDE into the "off" position.

Further movement of the MAIN CONTROL SLIDE, into the "Reject" position, results in increased SWITCH SPRING (Fig. V, Item 10) tension which will return the slide to the "Automatic" position after the finger is removed from the SWITCH KNOB.

The Switch Knob is in the "Manual" position, with the A.C. SWITCH "on", in Figure V. The SWITCH LEVER (Fig. V, Item n) is against the panel stud to the left of the A.C. SWITCH, near the edge of the panel. This position of the SWITCH LEVER corresponds to the "on" position of the SWITCH LEVER when in "Automatic" operation except the force is applied on the opposite side of the SWITCH LEVER, bearing in the opposite direction.

"SELECTOR ARM" ADJUSTMENTS

SETTING OF SELECTOR ARMS

The position of the SELECTOR ARMS (Fig. 1, Item 4) determines the TONE ARM indexing for ten inch or twelve inch records, through the position of the 12 INCH SET CAM (Fig. IV, Item 20). The position of this cam determines the position of the 12 INCH SET LEVER (Fig. IV, Item 19) which communicates the motion of the SET CAM to the 12 INCH SET SLIDE (Fig. IV, Item 18). The 12 INCH SET SLIDE (Fig. IV, Item 18) serves as a stop for the TONE ARM LOCATOR (Fig. IV, Item 25) at point "r" for 12 inch records, or point "r" for 10 inch records.

The 12 INCH RESET LEVER SPRING (Fig. V, Item 9) must be stronger than the 12 INCH RESET SLIDE SPRING (Fig. V, Item 9). Point "v" on the TONE ARM LOCATOR LEVER should then hook securely with point "z" on the 12 INCH RESET SLIDE if the setting of the SELECTOR ARMS is changed to the ten inch setting while the changer is playing a twelve inch record automatically.

ACTION OF SELECTOR ARMS

The SELECTOR ARMS (Fig. 1, Item 4) are rotated by the DRIVE LINK (Fig. IV, Item 4). The DRIVE LINK is moved by the CIRCULAR CAM (Fig. V, Item X) on the MAIN DRIVE GEAR ASSEMBLY (Fig. V, Item 2). The motion of the DRIVE LINK (Fig. IV, Item 4) is communicated to the SELECTOR SHAFT through the DRIVE CRANKS (Fig. IV, Item 8) and the DRIVE CRANK PAWL-RATCHET WASHER combination (Fig. IV, Item 9, 10). Failure of the DRIVE CRANK PAWL (Fig. IV, Item 9) to engage the RATCHET WASHER (Fig. IV, Item 10) will prevent the SELECTOR ARMS from synchronizing correctly and failure to select records may result. This condition may also be due to improper setting of the SELECTOR ARMS during loading, (see separate operating instructions). A damaged or broken DRIVE PAWL SPRING (Fig. IV, Item 7) or a bind in the DRIVE CRANK PAWL (Fig. IV, Item 9) will result in improper record selection.

MISCELLANEOUS MECHANICAL NOTES

"RUMBLE"

1. Remove the turntable and inspect the rubber rimmed MOTOR IDLER PULLEY (Fig. II, Item 14) for flat or worn spots which would tend to jar the turntable.

2. With the TURNTABLE removed, rotate the TURNTABLE SPINDLE to be sure that it turns smoothly.

"WOW" OR SPEED VARIATION

1. Remove the TURNTABLE and rotate the TURNTABLE SPINDLE (Fig. II, Item 1) with the fingers to determine whether it tends to bind. High friction at this point may be sufficient to cause the motor to slow down instantaneously. Apply ONLY a drop or two of light oil to the two spindle bearings. If the turntable shaft is bent to such an extent that replacement is necessary, it is recommended that the entire SPINDLE & PINION GEAR ASSEMBLY (Fig. IV, Item 13, also Fig. V) be replaced instead of replacing only the SPINDLE ASSEMBLY. This SPINDLE & PINION GEAR ASSEMBLY (see Fig. V) is fitted with precision machines at the factory, thus insuring proper clearances and smooth operation.

REPEATED TRIPPING

Turn off the changer during a change cycle so that the CLUTCH ENGAGEMENT LEVER (Fig. III, Item 6) may be observed. This CLUTCH ENGAGEMENT LEVER should lock into the up position due to its engagement with the TRIP LEVER (Fig. IV, Item 14) at the point "h" (Fig. V). If this engagement is not positive, inspect the bearing point of the TRIP LEVER (Fig. IV, Item 15) for evidences of dirt or binding. A more positive engagement may be obtained by strengthening the spring (Fig. IV, Item 11). CAUTION: This spring tension must be JUST SUFFICIENT to lock the CLUTCH ENGAGEMENT LEVER in the up position. Excessive tension of the spring will result in failure to trip.

Repeated tripping may also be due to the fact that the SWITCH KNOB does not return to the "Automatic" position when released. This condition can result from insufficient tension in spring (Fig. V, Item 10), or excessive friction or binding in the motion of the MAIN CONTROL SLIDE (Fig. IV, Item 21).

FAILURE TO TRIP

Turn off the changer during a change cycle so that the CLUTCH ENGAGEMENT LEVER (Fig. III, Item 6) may be actuated with the finger while the trip lever is being held away, so that the CLUTCH ENGAGEMENT LEVER does not lock in the "up" position. The CLUTCH ENGAGEMENT LEVER must fall by gravity. CAUTION: It is not advisable to use any lubricant at the bearing point of the CLUTCH ENGAGEMENT LEVER (Fig. III, points c); this bearing is intended to be a loose fit, and must be checked for binds.

Excessive pressure on spring (Fig. IV, Item 11) would tend to make the needle jump out of the cut-off groove of the record (see paragraph D-1 above) and prevent tripping.

The Shielded Pickup Lead Wire (Fig. II, Item 2) must have sufficient slack between the TONE ARM and the point where the tone arm lead enters the sub-panel to permit free sidewise movement of the tone arm. The Shielded Lead should be positioned that it loosely rests near the tone arm post immediately below the point at which it leaves the tone arm bracket. Under no circumstances should the Shielded Wire be fastened in place, pulled taut, or restrict free tone arm movement. This is particularly important in machines which use extremely light pressure pickup cartridges.

INSUFFICIENT POWER TO COMPLETE A CHANGE CYCLE

Inspect the bearing of the MAIN DRIVE GEAR (Fig. V, Item 2) for excessive friction or binding.

JAMMING OF THE MECHANISM

Should the changer jam at any time during a change cycle for some reason other than jamming of the SELECTOR ARMS with the records being changed, remove the records and attempt to free the machine by rotating the turntable in a reverse direction through a quarter turn. If the jam is apparently cleared by such action, the machine should be checked by operating it automatically several times, but with no records.

If the jam does not clear by rotating the turntable in a reverse direction, inspect the underside of the changer panel for damaged or missing parts.

Inspect the meshing of the DRIVE GEAR (Fig. V, Item 2) with the PINION GEAR (on SPINDLE shaft). If the two gears do not mesh (that is, if they are not so timed as to fit together properly) it is probably due to the fact that the CLUTCH ENGAGEMENT LEVER (Fig. III, Item 6) has been damaged or bent. This CLUTCH ENGAGEMENT LEVER is intended to so contact one of the lower projections on the PINION GEAR (on the SPINDLE) that the teeth of this PINION GEAR and the teeth of the MAIN DRIVE GEAR (Fig. V, Item 2) will be timed to fit together properly whenever the mechanism starts a change cycle. If the CLUTCH ENGAGEMENT LEVER (Fig. III, Item 6) is bent, it may be straightened until, by trial, the two gears mesh properly when the changer is tripped. It is advisable that the changer mechanism be operated by hand so that this timing or meshing between the two gears can be more closely observed during any adjustments or inspection.

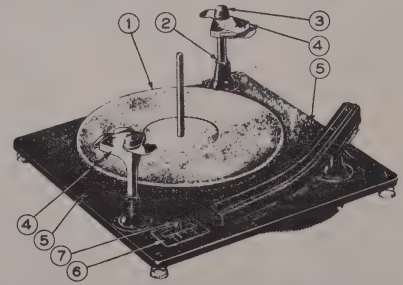

FIGURE I

ITEM	PART NO.	DESCRIPTION
1	C-29048	- Turntable
2	J-72025	- Thrust Washer
3	C-29135	- Selector Knob
4	C-29156-A	- Record Support Arm, Blade and Shaft Assembly
6	B-27074	- Control Escutcheon
7	C-2913[illegible]	- Switch Control Knob

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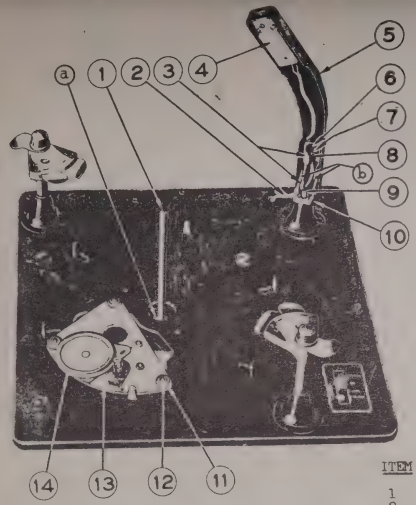
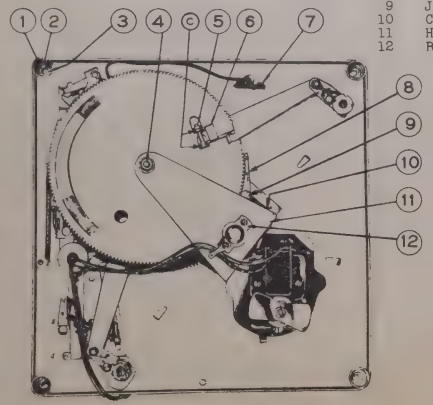


FIGURE II

ITEM	PART NO.	DESCRIPTION
1	C-29161-A	- Spindle, Pin and Ball Assembly
3	C-29150-A	- Tone Arm Shaft and Bracket Assembly
4	500725	- Tone Arm Cartridge
5	C-29153-A	- Tone Arm
6	J-78008	- Grommet
7	C-29128	- Tone Arm Adjusting Lock Spring
8	J-71051	- Tone Arm Height Adjusting Screw
9	C-29016	- Tone Arm Lift Pin
10	C-29127	- Tone Arm Counter Balance Spring
11	J-22144	- Motor Mounting Grommet
12	J-22266	- Motor Mounting Bushing
13	C-29028	- Motor Assembly (60 Cycle)
14	(161104	- Motor Pulley - 2" Dia.
	(117806	- Motor Pulley - 2½" Dia.

ITEM	PART NO.	DESCRIPTION
1	C-29130	- Tone Arm Locator and Latch Spring
2	C-29122-A	- Drive Gear and Cam Assembly
3	B-27067	- Retard Lever Spring
4	B-27065	- Tone Arm Retard Lever
5	B-27088	- Retard Lever Shoulder Screw
6	C-29133	- Lower Slide Spring
7	C-29061	- 12" Reset Lever Spring
8	J-22094	- Detent Arm Spring
9	J-22058	- Upper Slide and Reset Slide Spring
10	C-29131	- Switch Spring
11	H-20129	- Booster Spring
12	R-27028	- Connecting Link

FIGURE III



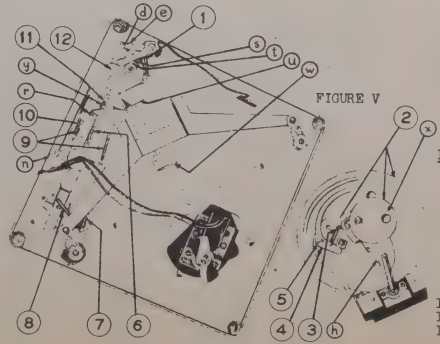
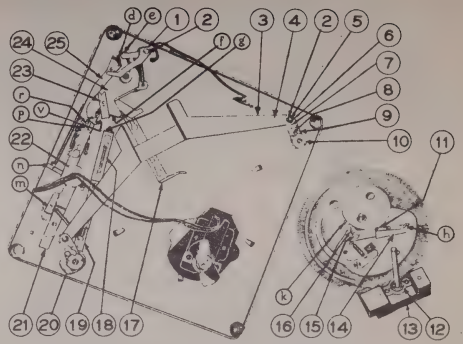


FIGURE V

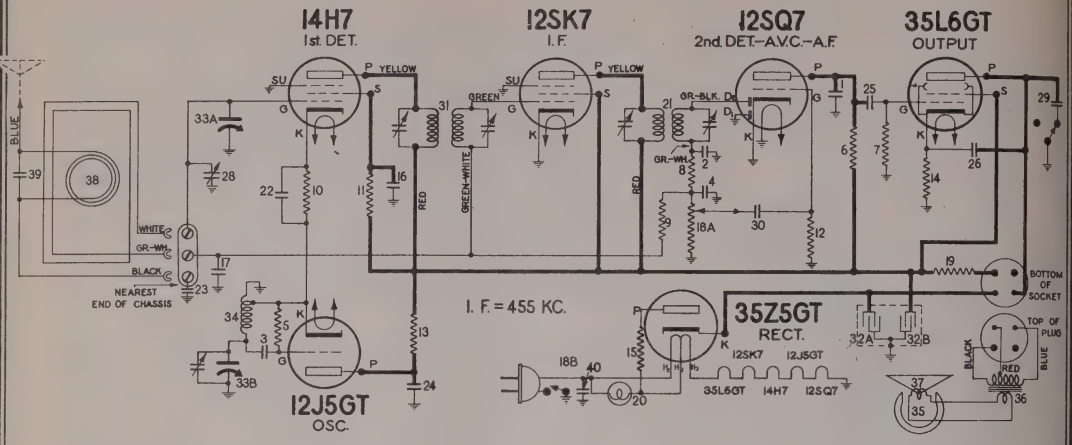


ITEM	PART NO.	FIGURE IV DESCRIPTION
1	C-29018	- Tone Arm Latch Lever
2	J-22021	- "C" Washer
3	C-29155	- Drive Link and Crank Assembly
4	C-29079	- Drive Link
5	C-29083	- Drive Crank Shoulder Rivet
6	C-29105	- Drive Crank
7	C-29129	- Drive Pawl Spring
8	C-29118	- Drive Pawl Shoulder Rivet
9	C-29112	- Drive Crank Pawl
10	C-29036	- Ratchet Washer
11	B-27092	- Trip Lever Spring
12	C-29089	- Spindle Bearing Retainer
13	C-29158-A	- Spindle and Gear Bracket Assembly (Complete)
14	C-29162-A	- Trip Lever Assembly
15	C-29100	- Trip Lever Shoulder Screw
16	B-27063	- Trip Dog Spring
17	C-29063	- Manual and Reject Lever
18	C-29059	- 12" Set Slide
19	C-29060	- 12" Set Lever
20	C-29113	- 12" Set Cam
21	C-29160-A	- Main Control Slide Assembly
22	B-27026	- Switch
23	C-29011	- Trip Shoe
24	C-29151-A	- Tone Arm Lever Assembly
25	C-29019	- Tone Arm Locator
	C-29117	- 12" Set Cam Pin (Not shown used with Item 20)

ITEM	PART NO.	DESCRIPTION
1	H-20198	- Panel Mounting Spring
2	C-29114	- Spring Retainer Cup
3	J-79024	- Rivet
4	C-29074	- Drive Gear Shaft
5	C-29088	- Clutch Engagement Lever Pin
6	C-29087	- Clutch Engagement Lever
7		- Terminal Strip
8	C-29077	- Drive Gear Stop Lever
9	C-29067	- Stop Lever Shoulder Rivet
10	C-29086	- Stop Lever Spring
11	C-29125-A	- Spindle Housing and Stop Lever Assy.
12	C-29090	- Thrust End Spindle Bearing Retainer

CHASSIS 206F

STEWART-WARNER CORP.



IF PEAK 455 KC

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1-2	83539	Condenser, Mica. 260 Mmfd.	$ .20
3-4	83783	Condenser, Mica. 110 Mmfd.	.20
5	110552	Resistor-Carbon, 47,000 Ohms ½ Watt	.12
6	110553	Resistor-Carbon, 220,000 Ohms ½ Watt	.12
7	110554	Resistor-Carbon, 470,000 Ohms ½ Watt	.12
8	110566	Resistor-Carbon, 33,000 Ohms ½ Watt	.12
9	110570	Resistor-Carbon, 2.2 Meg. ½ Watt	.15
10	110573	Resistor-Carbon, 2,200 Ohms ½ Watt	.12
11	110578	Resistor-Carbon, 68,000 Ohms ½ Watt	.12
12	116580	Resistor-Carbon, 3.3 Meg. ½ Watt	.12
13	116068	Resistor-680 Ohms ½ Watt	.12
14	116092	Resistor-140 Ohms 1 Watt, Wire Wound	.14
15	116752	Resistor-33 Ohms 1 Watt, Wire Wound	.15
16-17	116819	Condenser- .05 Mfd. 600 Volt	.20
18A-18B	116834	Volume Control- 1 Megohm with switch	1.10
19	116835	Resistor-Insulated, 1,500 Ohms 1 Watt	.15
20	118921	Lamp-Dial (Mazda #47)	.15
21	119024	Transformer-2nd I.F.	1.15
22 to 26	118193	Condenser- .01 Mfd. 600 Volt	.15
27	119214	Switch-Tone Control	.48
28	119345	Condenser-Trimmer	.20
29	119414	Condenser- .02 Mfd. 600 Volt	.15
30	119417	Condenser- .006 Mfd. 600 Volt	.15
31	500131	Transformer- 1st I.F.	1.10
32A-32B	500256	Condenser-Electrolytic (A-40 Mfd. 150 V. (B-20 Mfd. 150 V.	1.00
33A-33B	500403	Gang Condenser & Drum With Osc. Trimmer)	2.50
34	500408	Coil-Oscillator	.42
35	R-500423	Speaker-P.M. (5 inch)	4.50
36	R-500424	Transformer-Output, for R-500423 Spkr.	1.60
37	R-500425	Cone & Voice Coil for R-500423 Spkr.	1.60
38	500465	Cabinet Rack & Loop Assem.	1.70
39	88686	Condenser-Mica, 200 Mmfd.	.14
40	116819	Condenser- .05 Mfd. 600 Volt	.20

MISCELLANEOUS PARTS

Part Number	Description	List Price
500462	Cabinet	$7.00
112745	Clip-coil mounting	.01
112764	Clip-dial scale retaining	.01
117057	Cord-drive supplied in 3' lengths	.15
500404	Dial scale	.35
116610	Dial window-acetate	.35
119187	Knob	.10
110496	Plug-Speaker (4 prong)	.12
116863	Pointer	.16
83552	Screw-Chassis Mtg.	.03
116831	Shaft-tuning	.12
110501	Socket-Speaker (4 prong)	.16
118793	Socket - for dial light	.40
160294	Socket - 8 prong for 14H7	.12
114876	Socket-Octal (rectifier)	.15
119791	Socket-Octal	.12
114968	Spring-Dial cord tension	.03

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

ALIGNMENT PROCEDURE

ALIGN THIS RECEIVER IN THE CABINET WITH LOOP CONNECTED

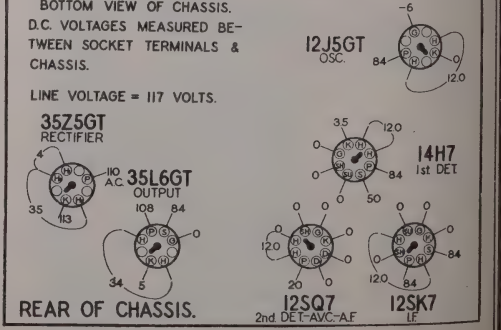
1. Connect output meter across the voice coil; or from 35L6GT plate to chassis.
2. Connect the ground lead of the signal generator to the chassis through a .25 mfd. condenser.
3. Set the volume control to the maximum volume position.
4. Set dial pointer in a horizontal position with gang condenser in full mesh.
5. Connect the antenna lead of the signal generator to the lug on the top of the rear section of the gang condenser, using a 200 mmfd. mica condenser in series.
6. Set the signal generator to 455 KC. Set receiver dial to a point where it does not affect signal. Adjust the trimmer screws on the top of each I.F. transformer for maximum output.
7. Connect the output of the signal generator in series with a 200 mmfd. mica condenser to the blue wire extending from the loop. Turn the receiver dial to 1500 KC.
8. Set the signal generator to 1500 KC. and adjust the trimmer on the front section of the receiver gang condenser for maximum output of the oscillator signal.
9. Place the loop antenna in its final position at the rear of the cabinet and adjust the trimmer screw on the back of the chassis for maximum output at 1500 KC.

SOCKET VOLTAGES

NO SIGNAL CONDITION — DIAL TUNED TO 540 KC.

BOTTOM VIEW OF CHASSIS.
D.C. VOLTAGES MEASURED BETWEEN SOCKET TERMINALS & CHASSIS.

LINE VOLTAGE = 117 VOLTS.



USE A VOLTMETER OF 1000 OHMS PER VOLT.

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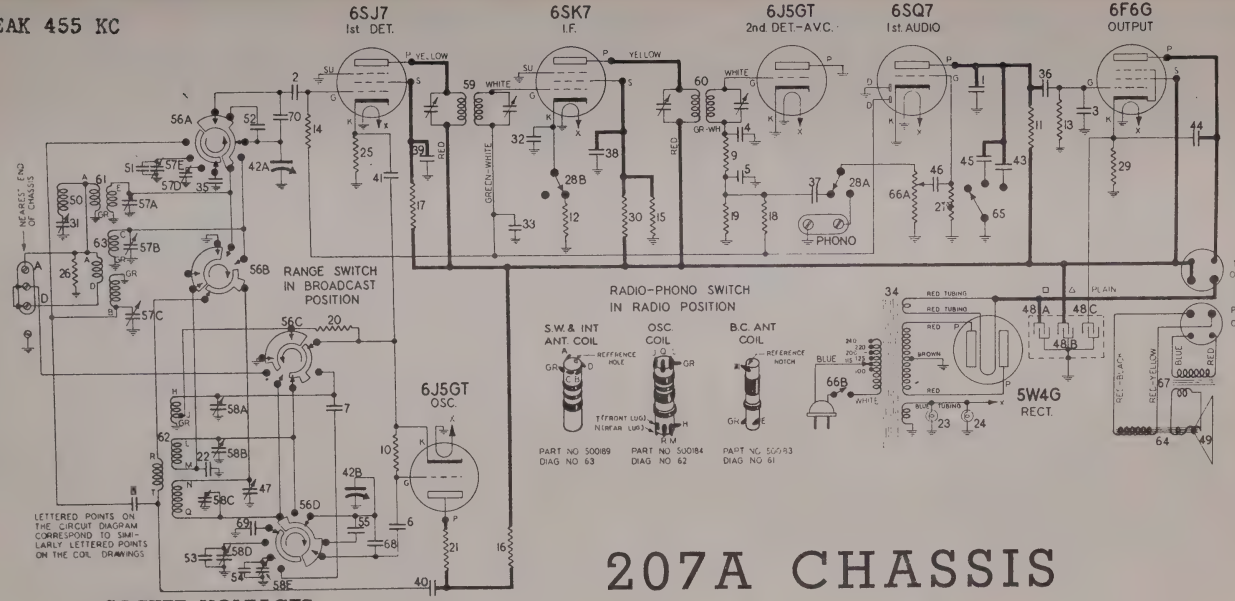
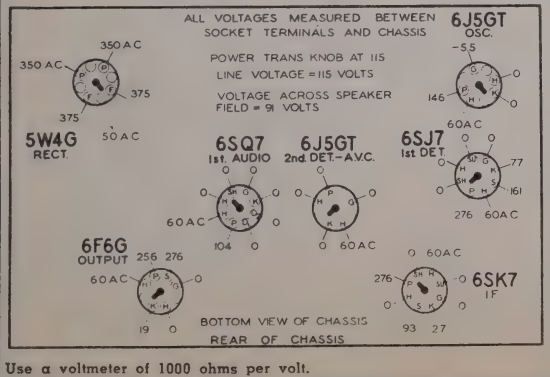


207A CHASSIS

SOCKET VOLTAGES

ANTENNA GROUNDED — **DIAL TUNED TO 540 KC.**



Use a voltmeter of 1000 ohms per volt.

Diagram Number	Part Number	Description
1-2	83539	Condenser- mica 260 mmfd.
3 to 5	83783	Condenser- mica 110 mmfd.
6	85061	Condenser- mica 51 mmfd.
7	88587	Condenser- mica .0042 mfd.
8	110510	Condenser- wire 3 mmfd.
9-10	110552	Resistor- carbon 47,000 ohms ¼ watt.
11	110553	Resistor- carbon 220,000 ohms ¼ watt.
12	110556	Resistor- carbon 330 ohm ¼ watt.
13-14	110559	Resistor- carbon 470,000 ohms ¼ watt.
15-16	110562	Resistor- carbon 22,000 ohms ½ watt.
17	110564	Resistor- carbon 100,000 ohms ¼ watt.
18	110570	Resistor- carbon 2.2 Meg. ¼ watt.
19	110584	Resistor- carbon 330,000 ohms ¼ watt.
20-21	110590	Resistor- carbon 180 ohms ¼ watt.
22	110985	Condenser- mica .00224 mfd.
23-24	112636	Lamp- dial Mazda No. 44 (frosted)
25-26	112952	Resistor- carbon 3300 ohm ¼ watt.
27	112975	Resistor- carbon 10 Meg. ¼ watt.
28A-28B	114141	Switch- D.P.D.T. (Phono)
29	114335	Resistor- wire wound 430 ohms 2 watt
30	116054	Resistor- carbon 27000 ohm 1 watt.
31	116599	Condenser- trimmer for wave trap
32-33	116819	Condenser- .05 mfd. 600 volt
34	117774	Transformer- power 100-240 V. 40-133 cycles
35	118771	Condenser- silver mica 300 mmfd.
36 to 41	119193	Condenser- .01 mfd. 600 volt
42A-42B	119291	Condenser- variable tuning
43	119417	Condenser- .006 mfd. 600 volt
44 to 46	119875	Condenser- .002 mfd. 600 volts
47	119934	Condenser- padder
48A-48B-48C	160174	Condenser- electrolytic Section A- 20 mfd. 400 volt Section B- 15 mfd. 400 volt Section C- 10 mfd. 25 volt
49	M-160312	Cone & Voice Coil for M-500200 speaker
50	160606	Wave Trap Coil
51	160625	Condenser- silver mica 60 mmfd.
52-53	161011	Condenser- silver mica 75 mmfd.
54	161126	Condenser- silver mica 21 mmfd.
55	500043	Condenser- silver mica 125 mmfd.
56A to 56D	500164	Band switch
57A to 57E 58A to 58E	500168	Condenser- trimmer (5 section)
59	500169	Transformer- 1st I.F.
60	500171	Transformer- 2nd I.F.
61	500183	Coil- broadcast antenna
62	500184	Coil- oscillator
63	500189	Coil- short wave antenna
64	M-500200	Speaker- Dynamic (6")
65	500207	Switch- tone
66A-66B	500208	Volume Control- 1 Meg. (with switch)
67	M-500210	Transformer- output for M-500200 speaker
68	500212	Condenser- compensating 200 mmfd.
69	500213	Condenser- silver mica 350 mmfd.
70	500259	Condenser- compensating 275 mmfd.

CHASSIS 207A

STEWART-WARNER CORP.

ALIGNMENT PROCEDURE FOR 207A CHASSIS

1. Connect the output meter across the voice coil or from the plate of the 6F6G output tube to ground through a .1 mfd. condenser.
2. Connect the ground lead of the signal generator to the chassis. Be sure the connector is between the center terminal and "D" on the antenna strip.
3. Keep the volume control in the maximum position throughout alignment.
4. THE ORDER OF ALIGNMENT STEPS SHOWN BELOW MUST BE FOLLOWED EXACTLY.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD. Condenser	Lug on Front Section of Gang Cond.	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then Repeat Adjustment.
					3-4	1st I.F.	
200 MMFD. Mica Condenser	"A" Terminal	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	5	Wave Trap	Adjust for Minimum Output, Using a Strong Generator Signal.
200 MMFD. Mica Condenser	"A" Terminal	1500 KC	Broadcast	1500 KC	6	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
200 MMFD. Mica Condenser	"A" Terminal	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	7	Broadcast Antenna	Adjust for Maximum Output.
200 MMFD. Mica Condenser	"A" Terminal	600 KC	Broadcast	Tune to 600 KC Generator Signal	8	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
400 OHM Carbon Resistor	"A" Terminal	5 MC	Intermediate	5 MC	9	Intermediate Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 4.1 MC. If image does not appear, Realign at 5 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	"A" Terminal	5 MC	Intermediate	Tune to 5 MC Generator Signal	10	Intermediate Antenna	Adjust for Maximum Output.
400 OHM Carbon Resistor	"A" Terminal	20 MC	Foreign	20 MC	11	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 19.1 MC. If Image does not appear, Realign at 20 MC, with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	"A" Terminal	20 MC	Foreign	Tune to 20 MC Generator Signal	12	Foreign Antenna	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
400 OHM Carbon Resistor	"A" Terminal	12 MC	1st Position	12 MC	13	25 Meter Oscillator	Adjust for maximum output. Use the signal encountered with the trimmer screw farthest in.
400 OHM Carbon Resistor	"A" Terminal	12 MC	1st Position	Tune to 12 MC Generator Signal	14	25 Meter Antenna	Adjust for Maximum Output.
400 OHM Carbon Resistor	"A" Terminal	10 MC	2nd Position	10 MC	15	31 Meter Oscillator	Adjust for maximum output. Use the signal encountered with the trimmer screw farthest in.
400 OHM Carbon Resistor	"A" Terminal	10 MC	2nd Position	Tune to 10 MC Generator Signal	16	31 Meter Antenna	Adjust for Maximum Output.

MISCELLANEOUS PARTS

Part Number	Description	List Price
114955	Clamp—for dial cord	$0.01
112745	Clip—Coil Mounting (Small)	.01
112798	Clip—for Mtg. Wave Trap Coil	.01
116009	Clip—for Ant. Coil Mtg. (Large)	.01
117057	Cord—drive supplied in 3' lengths	.15
500175	Dial Scale	.70
117029	Drive Drum & Bushing	.50
500188	Escutcheon—dial (with glass)	1.60
160219	Knob	.06
119987	Pointer	.11
81145	Retaining Ring for Tuning Shaft	Per C .50
114148	Rotor—Voltage Switch (on power transformer)	.50
85827	Set Screw 8-32 square head for drive drum	.02
110501	Socket 4 prong (for speaker)	.16
119791	Socket octal	.12
114876	Socket octal (rectifier)	.15
114878	Socket octal, with special ground	.15
160026	Socket condenser Mtg.	.04
113177	Spring dial cord tension	.09
119824	Terminal Strip with Connector for Antenna	.14
84407	Terminal Strip phono	.12
111456	Washer spring washer for tuning shaft	Per C .50

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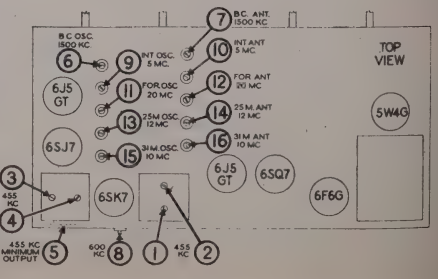

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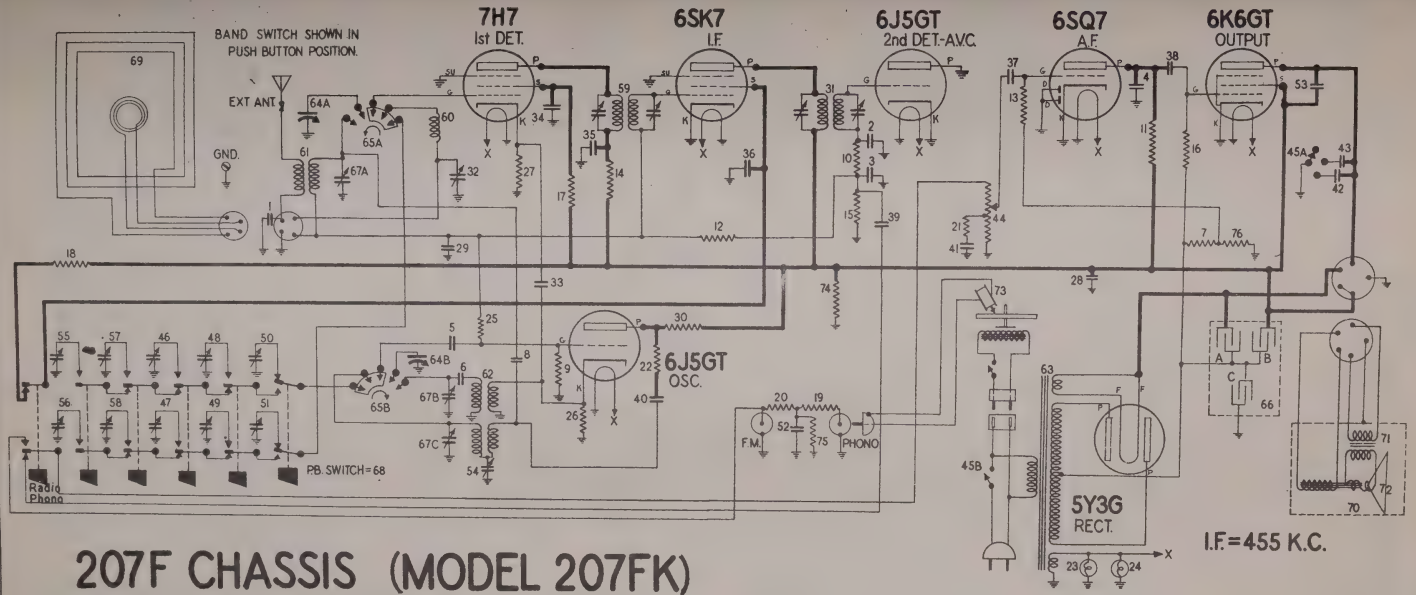
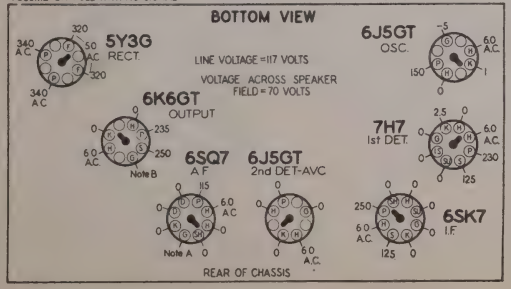


207F CHASSIS (MODEL 207FK)

SOCKET VOLTAGES

VOLUME ON FULL WITH NO SIGNAL — DIAL TUNED TO 540 KC.



NOTE A: The bias voltage on this grid is -2 volt measured across resistor No. 76.

NOTE B: The bias voltage on this grid is -16 volts measured across resistors 7 & 76.

USE A HIGH RESISTANCE VOLTMETER OF 1000 OHMS PER VOLT.

DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1 to 4	83963	Condenser, mica. 110 Mmfd.
5	85061	Condenser, mica. 51 Mmfd.
6	88587	Condenser, mica. .0042 Mfd.
7	89782	Resistor, wire wound, 220 ohm 1 watt
8	110510	Condenser, wire, 3 Mmfd.
9-10	110552	Resistor, carbon, 47,000 ohm 1/4 watt
11	110553	Resistor, carbon, 220,000 ohm 1/4 watt
12-13	110554	Resistor, carbon 1 Megohm 1/4 watt
14	110557	Resistor, carbon, 4700 ohm 1/4 watt
15-16	110559	Resistor, carbon, 470,000 ohm, 1/4 watt
17 to 20	110564	Resistor, carbon, 100,000 ohm, 1/4 watt
21	110569	Resistor, carbon, 10,000 ohm, 1/4 watt
22	110590	Resistor, carbon, 180 ohm, 1/4 watt
23-24	110629	Dial light bulb, 6.3 volt (Mazda #44)
25	112975	Resistor, carbon, 10 Meg. 1/4 watt
26	116078	Resistor, 560 ohm, 1/4 watt
27	116080	Resistor, insulated, 680 ohms, 1/4 watt
28	116625	Condenser, .1 Mfd. 600 volt
29	116819	Condenser, .05 Mfd. 600 volt
30	118805	Resistor, carbon, 10,000 ohm 1 watt
31	119024	Transformer, 2nd I.F.
32	119132	Condenser, trimmer
33 to 40	119193	Condenser, .01 Mfd. 600 volt
41 to 42	119414	Condenser, .02 Mfd. 600 volt
43	119417	Condenser, .006 Mfd. 600 volt
44	119634	Volume control, 1 Megohm
45A-45B	119640	Off-On switch & tone control
46 to 49	119663	Condenser, push button trimmer(750-1375 KC)
50-51	119664	Condenser, push button trimmer(960-1800 KC)
52-53	119675	Condenser, .002 Mfd. 600 volt
54	119934	Condenser, padder
55 to 58	500127	Condenser, push button trimmer(540-1000 KC)
59	500801	Transformer, 1st I.F.
60	500911	Coil, loading
61	501042	Coil, short wave antenna
62	501043	Coil, oscillator (B.C. & S.W.)
63	501044	Transformer power 60 cycles
64A-64B	501057	Condenser, variable tuning
65A-65B	501059	Switch, band
66	501060	Condenser, Electrolytic A=20 Mfd. 400 volt B=15 Mfd. 400 volt C=20 Mfd. 25 volt
67A-67B-67C	501087	Condenser, 3 section trimmer
68	501088	Switch, push button
69	501153	Loop antenna
70	M-501170	Speaker, dynamic 10 inch
71	M-501183	Transformer, output for M-501170 spkr.
72	M-501184	Cone & voice coil for M-501170 spkr.
73	501238	Crystal cartridge for tone arm
74	118076	Resistor, carbon, 33,000 ohms, 2 watt
75	110584	Resistor, carbon, 330,000 ohms 1/4 watt
76	501196	Resistor, carbon, 20 ohms, 1/4 watt

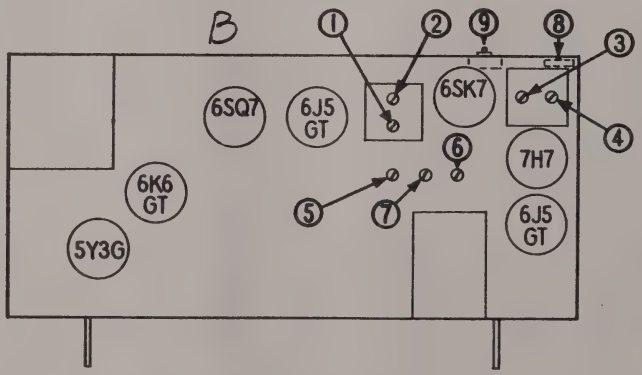
MODEL 207FK
Chassis 207F

STEWART-WARNER CORP.

ALIGNMENT PROCEDURE

1. Connect the output meter across the voice coil or from plate of the 6K6G output tube to chassis through a .1 mfd. condenser. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the receiver chassis.
3. Push the RADIO-PHONO SWITCH in.
4. Turn the volume control to the maximum position and keep it in this position throughout the alignment procedure.
5. Check the pointer to see that it is correctly set to low freq. end of dial scale with gang in full mesh.
6. The loop must be connected as indicated in circuit diagram at all times.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 Mfd. Condenser	Lug on front section of Gang Condenser	455 KC	"A" Position	Any Point Where it does not affect the signal	1-2	2nd. I.F.	Adjust for Maximum Output. Then repeat adjustment.
					3-4	1st. I.F.	
400 Ohm Carbon Resistor	Antenna Terminal (Blue Wire)	16 MC	"B" Position	16 MC	5	Foreign Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 15.1 MC. If Image does not appear, Realign at 16 MC. with Trimmer Screw farther out. Recheck Image.
400 Ohm Carbon Resistor	Antenna Terminal (Blue Wire)	16 MC	"B" Position	Tune to 16 MC Gen. Sig.	6	Foreign Antenna	Adjust for Maximum Output. Try to increase output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
200 Mmfd. Mica Condenser	Antenna Terminal (Blue Wire)	1500 KC	"A" Position	1500 KC	7	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
Now replace the chassis and loop antenna in the cabinet before proceeding further.							
200 Mmfd. Mica Condenser	Antenna Terminal (Blue Wire)	1500 KC	"A" Position	Tune to 1500 KC Gen. Sig.	8	Broadcast Antenna	Adjust for Maximum Output.
200 Mmfd. Mica Condenser	Antenna Terminal (Blue Wire)	600 KC	"A" Position	Tune to 600 KC Gen. Sig.	9	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to increase output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.



MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION	LIST PRICE
110405	Cable-pickup	.50
114955	Clamp, for dial cord	.01
112745	Clip, coil mounting	.01
117057	Cord, drive (supplied in 3 ft. lengths)	.15
500839	Dial background	.14
501791	Dial scale	
501792	Dial escutcheon with glass	
501036	Knob "Band"	.16
501035	Knob, "Tone"	.16
119968	Knob, "Tune"	.16
119971	Knob, "Volume"	.16
501988	Needle-phonograph	
160354	Pilot lamp socket	.10
119987	Pointer	.11
119953	Push button	.07
81145	Retaining ring for tuning shaft--Per C	.50
113463	Rubber bushing, chassis mtg.	.03
85040	Screw, #6 Hex. Hd.--Per C	.35
112874	Screw, #10 X 1-1/8 chassis mounting	.01
114914	Screw, special head for mtg. escutcheon--Per Dz.	.05
501041	Shaft, tuning	.10
111090	Spacer, steel - Mtg. for gang	.02
500051	Socket, for loop antenna	.15
117704	Socket, for speaker, 5 prong	.13
160294	Socket, for 7H7 8 prong	.12
119791	Socket, octal	.12
114876	Socket, octal (Rectifier)	.15
114878	Socket, octal with special ground	.15
160039	Socket, phono	.08
161384	Spring, dial cord tension	.06
160229	Station call letter tabs	.45
110829	Washer, flat steel, for mtg. chassis	.01
111456	Washer, spring washer for tuning shaft--Per C	.50

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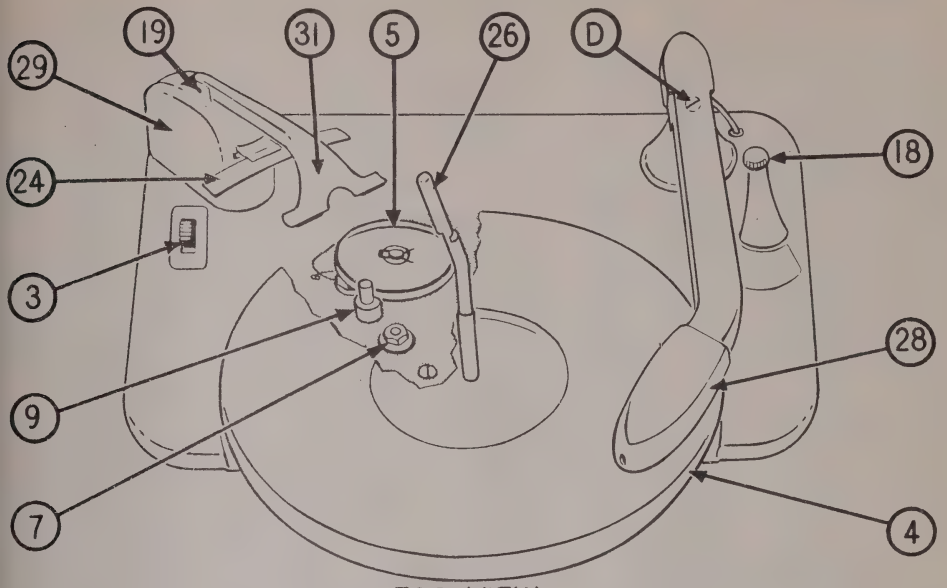
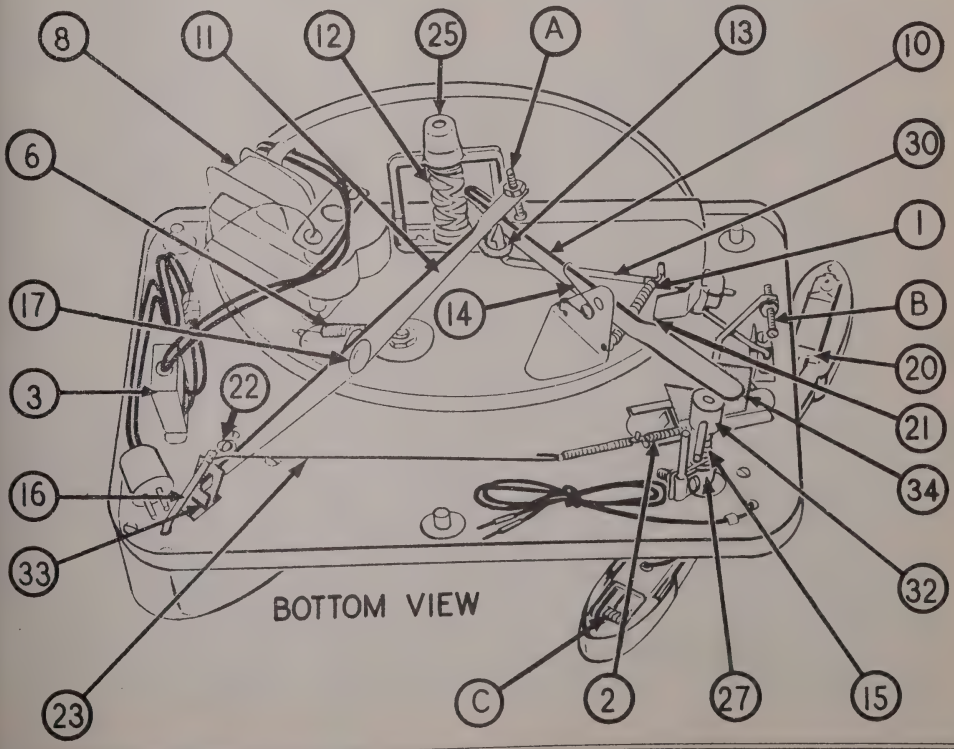
STEWART-WARNER CORP.

CHASSIS 207DL,207FK, 208CK



TOP VIEW



BOTTOM VIEW

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DESCRIPTION OF CYCLE

To start the cycle on models with a switch on the base plate or on the radio control panel, turn on the switch and press down on the TONE ARM. This depresses the REJECT BUTTON (#18 on Diagram) on top of the rest post, which in turn through TRIP LINK (30) engages the FOLLOWER (13), starting the cycle.

When FOLLOWER (13) engages in WORM (12), FOLLOWER ARM (10) is pivoted at the pivot, lifting CRANK (32) which raises TONE ARM. CRANK (32) is fastened to the lift pin. As this rises and strikes the incline at the angular upper end of the INDEX PLATE (34), it causes a rotation of the CRANK (32) which in turn contacts the CRANK PIN (27) fastened to the TONE ARM shaft and swings the TONE ARM inward until the CRANK (32) strikes INDEX PLATE (34). Then as the FOLLOWER (13) returns to its starting position, the CRANK (32) drops, setting the TONE ARM on the record.

The set down position for 10" or 12" records is automatically controlled when the ejector is positioned so that the edge of the 10" or 12" records rest on the support bracket. The RECORD EJECTOR (24) can be set in the 10" or 12" position by merely slightly lifting it and pulling or pushing it in or out until the 10" or 12" numbers show at the edge of the opening in the housing.

ADJUSTMENTS

All adjustments can be made with record changer disconnected from the power outlet.

TONE ARM SET-DOWN POSITION ADJUSTMENT: To adjust the set-down position of the tone arm, trip the reject button and turn the turntable by hand in a clockwise direction until the CRANK (Diagram No. 32) strikes the INDEX PLATE (Diagram No. 34) and the TONE ARM starts downward toward the record. Loosen the screw on #27 and, holding the CRANK in contact with the lower portion of the INDEX PLATE, move the TONE ARM until it is directly above a point 1/8" in from the outside of a record of the size indicated on the EJECTOR SLIDE (24). Retighten the screw and carry the mechanism through the remainder of the cycle.

EJECTOR ARM SETTING (A): The adjustment of screw "A" determines the point in the cycle in which the next record falls. Turning the screw clockwise causes record falling to be delayed, while turning the screw counter-clockwise causes the records to fall earlier in the cycle. This screw should be adjusted using a 12 inch record in the 12 inch position. Adjust the screw so that the record falls when the tone arm has moved to its extreme outside position in the change cycle. Tighten the locking nut after the adjustment has been made.

TONE ARM TRIP POSITION ADJUSTMENT (B): The trip position is adjusted by screw "B". For proper operation the screw should be adjusted to trip the mechanism at the eccentric finishing groove on a record. This will assure satisfactory operation for the majority of records in use. Turning the screw clockwise will cause earlier tripping of the mechanism; turning counter-clockwise will delay the tripping. Tighten the locking nut on the screw when the correct adjustment has been obtained.

NEEDLE PRESSURE ADJUSTMENT (C): To increase the weight on the needle, should it jump grooves or slide across the grooves too easily, lift the tone arm, and relieve the spring tension by releasing the small sprocket wheel a quarter turn at a time. On the other hand, should the records and needle wear too fast, increase the spring tension with the sprocket to decrease the needle pressure.

TONE ARM HEIGHT ADJUSTMENT (D): The height to which the tone arm rises during the change cycle is governed by the adjustment of the screw under the tone arm on the top of the tone arm post. Turning this screw clockwise will lower the height to which the tone arm rises and vice versa. The proper adjustment may be made by placing 12 ten inch records on the turntable and adjusting the screw to the point where the tone arm clears the top record during the change cycle.

EJECTOR SETTING: The small screw, (Diagram No. 22), makes two adjustments: It varies the tension of the spring used on the EJECTOR mechanism (24); and it also moves the stationary position of the EJECTOR with respect to the rest of the mechanism. To lower the spring tension on the EJECTOR, loosen the lock nut on the screw and turn the screw counter-clockwise. Turning the screw counter-clockwise also moves the EJECTOR farther away from the SPINDLE. Turning the screw clockwise increases the tension of the EJECTOR spring and also moves the EJECTOR closer to the SPINDLE.

The correct adjustment of the screw may be obtained as follows:

Set the EJECTOR for 12" records and place ten 12" records on the spindle. Turn the turntable by hand and observe record dropping. The screw should be adjusted so that the bottom record just falls. The screw is correctly set when almost entirely in the "out" position. The spring tension on the EJECTOR is then relatively small and stalling of the motor is less likely to occur.

NOTE: After adjusting this screw, check the adjustment of "A". Remember to tighten the locking nut after adjusting a screw.

TROUBLES & THEIR REMEDIES

1. NOISE WHILE CYCLING
   This trouble is caused by the FOLLOWER ARM (10) being bent out of position. Straighten the arm.

2. TURNTABLE RUBS
   Loosen set screw on WORM (12) with an Allen wrench and raise the spindle about 1/16".

3. DOES NOT CYCLE WITH REJECT BUTTON
   Check to see if TRIP LINK (30) is releasing FOLLOWER (13). If TRIP LINK releases FOLLOWER but will not center on threads of WORM, bend the FOLLOWER ARM (10).

4. MOTOR SLOWS DOWN DURING CYCLING
   Bend paddle end of FOLLOWER ARM (10) down slightly or loosen the EJECTOR SCREW (22) slightly.

5. RECORDS DO NOT DROP
   Tighten EJECTOR SCREW (22) slightly. Always check on full stack of 10-12" records. Set screw so that bottom record just falls.

6. RECORD DROPS ON TONE ARM
   Bend back end of FOLLOWER ARM (10) up slightly. Make sure EJECTOR SCREW (22) is adjusted properly.

7. MECHANISM KEEPS REPEATING ON TOP OF WORM
   Bend TRIP LINK (30) back slightly so as to loosen the TRIP SPRING (Diagram No. 1) tension on FOLLOWER (13). It may be necessary to first loosen the set screw on the TRIP. If this does not correct the trouble, check the FOLLOWER ARM (10) to make sure it is straight and bend slightly if necessary.

8. MECHANISM KEEPS REPEATING ON BOTTOM OF WORM
   This indicates a bent FOLLOWER ARM (10). Straighten arm.

9. FOLLOWER FLUTTERS WHILE PLAYING
   Check to see if FOLLOWER ARM (10) is all the way up to top of WORM (12), if not, bend arm slightly in toward WORM to stop binding.

10. FOLLOWER ARM BINDS
    Bend FOLLOWER ARM away from fulcrum at both sides of rivet.

11. FOLLOWER JAMS

    Bend FOLLOWER ARM to straighten.

12. TONE ARM DOES NOT LAND AT BEGINNING OF RECORD OR MISSES RECORD ENTIRELY
    Check EJECTOR to see if it is set for correct size of record. If EJECTOR is set for correct record size, the SET DOWN POSITION ADJUSTMENT should be loosened and the position of the TONE ARM adjusted as described under "TONE ARM SET-DOWN POSITION ADJUSTMENT."

13. TONE ARM DOES NOT GO INTO CYCLE AT END OF RECORD
    Check to see if record has spiral finishing groove. If it has not, reject record by means of REJECT-BUTTON. If trouble lies with mechanism, adjust screw "B" as described under "TONE ARM TRIP POSITION ADJUSTMENT."

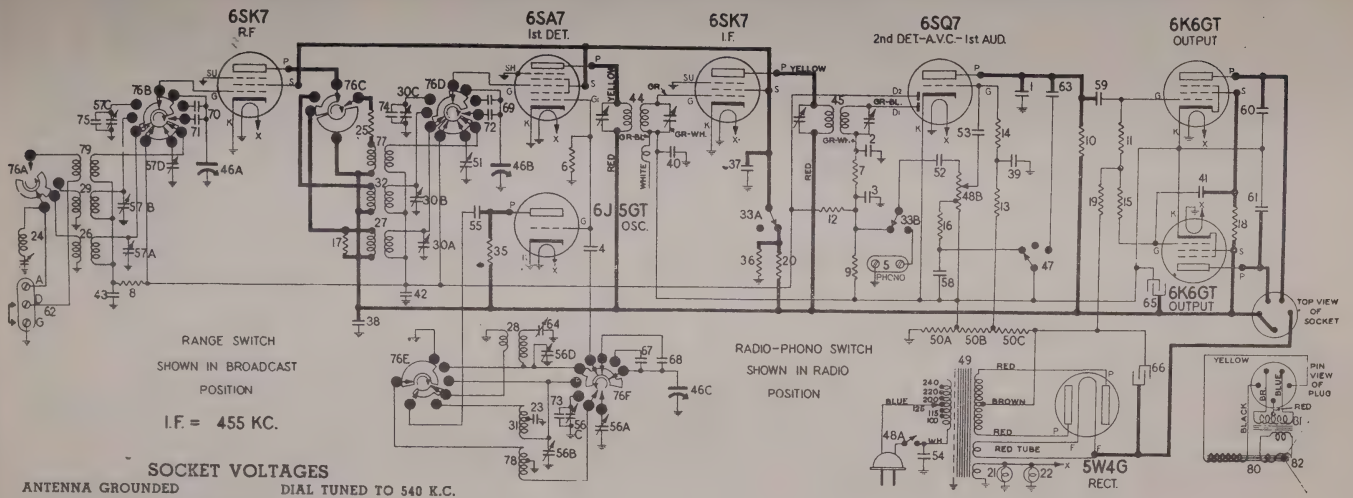
14. RECORDS WEAR EXCESSIVELY
    Check needle to see if worn out or defective. If needle is not cause of wear, lift the tone arm and increase the tension of the spring at the base as described under "NEEDLE PRESSURE ADJUSTMENT."

15. TONE ARM SLIPS OUT OF RECORD GROOVES OR SLIDES ACROSS RECORD
    This is usually due to insufficient needle pressure. The needle pressure may be increased by loosening the spring tension at the base of the tone arm as described under "NEEDLE PRESSURE ADJUSTMENT."

16. TONE ARM SLIDES ACROSS TOP RECORD OF STACK
    This is due to the tone arm having insufficient height to clear the top record on the turntable. This can be remedied by raising the tone arm height by means of the "TONE ARM HEIGHT ADJUSTMENT 'D'."

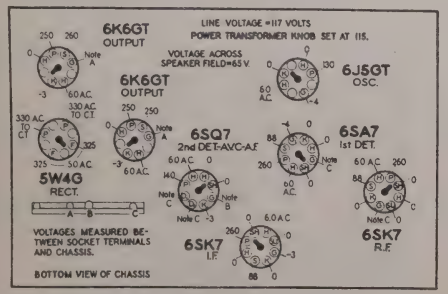
17. "WOW" IN RECORD REPRODUCTION
    This is usually due to worn rubber rim on the idler wheel. If this is the case, replace the idler wheel.

STEWART-WARNER MODEL 208A CHASSIS



SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 540 K.C.



All voltages measured in radio position. Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A: The 6K6GT grid bias voltage is 24.5 volts measured between terminals A and C on the bias resistor.

NOTE B: The 6SQ7 grid bias voltage is —1.8 volts measured between terminals A and B on the bias resistor.

NOTE C: The voltage present at these elements is —3 volts measured between terminal A on the bias resistor and chassis.

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	83539	Condenser, mica 260 mmfd.	$ .20
2-3-4	83783	Condenser, mica 110 mmfd.	.20
5	84407	Terminal strip—phono	.12
6-7	110552	Resistor—carbon 47,000 ohms ¼ watt	.12
8 to 11	110553	Resistor—carbon 220,000 ohms ¼ watt	.12
12-13-14	110554	Resistor—carbon 1 megohm ¼ watt	.12
15	110565	Resistor—carbon 22,000 ohms ¼ watt	.12
16	110566	Resistor—carbon 33,000 ohms ¼ watt	.12
17-18	110573	Resistor—carbon 2,200 ohms ¼ watt	.12
19	110578	Resistor—carbon 68,000 ohms ¼ watt	.12
20	110595	Resistor—carbon 12,000 ohms 3 watts	.20
21-22	110629	Dial light bulb—6.3 volt (Mazda No. 44)	.15
23	112426	Condenser—mica, 1650 mmfd.	.30
24	112796	Coil—wave trap (with trimmer)	.50
25	112963	Resistor—insulated 330 ohms ¼ watt	.15
26	113295	Coil—antenna (B.C.)	1.20
27	113296	Coil—Det. (B.C.)	1.30
28	113297	Coil—oscillator (B.C.)	.48
29	113298	Coil—antenna (Intermediate)	.50
30-30B-30C	113320	Condenser—trimmer—3 section	.54
31	113412	Coil—oscillator (Intermediate)	1.20
32	113609	Coil—Det. (Intermediate)	.50
33A-33B	114141	Switch—D.P.D.T.	.44
34	114148	Rotor—voltage switch (on power transformer)	.50
35	116055	Resistor—carbon 22,000 ohms ½ watt	.12
36	116086	Resistor—18,000 ohms 1 watt	.16
37-38-39	116625	Condenser—.1 mfd. 600 volt	.25
40	116706	Condenser—.2 mfd. 600 volt	.35
41 to 45	116819	Condenser—.05 mfd. 600 volt	.20
44	117610	Transformer—1st I.F.	$1.60
45	117612	Transformer—2nd I.F.	1.60
46A-46B-46C	117665	Condenser—variable tuning	5.00
47	117678	Switch—tone control	.55
48A-48B	117685	Volume control 1 meg. with switch	1.00
49	117774	Transformer—power 100-240 volt 40-133 cycle	7.60
50A-50B-50C	117786	Resistor—Bias strip, A—85 ohms; B—20 ohms; C—270 ohms	.42
51	119132	Condenser—trimmer	.20
52 to 55	119193	Condenser—.01 mfd. 600 volt	.15
56A to 56D	119283	Condenser—trimmer (4 section)	.60
57A to 57D			
58	119415	Condenser—.015 mfd. 600 volt	.15
59	119417	Condenser—.006 mfd. 600 volt	.15
60-61	119817	Condenser—.004 mfd. 600 volt	.15
62	119824	Antenna terminal strip with connector	.14
63	119875	Condenser—.002 mfd. 600 volt	.15
64	119934	Condenser—padder	.36
65-66	500026	Condenser—electrolytic 16 mfd. 450 volts	.78
67 to 69	500041	Condenser—silver mica 160 mmfd.	.25
70 to 72	500042	Condenser—silver mica 150 mmfd.	.22
73 to 75	500043	Condenser—silver mica 125 mmfd.	.22
76A to 76F	500044	Switch—Band	2.50
77	500061	Coil—short wave Det.	.65
78	500062	Coil—short wave oscillator	.62
79	500063	Coil—short wave antenna	.64
80	M-500090	Speaker—dynamic (9 in. oval)	7.00
81	M-500091	Transformer—output for M-500090 speaker	1.75
82	M-500092	Cone & Voice coil for M-500090 speaker	1.75

Prices Subject to Change Without Notice

CHASSIS 208A

STEWART-WARNER CORP.

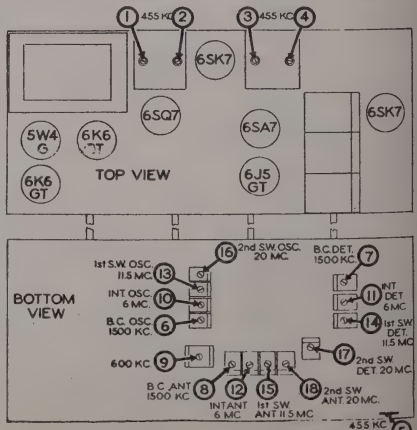
ALIGNMENT PROCEDURE FOR 208A CHASSIS

1. Connect the output meter across the voice coil or across the plates of the 6K6GT output tubes. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the receiver chassis or to the "G" terminal at the back of the chassis. NOTE: The "G" and "D" terminals on this terminal strip must be connected together.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the alignment procedure.
4. With the gang condenser in full mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is incorrectly set, it is only necessary to loosen the set screws on the dial cord drive drum and push the gang condenser to full mesh with the pointer properly set, then retighten the set screws.

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator Output to Receiver	Signal Generator Frequency	Band Switch Position	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
.1 MFD Condenser	Lug on Middle Section of Gang Cond.	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	1-2	2nd I.F.	Adjust for Maximum Output. Then Repeat Adjustment.
					3-4	1st I.F.	
200 MMFD. Mica Condenser	"A" Terminal	455 KC	Broadcast	Any Point Where It Does Not Affect the Signal	5	Wave Trap	Adjust for Minimum Output, Using a Strong Generator Signal.
200 MMFD. Mica Condenser	"A" Terminal	1500 KC	Broadcast	1500 KC	6	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
200 MMFD. Mica Condenser	"A" Terminal	1500 KC	Broadcast	Tune to 1500 KC Generator Signal	7	Broadcast Detector	Adjust for Maximum Output.
					8	Broadcast Antenna	
200 MMFD. Mica Condenser	"A" Terminal	600 KC	Broadcast	Tune to 600 KC Generator Signal	9	Broadcast Oscillator (Series)	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
400 OHM Carbon Resistor	"A" Terminal	6 MC	Intermediate	6 MC	10	Intermediate Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 5.1 MC. If Image does not appear, Realign at 6 MC. with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	"A" Terminal	6 MC	Intermediate	Tune to 6 MC Generator Signal	11	Intermediate Detector	Adjust for Maximum Output.
					12	Intermediate Antenna	
400 OHM Carbon Resistor	"A" Terminal	11.5 MC	1st S.W.	11.5 MC	13	1st S.W. Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 10.6 MC. If Image does not appear, Realign at 11.5 MC. with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	"A" Terminal	11.5 MC	1st S.W.	Tune to 11.5 MC Generator Signal	14	1st S.W. Detector	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
					15	1st S.W. Antenna	
400 OHM Carbon Resistor	"A" Terminal	20 MC	2nd S.W.	20 MC	16	2nd S.W. Oscillator	Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 19.1 MC. If Image does not appear, Realign at 20 MC. with Trimmer Screw farther out. Recheck Image.
400 OHM Carbon Resistor	"A" Terminal	20 MC	2nd S.W.	Tune to 20 MC Generator Signal	17	2nd S.W. Detector	Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained.
					18	2nd S.W. Antenna	

MISCELLANEOUS PARTS

Part Number	Description	List Price
114032	Bracket and pulley assembly right hand	$ .34
114034	Bracket and pulley assembly left hand	.34
112874	Chassis mtg. bolt No. 10 x 1⅛"	.01
114955	Clamp for dial cord	.01
112745	Clip coil mounting	.01
116948	Cord dial drive (supplied in 6 ft. lengths)	.18
117057	Cord drive (supplied in 3 ft. lengths)	.15
114915	Dial mtg. plate	.38
113338	Drum dial drive	.54
160182	Escutcheon dial	2.10
88348	Eyelet for dial cord Per Dz.	.05
160219	Knob push on	.06
117662	Pointer assembly	.32
112762	Pulley dial cord drive	.04
113463	Rubber bushing chassis mtg.	.03
83624	Screw self tapping No. 8 x ¼	.01
114914	Screw special head for mtg. escutcheon Per Dz.	.15
111116	Screw No. 5 x ⅝ mechanism mtg.	.02
85040	Screw No. 6 Hex. Hd. Per C	.35
85827	Set Screw 8-32 Square Head for drive drum	.02
117704	Socket for speaker 5 prong	.13
114876	Socket octal (for rectifier)	.15
119791	Socket octal	.12
114878	Socket octal with special ground	.15
111090	Spacer steel mtg. for gang	.02
113177	Spring dial cord tension	.09
113205	Thrust plate for tuning shaft	.02
117664	Tuning shaft	.32
110829	Washer flat steel for mtg. chassis	.01



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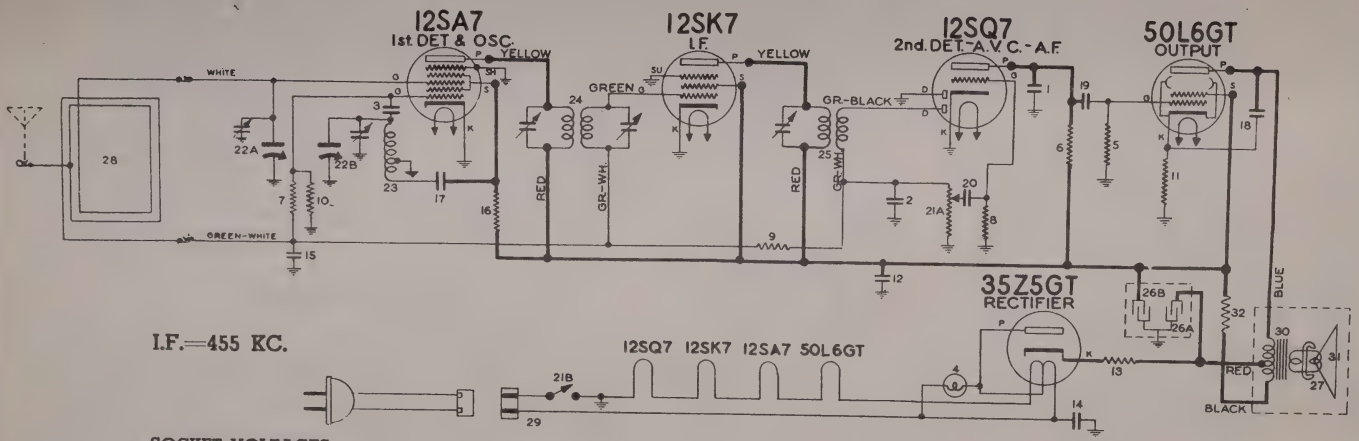
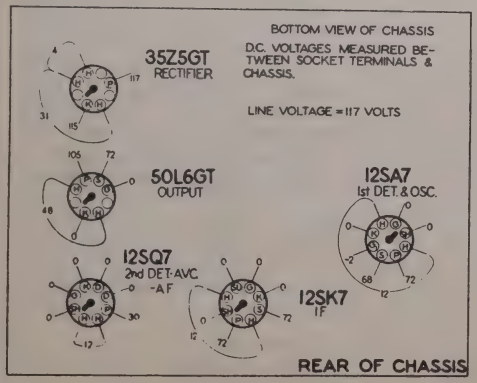
STEWART-WARNER R-358 CHASSIS

(RECEIVER MODELS R-3581 to R-3589)



SOCKET VOLTAGES

Volume on full with no signal. Dial tuned to 540 KC



Use a voltmeter of 1000 ohms per volt.

ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1	83539	Condenser, Mica. 260 Mmfd.	$ .20
2-3	83783	Condenser, Mica. 110 Mmfd.	.20
4	85296	Lamp-Dial 6 to 8 Volt (Mazda 51)	.16
5	112971	Resistor—Insulated, 470,000 Ohms ¼ Watt	.15
6	112987	Resistor—Insulated, 220,000 Ohms ¼ Watt	.15
7-8	116050	Resistor—Insulated, 10 Meg. ¼ Watt	.12
9	116056	Resistor—2.2 Megohms ¼ Watt.	.10
10	116059	Resistor—Insulated, 22,000 Ohms ¼ Watt	.12
11	116092	Resistor—140 Ohms 1 Watt W.W.	.14
12	116625	Condenser—.1 Mfd. 600 Volt	.25
13	116752	Resistor—33 Ohms 1 Watt, Wire Wound	.15
14-15	116819	Condenser—.05 Mfd. 600 Volt	.20
16	118803	Resistor—(Insulated)—680 Ohms ¼ Watt	.12
17 to 19	119193	Condenser—.01 Mfd. 600 Volt	.15
20	119875	Condenser—.002 Mfd. 600 Volts.	$ .15
21A-21B	500223	Volume Control—1 Meg. (With Switch)	.95
22A-22B	500225	Condenser—Variable Tuning	3.00
23	500232	Coil—Oscillator	.52
24	500233	Transformer—1st I.F.	1.15
25	500236	Transformer—2nd I.F.	1.10
26A-26B	500256	Condenser—Electrolytic, {A—40 Mfd. 150 V. / B—20 Mfd. 150 V.}	1.00
27	C-500257	Speaker—P.M. Dynamic (4")	2.80
28	500288	Loop Antenna	.95
29	500291	Socket for power cord cable	.30
30	C-500360	Transformer—Output for C-500257 Speaker	1.95
31	C-500361	Cone & Voice Coil for C-500257 Speaker	1.65
32	67986	Resistor—2,000 Ohms. 1 Watt.	.25

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(RECEIVER MODELS R-3581 to R-3589)
ALIGNMENT PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.

1. **Connect the output meter across the voice coil; or, using a condenser in series, connect between the plate of the 50L6GT output tube and chassis.**
2. **Connect the ground lead of the signal generator to chassis through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to use the series condenser may have serious results, as one side of the power line may be grounded in the signal generator, or hum may be encountered.**
3. **Turn the volume control to the maximum volume position and leave it in this position throughout the entire alignment procedure.**
4. **Set the dial pointer to the last mark after 55 on the dial with the gang condenser in full mesh.**
5. **The loop antenna must be connected and in the same relative position to the chassis as when in the cabinet**

Dummy Ant. in Series with Sig. Gen.	Connection of Sig. Generator To Receiver	Signal Generator Frequency	Receiver Dial Setting	Trimmer Number	Trimmer Description	Type of Adjustment
200 MMFD. Mica Condenser	Lug On Rear Section Of Variable Condenser	455 KC	Any Point Where It Does Not Affect the Signal	1	2nd I.F.	Adjust the screws on the top of each I.F. can for maximum output. Then repeat adjustment.
				2-3	1st I.F.	
No Connection	Place Lead from Signal Generator Near Loop	1500 KC	1500 KC	4 (Trimmer screw at side of front section of variable condenser.)	Broadcast Oscillator (Shunt)	Adjust for Maximum Output.
No Connection	Place Lead from Signal Generator Near Loop	1500 KC	Tune To 1500 KC Generator Signal	5 (Trimmer screw at side of rear section of variable condenser.)	Broadcast Antenna (Shunt)	Adjust for Maximum Output.

MISCELLANEOUS PARTS

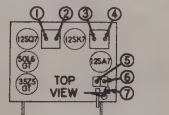
Part Number	Description	List Price
114955	Clamp—for dial cord	$ .01
112745	Clip—Coil Mounting	.01
117057	Cord—Drive, supplied in 3' lengths	.15
500258	Dial Scale	.12
500267	Knob—Tuning or Volume	.15
500218	Pointer	.08
81145	Retaining Ring for Tuning Shaft	Per C .50
160026	Socket—Condenser Mtg.	.04
116793	Socket—For Dial Light	.40
500291	Socket—For Power Cord Cable	.30
116690	Socket—Octal Base	.12
161384	Spring—Dial cord tension	.06
111972	Washer—Extruded and tapped (for Mtg.)	.05
111458	Washer—Spring washer for tuning shaft	Per C .50
500219	Window—Dial	.30

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

CHASSIS R-386 ALIGNMENT PROCEDURE

1. Connect output meter across voice coil or from 50L6GT plate through a .1 mfd. condenser to chassis.
2. Set Volume Control in maximum position.
3. Connect signal generator ground through a .1 mfd. condenser to chassis.
4. Set dial pointer to 160 with slugs all the way out.

Dummy Ant. in Series with Sig. Gen.	Connection Sig. Gen. Output to Receiver	Sig. Gen. Freq.	Receiver Dial Setting	Trimmer No.	Trimmer Description	Type of Adjustment
200 Mmfd. Mica Condenser	Grid of 12SA7 Tube	455 KC	Any place where it does not affect signal	1-2 3-4	2nd I.F. 1st I.F.	Adjust screws on top of I.F. cans for maximum output
200 Mmfd. Mica Condenser	Antenna Terminal	1600 KC	1600 KC	5	B.C. Osc.	Adjust for maximum output
200 Mmfd. Mica Condenser	Antenna Terminal	1600 KC	Tune to 1600 KC Gen. Sig.	6	B.C. Ant.	Adjust for maximum output
200 Mmfd. Mica Condenser	Antenna Terminal	1400 KC	Tune to 1400 KC Gen. Signal	7	B.C. Ant. Coil	Adjust moveable Antenna Coil for maximum output



NOTE: After completing adjustment No. 7 return slugs to maximum out position and check trimmer No. 6. If no appreciable change in trimmer adjustment is necessary for maximum output, the antenna circuit is tracking. If the trimmer No. 6 requires considerable change it will be necessary to repeat adjustment No. 7 again. These two adjustments (Nos. 6 & 7) should be made several times until no change in trimmer adjustment for maximum output is necessary at either point.

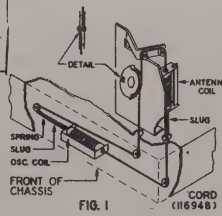


FIG. 1

DRUM SHOWN WITH SLUGS IN FULL OUT POSITION

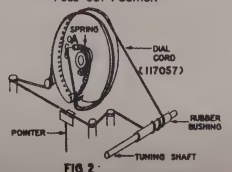


FIG. 2

TO RESTRING TUNING MECHANISM

1. Form a loop in one end of the cord and attach it to the hook nearest to the dot on the slug marked with a yellow dot. Form another loop through the hook farthest from the dot on the slug with the white dot and adjust the length so that the distance from the iron end of one slug to the iron end of the other is 2 15/16 inches.
2. Attach another length of cord to the other end of the yellow dot slug and drop the assembly through the hole in the top of the antenna coil leaving the newly added length of cord on the top end.
3. Pass the lower slug through the hole in the chassis, around the lower pulley and through the oscillator coil.
4. Now pass the cord from the top end over the two pulleys at the top of the mounting bracket, around the rear side of the small irregularly shaped pulley (see Fig. 1) threading it through the slots as shown in the "Detail" drawing and across the front down through the second hole in the chassis. Pass the cord under the upper pulley and around the top of the left hand pulley.
5. Form a loop and attach to spring (part no. 501145). Attach spring to slug in oscillator coil and adjust loop in cord to give normal tension.
6. The iron slug in the oscillator coil should project 1/8" from the end of the coil when the drive pulley is in its maximum counter-clockwise position. This may be adjusted by sliding the cord in the slots shown in the "Detail" drawing.
7. If the procedure outlined in the steps above has been carefully followed, the colored dot ends of the slugs will enter the coil last when the slugs are fully entered in the coils.
8. After restringing tuning mechanism, perform the alignment indicated under "Alignment Procedure" above.

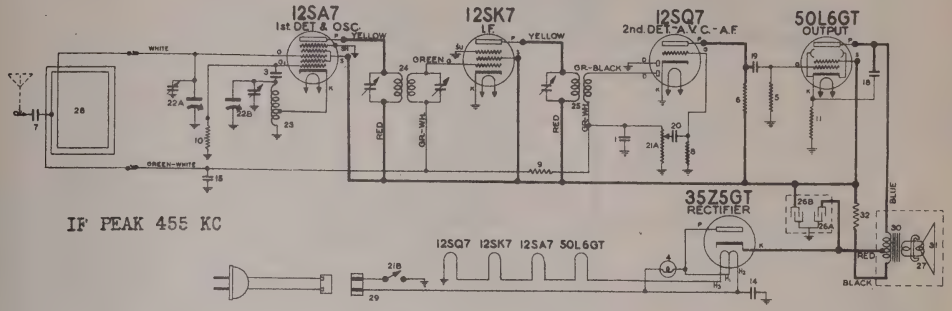
TO RESTRING DIAL CORD

1. Set drum to position shown in Figure 2 with slugs in full out position (shown in Fig. 1).
2. Attach one end of the dial cord to point A on the drum.
3. Pass the cord through the opening at the bottom of the drum around the rear of the left side over the top and make two and one half turns around the rubber bushing on the tuning shaft as shown in Fig. 2.
4. Pass the cord around the guides as shown and over the front edge of the drum around and up through the opening at the bottom of the drum.
5. Attach spring to point A and bring it over hub of drum.
6. Form a loop in the cord and adjust for normal tension on the spring. (See Fig. 2).
7. Set the pointer to 1600 KC on the dial scale with the drum in the maximum counter-clockwise position.

STEWART-WARNER CORP.

MODELS R-3581S to R-3589S
Chassis R-358S

STEWART-WARNER R-358S CHASSIS
(RECEIVER MODELS R-3581S TO R-3589S)



ELECTRICAL PARTS

Diagram Number	Part Number	Description	List Price
1------	83539	Condenser, Mica. 260 Mmfd.----------	$ .20
3------	83783	Condenser, Mica. 110 Mmfd.----------	.20
4------	85296	Lamp-Dial 6-8 Volt (Mazda 51)----------	.18
5------	112971	Resistor-(Ins.) 470,000 Ohms 1/4 Watt----	.15
6------	112987	Resistor-(Ins.) 220,000 Ohms 1/4 Watt----	.15
7------	84833	Condenser, Mica. 70 Mmfd.----------	.28
8------	116050	Resistor-(Ins.) 10 Meg. 1/4 Watt----------	.12
9------	116056	Resistor-2.2 Megohms 1/4 Watt----------	.10
10------	116059	Resistor-(Ins.) 22,000 Ohms 1/4 Watt-----	.12
11------	116092	Resistor-140 Ohms 1 Watt W.W.----------	.14
12------	116825	Condenser, .1 Mfd. 600 Volt--(Not used)--	.25
14-15---	116819	Condenser, .05 Mfd. 600 Volt----------	.20
17 to 19	119193	Condenser, .01 Mfd. 600 Volt----------	.15
20------	119875	Condenser, .002 Mfd. 600 Volt----------	.15
21A-21B-	500223	Volume Control, 1 Meg. (With Switch)-----	.95
22A-22B-	500225	Condenser, Variable Tuning----------	3.00
23------	500855	Coil, Oscillator----------	
24------	500233	Transformer, 1st I.F.----------	1.15
25------	500236	Transformer, 2nd I.F.----------	1.10
26A-26B-	500256	Condenser, Electrolytic, (A-40 Mfd. 150 V.)---------- (B-20 Mfd. 150 V.)	1.00
27-----C-500257		Speaker, P.M. Dynamic (4")----------	2.80
28------	500288	Loop Antenna----------	.95
29------	500291	Socket for power cord cable----------	.30
30-----C-500360		Transformer, Output for C-500257 Speaker-	1.95
31-----C-500361		Cone & Voice Coil for C-500257 Speaker---	1.65
32-----	67986	Resistor-2,000 Ohms 1 Watt----------	.25

MISCELLANEOUS PARTS

Part Number	Description	List Price
114955	Clamp, for dial cord----------	$ .01
112745	Clip, Coil Mounting----------	.01
117057	Cord, Drive, supplied in 3' lengths----------	.15
500258	Dial Scale----------	.12
500287	Knob (R-3581 & R3582)----------	.15
500639	Knob (R-3583)----------	.10
500218	Pointer----------	.08
81145	Retaining Ring for Tuning Shaft----------Per C	.50
160028	Socket, Condenser Mtg.----------	.04
116793	Socket, For Dial Light----------	.40
500291	Socket, For Power Cord Cable----------	.30
116890	Socket, Octal Base----------	.12
161384	Spring, Dial cord tension----------	.06
111972	Washer, Extruded and tapped (for Mtg.)----------	.05
111456	Washer, Spring washer for tuning shaft-----Per C	.50
500219	Window,Dial----------	.30

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

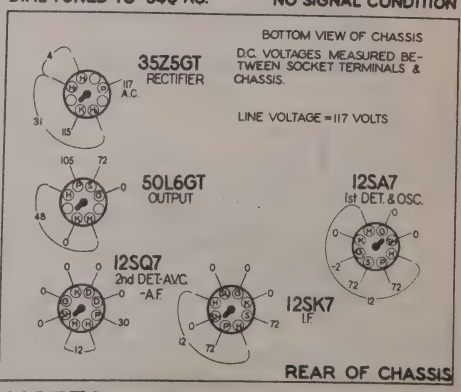
ALIGNMENT PROCEDURE

ALIGN THIS RECEIVER WITH LOOP CONNECTED & IN SAME RELATIVE POSITION TO CHASSIS AS WHEN IN CABINET

1. Connect output meter across voice coil; or from 50L6GT plate to chassis.
2. Connect the ground lead of the signal generator to chassis through a .25 mfd. condenser.
3. Set the volume control to the maximum volume position.
4. Set dial pointer to last mark after 55 with gang in full mesh.
5. Connect the antenna lead of the signal generator to the lug on the side of the rear section of the gang condenser, using a 200 mmfd. mica condenser in series.
6. Set the signal generator to 455 KC.. Set receiver dial to a point where it does not affect signal. Adjust the trimmer screws on the top of each I.F. transformer for maximum output.
7. Disconnect signal generator lead from gang and place it near the loop. Turn the receiver dial to 1500 KC.
8. Set the signal generator to 1500 KC. and adjust the trimmer on front section of the receiver gang condenser for maximum output of the oscillator signal.
9. Adjust the trimmer on rear section of gang for maximum output at 1500 KC.

SOCKET VOLTAGES

DIAL TUNED TO 540 KC. NO SIGNAL CONDITION



CIRCUIT NOTES

THIS MANUAL APPLIES ONLY TO THE R-358S CHASSIS. SERVICE DATA FOR THE R-358 CHASSIS IS CONTAINED ON ANOTHER SHEET

The main difference between the two chassis is the method of obtaining feedback in the oscillator circuit. Please note that the two oscillator coils bear different part numbers.

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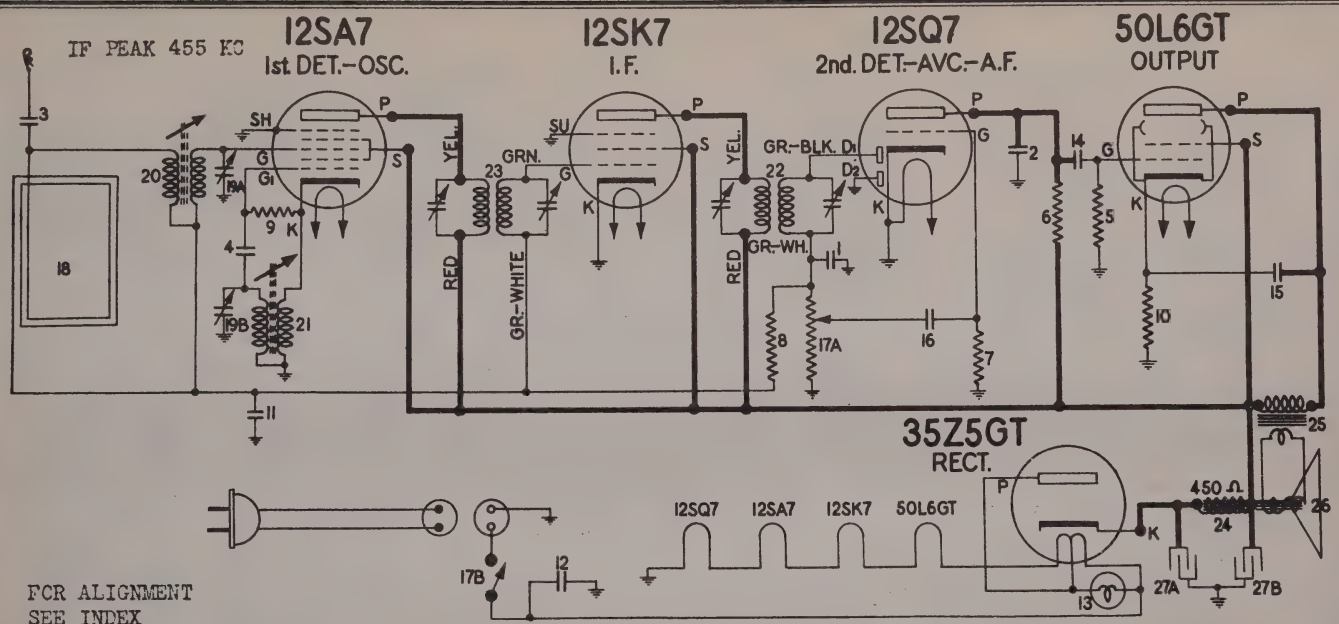
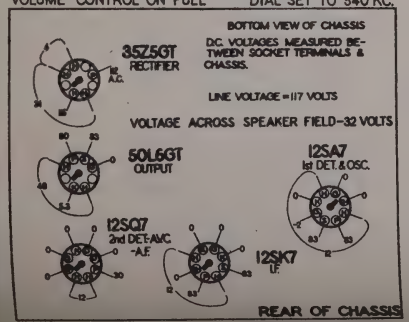


SOCKET VOLTAGES

VOLUME CONTROL ON FULL — DIAL SET TO 540 KC.



USE A VOLTMETER OF 1000 OHMS PER VOLT

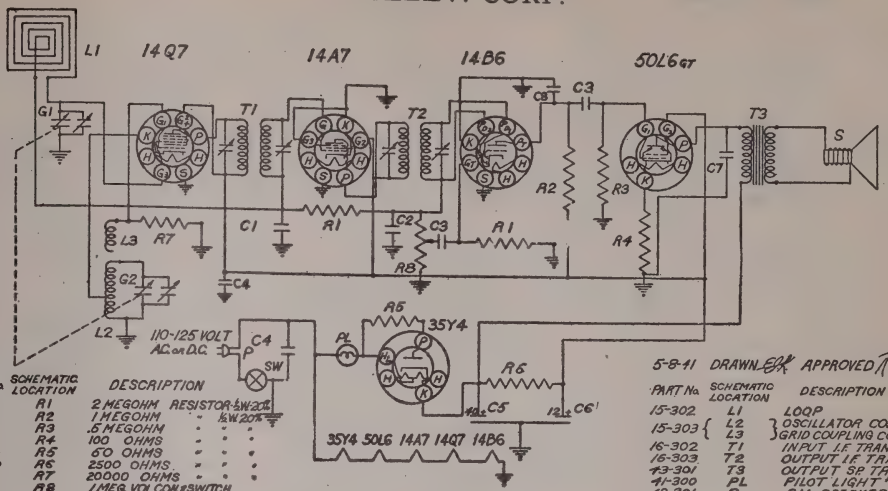
DIAGRAM NUMBER	PART NUMBER	DESCRIPTION
1-2	83539	Condenser - mica 260 mmfd.
3	85061	Condenser - mica 51 mmfd.
4	88686	Condenser - mica 200 mmfd.
5	112971	Resistor - insulated, 470,000 ohm ½ watt
6	112987	Resistor - insulated, 220,000 ohm ½ watt
7	116050	Resistor - insulated, 10 meg. ½ watt
8	116056	Resistor - 2.2 meg. ½ watt
9	116059	Resistor - insulated, 22,000 ohm ½ watt
10	116092	Resistor - 140 ohm, 1 watt-wire wound
11-12	116819	Condenser - .05 mfd. 600 volt
13	118921	Lamp-Dial (Mazda #47)
14-15	119193	Condenser - .01 mfd. 600 volt
16	119875	Condenser - .002 mfd. 600 volt
17A-17B	500223	Volume Control - 1 meg. (with switch)
18	501150	Loop Antenna
19A-19B	501223	Condenser - trimmer (2 sections) (A-35 mmfd.) (B-238 mmfd.)
20	501157	Coil - antenna (with slug)
21	501158	Coil - oscillator (with slug)
22	501166	Transformer - 2nd I.F.
23	501233	Transformer - 1st I.F.
24	R-500916	Speaker - dynamic (4")
25	R-501163	Transformer - output for R-500916 Spkr.
26	R-501164	Cone & Voice Coil for R-500916 Spkr.
27A-27B	501213	Electrolytic Condenser (A-40 mfd. - 150 volt) (B-20 mfd. - 150 volt)

MISCELLANEOUS PARTS

PART NUMBER	DESCRIPTION
114955	Clamp - for drive cord
112764	Clip - coil mounting
116948	Cord - tuning mech. drive (6 ft. length)
117057	Cord - dial drive (3 ft. length)
501099	Dial Scale
501140	Drive - drum & bushing
501135	Drive - shaft & disc
500639	Knob - gold
500287	Knob - tuning or volume
500218	Pointer
81145	Retaining ring - for tuning shaft - Per C
85827	Set Screw - 8/32 square head
180026	Socket - condenser mtg. (used with alum. can only)
500291	Socket - power cord cable
116690	Socket - octal base
500499	Socket - pilot lamp (with leads)
161384	Spring - dial cord tension
501145	Spring - tension for tuning mech.
500216	Tuning shaft
111972	Washer - extruded & tapped (mtg.)
111456	Wasner - spring washer for tuning shaft - Per C,
500219	Window - dial

TRAV-LER KARENOLA RADIO & TELEV. CORP.

MODELS T-501L, T-530A-L, MODEL T-2625



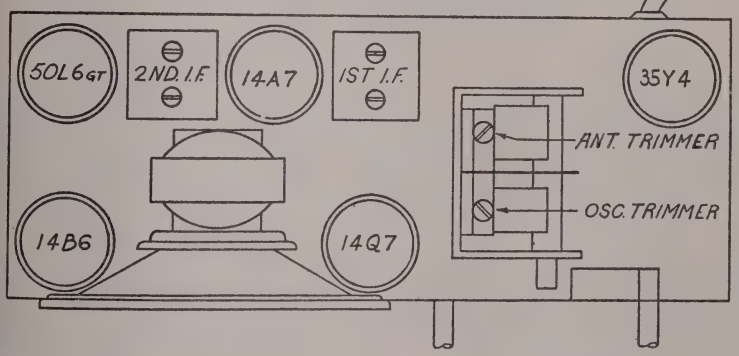
PART No.	SCHEMATIC LOCATION	DESCRIPTION
3-2	R1	2 MEGOHM RESISTOR ½W 20%
3-6	R2	1 MEGOHM " ½W 20%
3-1	R3	.5 MEGOHM " " "
3-31	R4	100 OHMS " " "
3-174	R5	60 OHMS " " "
3-120	R6	2500 OHMS " " "
3-26	R7	20000 OHMS " " "
5-301	R8	1 MEG. VOL.CON & SWITCH
10-301	G1, G2	GANG CONDENSER
6-12	C1	.05 MFD. 200V. COND.
6-8	C2	.0001 MFD. MICA "
6-3	C3	.01 MFD 400V. "
6-14	C4	.05 MFD. 400V. "
7301	C5	40 MFD } ELECTROLYTIC
	C6	12 MFD }
6-306	C7	.005 MFD. 600V. COND.
6-305	C8	.0006 MFD. 400V. "

MODELS T-501-L and T-530A-L

5-8-41 DRAWN APPROVED

PART No.	SCHEMATIC LOCATION	DESCRIPTION
15-302	L1	LOOP
15-303	L2	OSCILLATOR COIL
	L3	GRID COUPLING COIL
16-302	T1	INPUT I.F. TRANS.
16-303	T2	OUTPUT I.F. TRANS.
43-301	T3	OUTPUT SP. TRANS
41-300	PL	PILOT LIGHT #47
43-301	S	P.M. SPEAKER
40-301	14Q7	OSCILLATOR MIXER
	14A7	I.F. AMPLIFIER
	14B6	DETECTOR-AUDIO
	50L6 GT	AUDIO AMPLIFIER
	35Y4	RECTIFIER
34-5	P	LINE CORD
5-301	SW	SWITCH ON VOL. CON.

110-125 VOLTS 60 CYCLES A.C. or D.C.



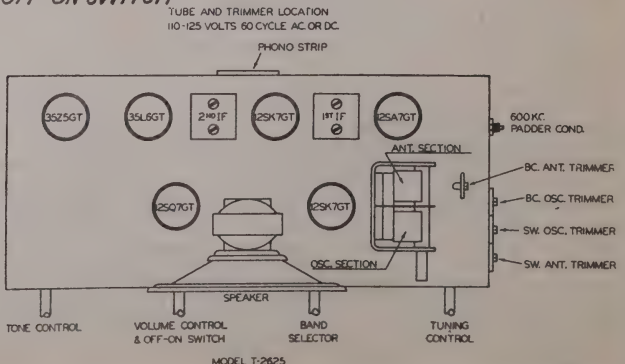
FOR ALIGNMENT INSTRUCTIONS SEE THE NEXT PAGE

IF PEAK 456 KC

FIGURE-1

VOLUME CONTROL TUNING SHAFT
OFF-ON SWITCH

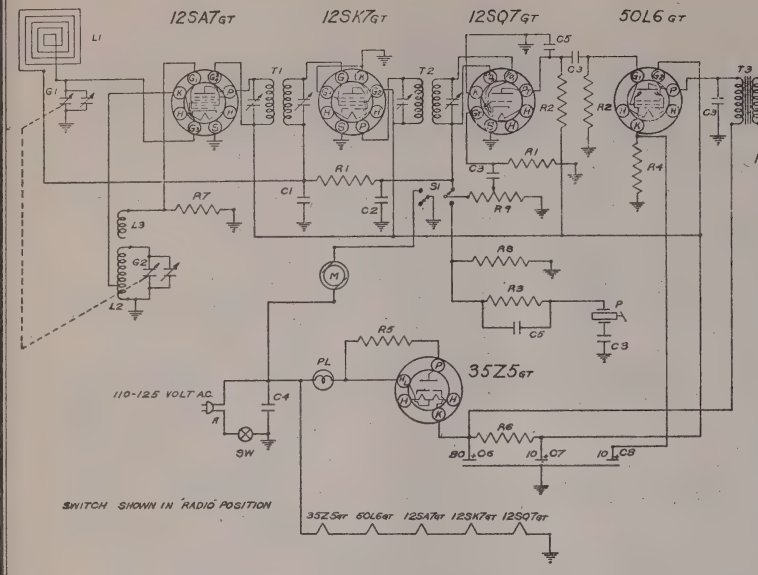
MODEL T-2625



MODEL T-2625
FIG. 1

MODELS TK-509, TK-510

TRAV-LER KARENOLA RADIO & TELEV. CORP.



PART No.	SCHEMATIC LOCATION	DESCRIPTION
3-2	R1	2 MEG. ½ W. 20% RESISTOR
3-6	R2	1 MEG. " " "
3-1	R3	.5 MEG. " " "
3-31	R4	100 Ω " " "
3-174	R5	50 Ω " " "
3-120	R6	2500 Ω " " "
3-26	R7	25000 Ω " " "
3-62	R8	200000 Ω " " "
6-301	R9	1 MEGOHM VOL. CONTROL
	SW	½ SWITCH
14-301	S1	CHANGEOVER SWITCH
6-12	C1	.02 MFD. 200V CONDENSER
8-8	C2	.0001 MFD. MICA "
6-5	C3	.01 MFD. 400V. "
6-14	C4	.05 MFD. 400V "
6-306	C5	.0005 MFD. 400V "
7-301	C6	80 MFD. 150V } ELECTROLYTIC
	C7	10 MFD. 150V } ELECTROLYTIC
	C8	10 MFD. 25V } ELECTROLYTIC
15-302	L1	LOOP
15-303	L2	OSCILLATOR COIL
	L3	GRID COUPLING COIL
16-302	T1	INPUT I.F. TRANSFORMER
16-303	T2	OUTPUT I.F. "
13-301	T3	OUTPUT TRANSFORMER
	S	8 OHM SPEAKER
41-300	PL	PILOT LIGHT #47
34-3	A	POWER CORD
51-301	P	CRYSTAL PICKUP L-25A
10-301	G1	GANG CONDENSER
	G2	GANG CONDENSER
58-300	M	PHONO MOTOR
40-301	12SA7GT	OSCILLATOR-MIXER
	12SK7GT	I.F. AMPLIFIER
	12SQ7GT	DETECTOR-AUDIO
	50L6GT	AUDIO AMPLIFIER
	35Z5GT	RECTIFIER

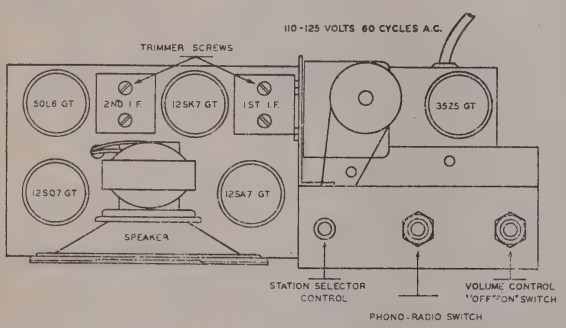


FIGURE-1

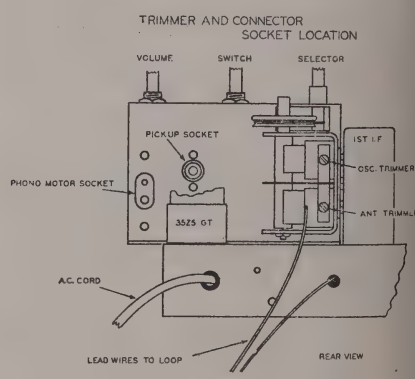


FIGURE-2

Remove chassis from cabinet for alignment.

A signal generator is required having the following frequencies: 456KC, 1400KC, 1720KC.

First Step: Connect the generator lead through a .1 mfd. condenser to the terminal lug next to the Antenna trimmer on top of the tuning condenser. The ground lead from the generator may be connected to any convenient spot on the metal chassis. Adjust generator to 456KC and adjust IF trimmer screws until a maximum reading is noted on the output meter which has been connected across the speaker. The tuning condenser should be turned out to complete minimum capacity when aligning the IF. With generator lead still connected to antenna trimmer terminal, adjust generator frequency to 1720KC, and with tuning condenser still at minimum, adjust oscillator trimmer till the 1720KC signal is tuned in. Next, remove generator leads from set and connect both to a transmitting loop. This loop can be made with 2 turns of wire about 6 inches in diameter. Adjust generator frequency to 1400KC. Turn tuning condenser until the signal is tuned in and adjust antenna trimmer until a maximum reading is noted. No further adjustment should be necessary, unless the set has been damaged, as the coils and condenser in this receiver have been specially handled at the factory so as to insure proper alignment at the lower frequency end of the dial.

ALIGNMENT FOR MODELS T-501-L T-530A-L TK-509 TK-510 TB-512

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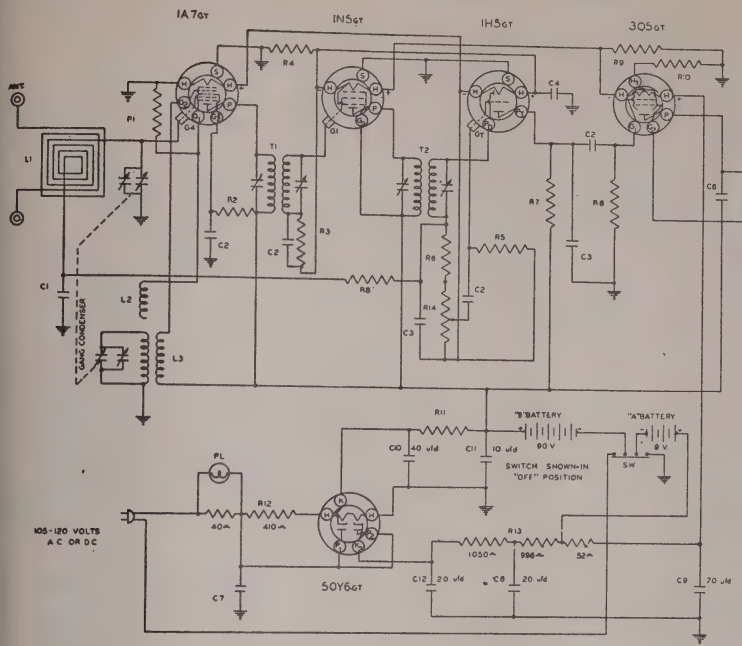
MODEL TB-512



IF PEAK 456 KC.

MODEL TB-512

PART NO	SCHEMATIC LOCATION	DESCRIPTION
3-1135	R1	100000Ω ½W -20% RESISTOR
3-27	R2	40000Ω " " "
3-9	R3	4 MEG. " " "
3-344	R4	2000Ω " 10% "
3-1141	R5	6 MEG. " 20% "
3-157	R6	50000Ω " " "
3-309	R7	1 MEG. " " "
3-2	R8	2 MEG. " " "
3-345	R9	800Ω " 10% "
3-150	R10	1000Ω " " "
3-316	R11	2200Ω " " "
4-304	R12	450Ω 10.5-W-10%-WW "
4-303	R13	2100Ω 5.5-W-5%-WW "
5-305	R14 SW	1 MEG VOLUME CONTROL & SWITCH
6-12	C1	.05 MFD-200V CONDENSER
6-3	C2	.01 " -400V "
6-46	C3	.0061 " -600V "
6-70	C4	.1 " -200V "
6-69	C5	.0005 " -600V "
6-68	C6	.001 " " "
6-14	C7	.05 " -400V "
7-306	C8	20 " -80V ELECTROLYTIC CONDENSER
7-305	C9	70 " -7V " "
7-304	C10 C11 C12	40 " -150V } 10 " " } 20 " " } " "
15-311	L1	LOOP
15-310	L2 L3	OSCILLATOR COIL " "
16-306	T1	INPUT I.F. TRANSFORMER
16-303	T2	OUTPUT I.F. "
43-306	T3	" " ON
	SPKR	P.M. SPEAKER
41-300	PL	PILOT LIGHT #47
40-305	1A7 GT	OSCILLATOR-MIXER
	1N5 GT	I.F. AMPLIFIER
	1H5 GT	DETECTOR-AUDIO
	3Q5 GT	POWER AMPLIFIER
	5OY6 GT	RECTIFIER

The following is a table of manufacturers and their battery type number:

"B" BATTERIES (2 Required)

Mfgr.	Volts	Type No.
Burgess	45 "B"	M30
General	45 "B"	W30B
Bright Star	45 "B"	3033
Usalite	45 "B"	640
Rayovac	45 "B"	P7830
Eveready	45 "B"	482

"A" BATTERIES (2 Required)

Mfgr.	Volts	Type No.
Burgess	4½ "A"	G3
General	4½ "A"	3H3
Bright Star	4½ "A"	361
Usalite	4½ "A"	683
Rayovac	4½ "A"	P83A
Eveready	4½ "A"	746

TUBE AND TRIMMER LOCATION

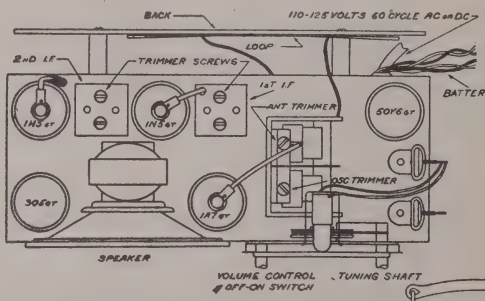
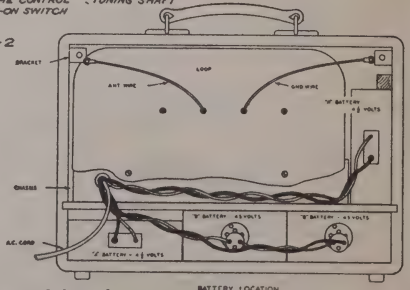


FIGURE-2



BATTERY LOCATION

FIGURE-1 TB-542

FOR ALIGNMENT, SEE INDEX

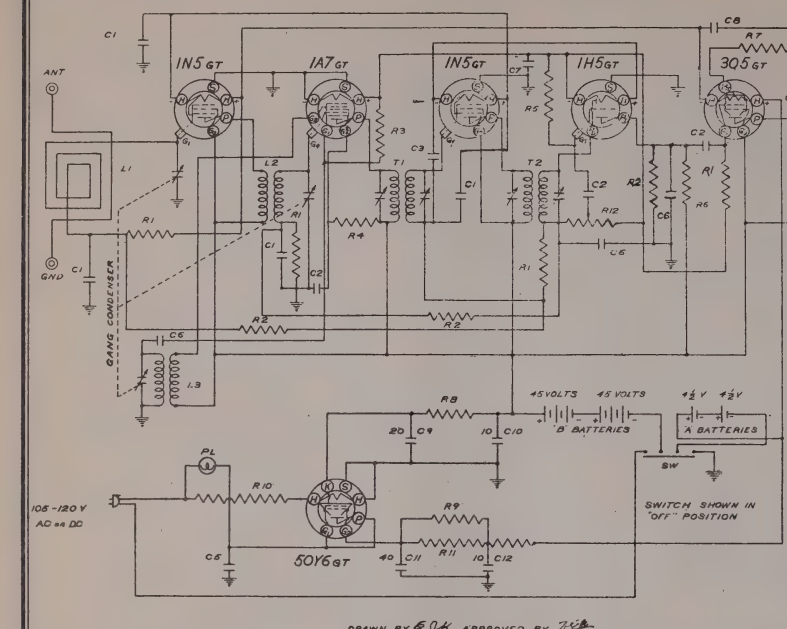
BATTERY SERVICING

(See Figure No. 1)

To replace batteries, loosen and remove the two screws at the upper left and right hand corners of the cabinet back. Remove the back and pull out the plug from each battery. Never pull on the wires connected to the plugs as they may break. Always grasp the plug form between the fingers, or use a flat blade to pry out the plug. Observe with care the position of the batteries and plugs when replacing. Be sure that batteries and plugs are replaced as shown in the "Battery Location" diagram. (Figure No. 1)

MODEL TB-601
MODEL T-2625

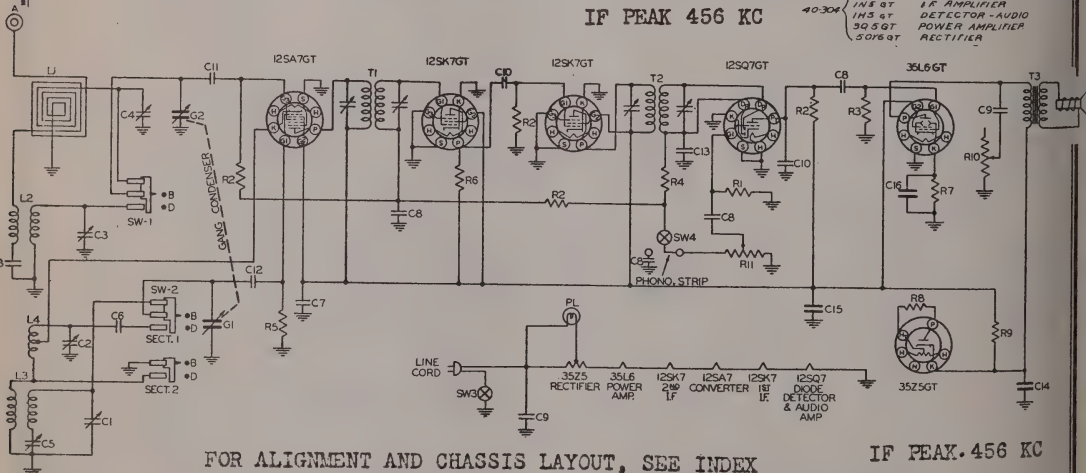
TRAV-LER KARENOLA RADIO & TELEV. CORP.



PART NO	SCHEMATIC LOCATION	DESCRIPTION
3-2	R1	2 MEG ~ ½ W. 20% RESISTOR
3-6	R2	1 " " "
3-108	R3	150,000 ~ " "
3-157	R4	50,000 ~ " "
3-311	R5	3 MEG ~ " "
3-309	R6	500,000 ~ " "
3-24	R7	700 ~ " "
3-312	R8	3000 ~ " "
3-8	R9	25,000 ~ " "
4-301	R10	45 Ω ~ WIREWOUND "
4-302	R11	2250 ~ " "
6-304	R12	2 MEG ~ VOLUME CONTROL
	SW	A SWITCH
6-12	C1	.05 MFD 200V CONDENSER
6-3	C2	.01 MFD 400V "
6-46	C3	.1 MFD 200V "
6-60	C4	.002 MFD 400V "
6-42	C5	.1 MFD 400 V "
6-307	C6	.00025 MFD 600V "
6-308	C7	.25 MFD 25V "
7-303	C8	70 MFD 7V "
	C9	20 MFD 150V ELECTROLYTIC
	C10	10 MFD 150V CONDENSER
	C11	40 MFD 150V
	C12	10 MFD 35V
15-306	L1	LOOP
15-307	L2	RF COIL
15-308	L3	OSCILLATOR COIL
16-306	T1	INPUT I.F. TRANSFORMER
16-305	T2	OUTPUT I.F. "
43-303	T3	OUTPUT "
	S	ON P.M. SPEAKER
41-300	PL	PILOT LIGHT #47
40-304	IN5 GT	RF. AMPLIFIER
	IA7 GT	OSCILLATOR-MIXER
	IN5 GT	I.F. AMPLIFIER
	IH5 GT	DETECTOR-AUDIO
	30S GT	POWER AMPLIFIER
	50Y6 GT	RECTIFIER

DRAWN BY E.J.K. APPROVED BY J.F.R.

IF PEAK 456 KC



FOR ALIGNMENT AND CHASSIS LAYOUT, SEE INDEX

IF PEAK. 456 KC

PART NO	SCHEMATIC LOCATION	DESCRIPTION
3-2	R1	2 MEG ~ ½W 20% RESISTOR
3-6	R2	1 MEG ~ " " "
3-1	R3	500M ~ " " "
3-4	R4	50M ~ " " "
3-116	R5	30M ~ " " "
3-321	R6	1700 ~ " 10% "
3-34	R7	100 ~ " 20% "
3-174	R8	50 ~ " " "
3-37	R9	2500 ~ " " "
5-311	R10	25M ~ TONE CONTROL
5-310	R11	1 MEG ~ VOLUME CONTROL
9-305	C1	BC. OSC. TRIMMER COND.
	C2	SW. OSC. TRIMMER COND.
	C3	SW. ANT. TRIMMER COND.
9-47	C4	BC. ANT. TRIMMER COND.
9-27	C5	BC. OSC. PADDER COND.

PART NO	SCHEMATIC LOCATION	DESCRIPTION
	C6	SW. OSC. PADDER COND. 250 WV (ON COIL)
6-26	C7	.01 MFD. 400 VDC PAPER COND.
6-3	C8	.01 MFD. " " "
6-14	C9	.05 MFD. " " "
8-10	C10	.00025 MFD. 20% MICA COND.
8-43	C11	.0005 MFD. " " "
8-13	C12	.00005 MFD. " " "
8-8	C13	.0001 MFD. " " "
A7-302	C14	80 MFD. 150 WV ELECTROLYTIC COND.
	C15	10 MFD. " " "
	C16	10 MFD. 25 WV " "
15-315	L1	BC. LOOP
15-316	L2	SW. ANTENNA COIL
15-317	L3	BC OSCILLATOR COIL
	L4	SW. " "
43-301	S	P.M. SPEAKER

PART NO	SCHEMATIC LOCATION	DESCRIPTION
16-39	T1	INPUT IF TRANSFORMER
16-40	T2	OUTPUT IF "
	T3	OUTPUT TRANSFORMER (ON SPKR)
14-307	SW1	BAND SWITCH
	SW2	"
	SW3	ON-OFF SWITCH ON VOL. CONTROL
28-303	SW4	PHONO. JACK & SWITCH
47	PL	PILOT LIGHT
40-306	12SA7GT	CONVERTER
	12SK7GT	1ST & 2ND IF
	12SQ7GT	DIODE DETECTOR & AUDIO AMP.
	35L6GT	POWER AMPLIFIER
	35Z5GT	RECTIFIER
10-304	G1	OSCILLATOR TUNING COND.
	G2	ANTENNA TUNING COND.

MODEL T-2625

DRAWN BY E.J.K. APPROVED BY J.F.R. MARCH 2, 1942

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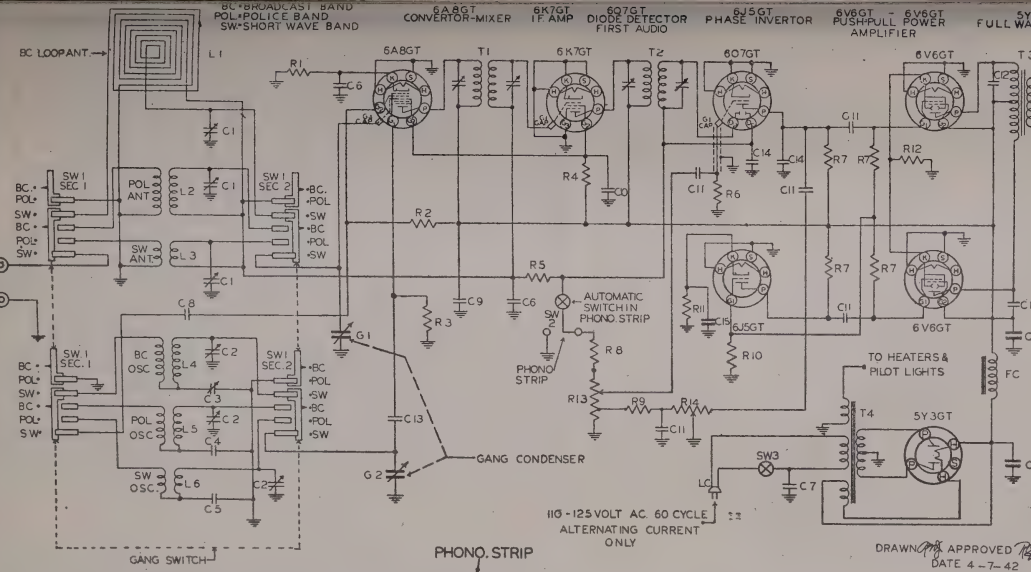
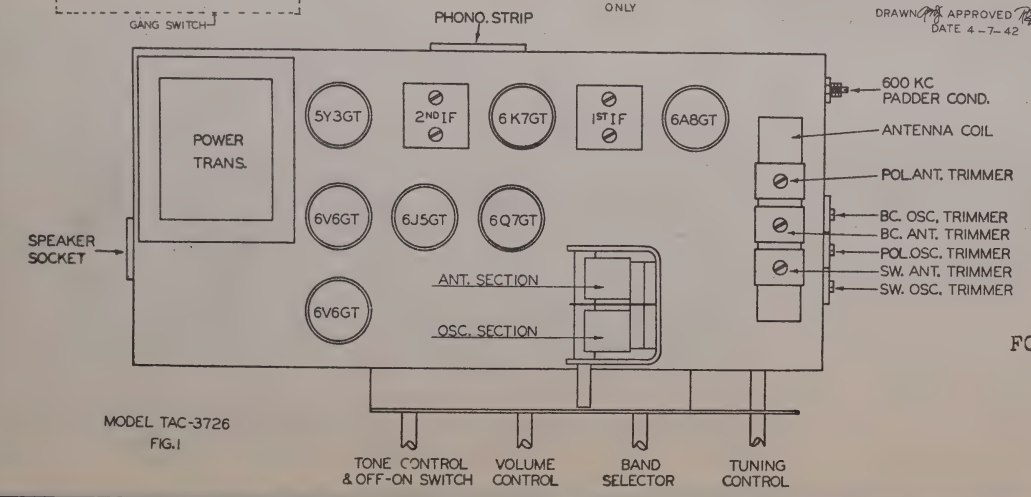


MODEL TAC3726

PART NO.	SCEMATIC LOCATION	DESCRIPTION
9-308	C1	HALF PLATE TRIMMERS
9-305	C2	FULL " " "
9-27	C3	BC OSC. 600KC. PADDING CONDENSER
8-5	C4	.0013MMF. MICA FIXED " "
8-47	C5	.0087" " " " "
6-12	C6	.05-200 V. TUBULAR PAPER " "
6-14	C7	.05-400 V. " " " " "
6-53	C8	.003-600V " " " " "
6-32	C9	.25 -400V " " " " "
6-26	C10	.1 - 400V. " " " " "
6-3	C11	.01 - 400V " " " " "
6-68	C12	.001-600V. " " " " "
8-13	C13	.00005 - 20% MICA " "
8-10	C14	.00025 - " " " "
7-307	C15	10MFD. -25V ELECTROLYTIC - " "
	C16	16 " 350V. " " " "
	C17	12 " 350V. " " " "
3-177	R1	150 OHM ½ WATT - 10% RESISTOR
3-16	R2	20M " " " 20% " "
3-4	R3	50M " " " " " "
3-322	R4	1.7M " ½ " 10% " "
3-2	R5	2MEG " ½ " " " "
3-6	R6	1 " " " " " "
3-5	R7	250M " " " 5% " "
3-108	R8	150M " " " 20% " "
3-14	R9	10 M " " " " "
3-1	R10	150M " " " 5% " "
3-18	R11	1000 " " " 20% " "
3-68	R12	300 " 1 " " "
5-312	R13	1 MEG " VOLUME CONTROL [WITH TAP]
5-313	R14	500M " TONE " "
10-304	G1	ANT. SECTION OF TUNING CONDENSER
	G2	OSC " " " " " " "
15-329	L1	BC LOOP ANTENNA COIL
15-325	L2	- POL " " " "
	L3	- SW " " " "
	L4	- BC OSCILLATOR "
15-326	L5	- POL " " " "
	L6	- SW " " " "
14-305	SW1	GANG BAND SWITCH
28-303	SW2	AUTOMATIC SWITCH & PHONO STRIP
	SW3	ON TONE CONTROL
16-39	T1	INPUT I.F. TRANSFORMER 456 KC.
16-40	T2	OUTPUT " " " " " "
	T3	AUDIO OUTPUT " " " ON SPKR
11-301	T4	POWER TRANSFORMER
	HBC	HUM BUCK COIL ON SPKR.
43-311-S	VC	VOICE COIL " "
	FC	FIELD COIL 1100 OHM
34-3	LC	POWER CORD & PLUG

IF PEAK 456 KC

FOR ALIGNMENT, SEE INDEX



MODEL TAC-3726
FIG. 1

TRAV-LER KARENOLA RADIO & TELEV. CORP.

MODEL TAC-3726

MODEL T-2625
MODEL TAC-3726

TRAV-LER KARENOLA RADIO & TELEV. CORP.

ALIGNMENT FOR MODEL 2625

I. F. Alignment: Connect the generator lead through a .1MFD condenser to the terminal lug on the "Antenna" section of the gang condenser. The ground lead from the generator should be connected to the chassis base. Set the generator at 456KC. Adjust the trimmer screws in the 1st and 2nd I. F. cans (see Fig. No. 1) until a maximum reading is noted on the output meter.

The receiver volume control should be turned to maximum during the I F and all subsequent alignments, to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

BC or Broadcast Alignment: With the generator leads still connected as in I. F. Alignment, rotate the tuning condenser to complete minimum capacity. Set the generator to 1720KC. Adjust the BC oscillator trimmer until the signal is tuned in. Next, remove the generator leads and connect them to the antenna lead of the loop antenna, through a 100 MMFD condenser. Set the generator to 1400KC and rotate the tuning condenser until the signal is tuned in. Adjust the BC antenna trimmer until a maximum reading is noted on the output meter. Set the generator to 600KC and turn the tuning condenser until the signal is tuned in. Rock the tuning control back and forth slowly until a maximum reading is noted on the output meter. It is advisable to return to the 1720KC adjustment and recheck that setting to make sure it has not changed while padding at 600KC.

SW or Short Wave Alignment: Set the generator at 18.3MC. Turn the receiver band switch to short wave position. Turn the tuning condenser to complete minimum capacity. The generator leads should be connected to the antenna lead of the loop through a 400 Ohm resistor. Adjust the S. W. oscillator trimmer slowly until the 18.3MC signal is tuned in. At this point, it will be well to make sure that the fundamental signal is tuned in. Turn up the generator output and tune the receiver to approximately 17.3MC. At this point, the 18.3MC signal will be heard again but much weaker. This is the image frequency. If the image is not heard, then turn the tuning condenser back to complete minimum and readjust the SW oscillator trimmer. Remember the image must always be heard (at 2 times the IF frequency in KC) lower in frequency than the fundamental signal. After the oscillator has been properly set, tune the signal generator to 16MC and rotate the tuning control until the signal is tuned in. Adjust the SW antenna trimmer until a maximum reading is noted on the output meter. It is advisable to rock the gang slowly while adjusting the antenna trimmer. Set the generator to 6MC and tune the signal in on the receiver. Check the alignment at this frequency. No adjustment should be necessary, as the coils have been carefully checked before leaving the factory. A fixed oscillator padding condenser is used at 6MC.

ALIGNMENT FOR MODEL TAC-3726

IF Alignment: Connect the generator lead through a .1 mfd. condenser to the terminal lug on the "Antenna" section of the gang condenser. The ground lead from the generator should be connected to the chassis base. Set the generator at 456KC. Adjust the trimmer screws in the first and second IF cans (See Fig. No. 1) until a maximum reading is noted on the output meter.

The receiver volume control should be turned to maximum during the IF and all subsequent alignments to keep the AVC from working and giving false readings. Keep the generator output as low as possible to prevent overloading.

BC OR BROADCAST ALIGNMENT: With the generator leads still connected as in IF alignment, rotate the tuning condenser until the dial pointer comes to 1400KC. Set the signal generator at 1400KC and adjust the BC oscillator trimmer until the signal is tuned in. Remove the generator lead from the gang condenser and connect it to the yellow wire which protrudes from the back of the set through a 100 mmfd. condenser. Adjust the BC antenna trimmer until a maximum reading is noted on the output meter. Set the generator to 600KC and turn the tuning condenser until the signal is tuned in. Rock the tuning control back and forth slowly until a maximum reading is noted on the output meter. It is advisable to return to the 1400KC adjustment and recheck that setting to make sure it has not changed while padding at 600KC.

INT. OR POLICE BAND ALIGNMENT: The generator lead should now be connected to the antenna lead through a 400 ohm resistor. Rotate the tuning condenser until the dial pointer comes to 5MC. Turn the band switch to INT or Police position. Set the generator to 5MC and adjust the POL oscillator trimmer until the signal is tuned in. Adjust the POL antenna trimmer until a maximum reading is noted on the output meter. Set the generator to 1.8MC and tune the receiver until the signal is tuned in. Check the alignment at this frequency. No adjustments should be necessary as a fixed oscillator pad is used at this frequency and the coils and condenser have been thoroughly checked at the factory.

SW OR SHORT WAVE ALIGNMENT: Set the generator at 18MC. Turn the receiver band switch to short wave position. Turn the tuning condenser until the dial pointer comes to 18MC. The generator lead should be connected to the antenna lead through a 400 ohm resistor. Adjust the S.W. oscillator trimmer slowly until the 18MC signal is tuned in. At this point, it will be well to make sure that the fundamental signal is tuned in. Turn up the generator output and tune the receiver to approximately 17MC. At this point, the 18MC signal will be heard again but much weaker. This is the image frequency. If the image is not heard, then turn the tuning condenser back to 18MC and readjust the SW oscillator trimmer. Remember the image must always be heard (at two times the IF frequency in KC) lower in frequency than the fundamental signal. After the oscillator has been properly set, tune the signal generator to 16MC and rotate the tuning control until the signal is tuned in. Adjust the SW antenna trimmer until a maximum reading is noted on the output meter. It is advisable to rock the gang slowly while adjusting the antenna trimmer. Set the generator to 6MC and tune the signal in on the receiver. Check the alignment at this frequency. No adjustment should be necessary as the coils have been carefully checked before leaving the factory. A fixed oscillator padding condenser is used at 6MC.

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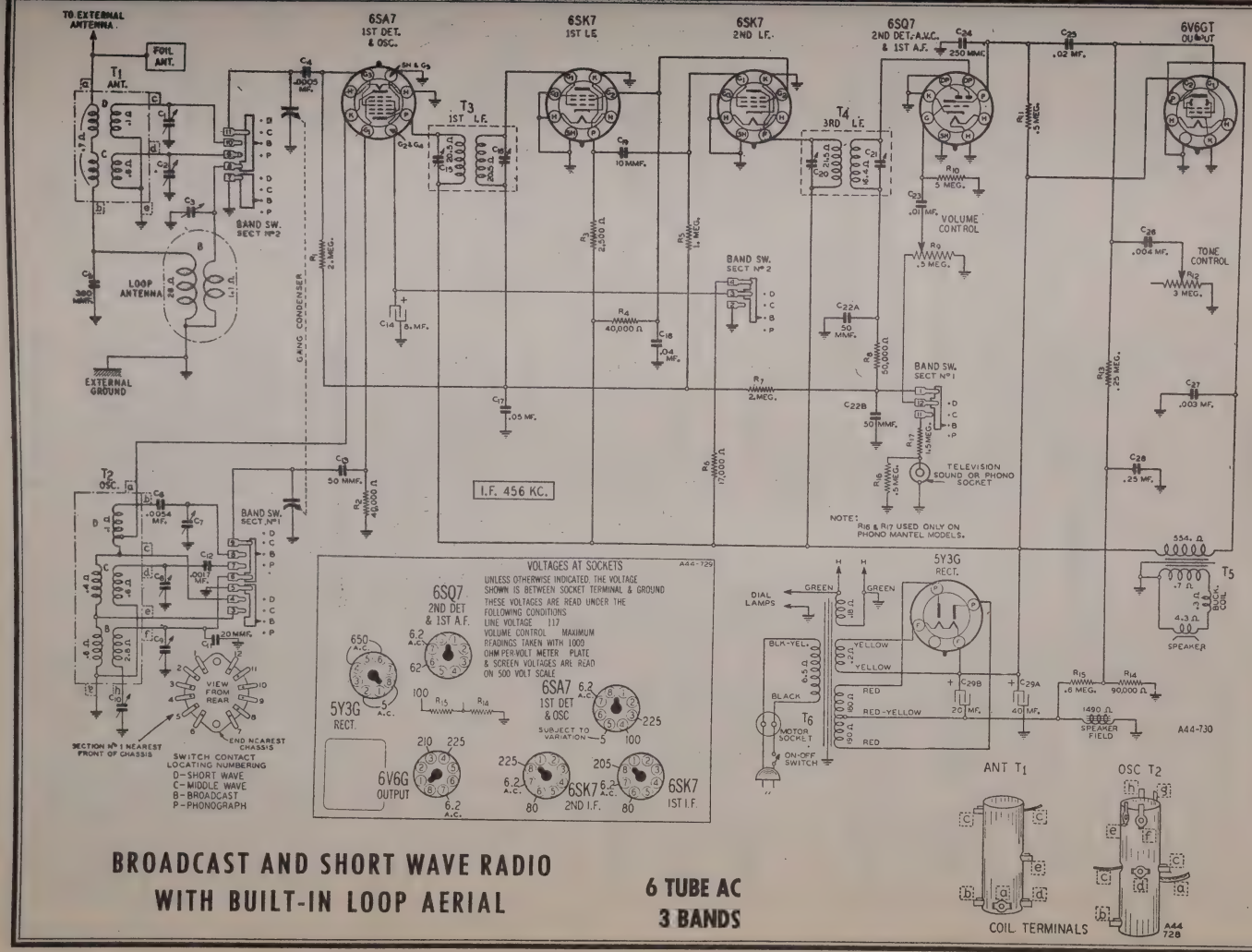


BROADCAST AND SHORT WAVE RADIO WITH BUILT-IN LOOP AERIAL

6 TUBE AC
3 BANDS

MODEL 6A44

WELLS-GARDNER & CO.

SPECIFICATIONS

Power Consumption 60 Watts (At 117 volts 60 cycles)

Power Output.....2.5 Watts Undistorted
3.5 Watts Maximum

Selectivity.....40 KC Broad at 1000 times Signal

Intermediate Frequency.....456 KC

Speaker.....6" or 8" Electro-Dynamic

Tuning Frequency Range

B Range	528 to 1600 KC
C Range	2200 to 7000 KC
D Range	7000 to 22000 KC

Sensitivity—External Antenna—(For 0.5 Watt output)

B Range	7 Microvolts Average
C Range	7 Microvolts Average
D Range	15 Microvolts Average

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

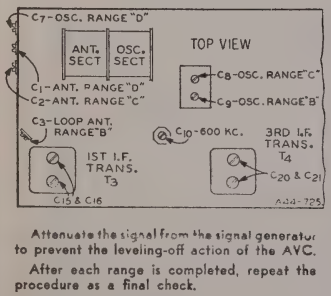
The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 100 mmf., and 400 ohms.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
I.F.					
456 KC	Grid Terminal No. 8 of 1st Det.	.1 mf.	B Range	Turn Rotor to Full Open	1st I.F. (C15) & (C16) 3rd I.F. (C20) & (C21)
RANGE B					
1600 KC	External Antenna Clip or Lead	100 mmf.	B Range	Turn Rotor to Full Open	Oscillator Range B (C9)
1400 KC	External Antenna Clip or Lead	100 mmf.	B Range	Turn Rotor to Max. Output Set Indicator to 1400 KC— See Note A	Ant. Range B (C3)
600 KC	External Antenna Clip or Lead See Note B	100 mmf.	B Range	Turn Rotor to Max. Output	600 KC (C10) Rock Rotor—See Note C
RANGE C					
7000 KC	External Antenna Clip or Lead	400 Ohm	C Range	Turn Rotor to Full Open	Oscillator Range C (C8)
6000 KC	External Antenna Clip or Lead	400 Ohm	C Range	Turn Rotor to Max. Output	Antenna Range C (C2)
RANGE D					
22,000 KC	External Antenna Clip or Lead	400 Ohm	D Range	Turn Rotor to Full Open	Oscillator Range D (C7)
21,000 KC	External Antenna Clip or Lead	400 Ohm	D Range	Turn Rotor to Max. Output	Ant. Range D (C1) Rock Rotor—See Note C
LOOP RANGE B					
1400 KC	External Antenna Clip or Lead See Note D	100 mmf.	B Range	Turn Rotor to Max. Output	Ant. Range B (C3)



Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial, remove pointer from drive cord. Set pointer at the 1400 KC mark on the dial scale. Attach pointer to drive cord.

NOTE B—(Table Model) By means of wooden blocks, stand the loop aerial assembly the same distance from the back of the chassis that it is normally when the chassis is assembled in the cabinet.

NOTE C—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE D—Re-assemble chassis in cabinet. Replace back on cabinet (Table Model). Connect ground post of signal generator to external ground clip on loop antenna (Table Model) or ground screw on chassis (Console Model).

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

DRIVE CORD REPLACEMENT

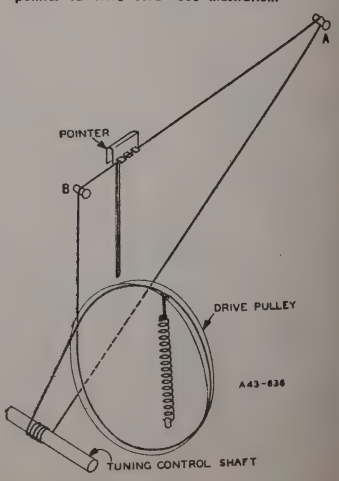
Turn gang condenser to full open position—See illustration. Use a new drive cord 42 inches in length.

Tie one end of cord to tension spring. Pass other end of cord up through hole in groove of drive pulley. Pull cord through hole until spring is flush against inside of pulley rim.

Wind cord 1/4 turn counter-clockwise (from pulley side of chassis) around drive pulley. Then wind 4½ turns clockwise (from front of chassis) around tuning control shaft. These turns should progress toward chassis. Pass cord over idler studs A and B as shown, then wind cord ¾ turn counter-clockwise (from pulley side of chassis) around drive pulley. This turn should be on left side (from front of chassis) of pulley groove.

Pass cord through hole in groove of drive pulley. Tie cord to tension spring. Fasten other end of spring to hook on drive pulley.

DIAL POINTER ATTACHMENT—Tune in a signal of known frequency. Set pointer at this frequency mark on dial scale. Fasten pointer to drive cord—See illustration.



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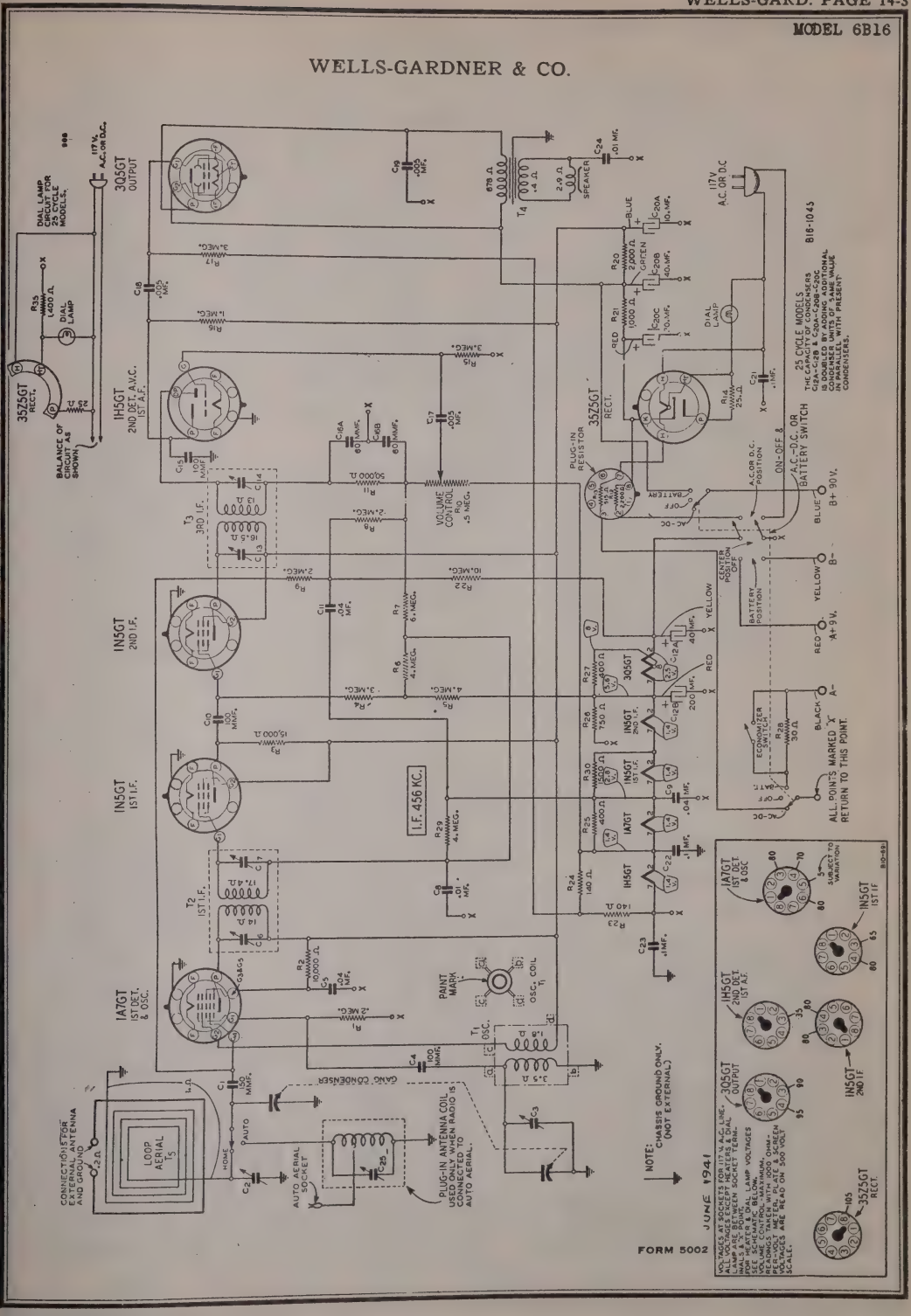
MODEL 6B16

WELLS-GARDNER & CO.



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MODEL 6B16

WELLS-GARDNER & CO.

ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The equipment in column at right is required for aligning:

A Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 50 mmf.

SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR ANTENNA CONNECTION	SIGNAL GENERATOR GROUND CONNECTION	DUMMY ANTENNA	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration below)
456 KC	External Antenna Clip on Loop	External Ground Clip on Loop	.1 mf.	Turn Rotor to full open	1st I.F. (C6) & (C7) 3rd I.F. (C13) & (C14)
1600 KC	External Antenna Clip	External Ground Clip	.1 mf.	Turn Rotor to full open	Oscillator (C3)
1400 KC	External Antenna Clip See Note A	External Ground Clip	50 mmf.	Turn Rotor to max. output	Antenna (C2)

If radio is equipped with special antenna coil for use in car, make the following additional adjustment after the radio is installed in the car and the car antenna is connected.

Car Antenna Adjustment—Tune in weak signal near 1400 KC—Adjust Car Antenna Trimmer C25 for maximum output. This trimmer is in special antenna coil can at left side of chassis (See illustration in Auto Installation Sheet).

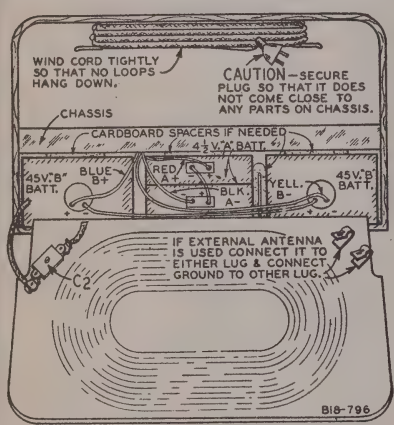
SPECIFICATIONS

Input Voltages and Currents—Battery Operation
"A" Battery .....9 Volts—50 Ma.
"B" Battery .....90 Volts—11.5 Ma.

Power Consumption
(At 117 volts AC Supply) .....28 Watts

Power Output
Battery Operation - - - 150 Mw. Undistorted 350 Mw. Maximum
AC Operation - - - - 200 Mw. Undistorted 400 Mw. Maximum

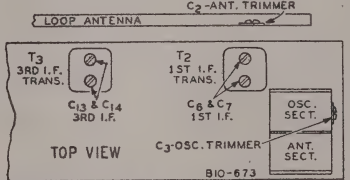
Selectivity - 50 KC Broad at 1000 Times Signal
Intermediate Frequency - - - - - - 456 KC
Speaker - - - - - - - - 6" P.M. Dynamic
Tuning Frequency Range - - - 540 to 1600 KC
Sensitivity (For .05 Watt Output)
External Antenna - - 10 Microvolts Average

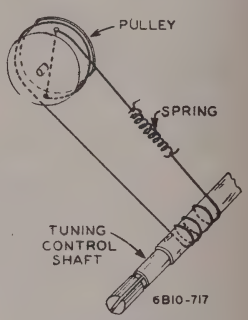

WIND CORD TIGHTLY SO THAT NO LOOPS HANG DOWN.
CAUTION—SECURE PLUG SO THAT IT DOES NOT COME CLOSE TO ANY PARTS ON CHASSIS.
CHASSIS
CARDBOARD SPACERS IF NEEDED
45V."B" BATT.
BLUE B+
RED A+
BLK. A-
YELL. B-
45V."B" BATT.
IF EXTERNAL ANTENNA IS USED CONNECT IT TO EITHER LUG & CONNECT GROUND TO OTHER LUG.
C2
B18-796

NOTE A—Reassemble chassis in cabinet. Close back on cabinet.

CALIBRATION—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, set the pointer at the 800 KC mark. Retighten set screw.

REMOVING CHASSIS FROM CABINET—Pull off the 3 control knobs. Take out the 4 screws, 2 at each side on the outside of the cabinet. Then pull the chassis out of the cabinet.





GANG CONDENSER IN CLOSED POSITION

REPLACEMENT PARTS LIST

NOTICE: There is a chassis number label on the chassis. The chassis number identifies the radio as to chassis, dial, and issue letter. When ordering parts or writing, be sure to mention the chassis number.

No. 3 DIAL—Black Calibration Numbers on Gold Background

No. 4 DIAL—Blue Calibration Numbers on Gold Background

Part No.	Description	List Price
12A358	6" P.M. Dynamic Speaker complete with Output Transformer	$6.10⊗
	Cone and Voice Coil (Specify part number and letters stamped on Speaker)	1.20⊗
	Output Transformer (Specify part number and letters stamped on Speaker)	1.50
14X295	Screen for above Speaker (Dial No. 3)	.25
14X297	Screen for above Speaker (Dial No. 4)	.40
14X290	Grille Cloth (Dial No. 3)	.10
14X298	Grille Cloth (Dial No. 4)	.10
10A421	Knob (Off Switch—AC-DC—Battery Switch)	.10
10A418	Knob (Tuning or Volume Control)	.10
3A303	Tube or Resistor Sockets—Oct.- (6 Prong) Molded	Ea. .10
3A309	4 Prong Socket for Antenna Transformer Assembly	.10
30X44	Grid Clips	Doz. .10
52X174	Tube Shields	Ea. .10
13X418	"A" Battery Cable and Plug Assembly	.20
13X419	"B" Battery Cable and Plug Assembly	.20
13X328	Line Cord and Plug Assembly	.40
2A193	Off-Switch—AC-DC—Battery Switch	.85
26A284	Home-Auto Switch and Mounting Spring Assembly	.40
4X621	Escutcheon for Home-Auto Switch	.25
2A175	Economizer Switch	.15
28X265	Phosphor Bronze Ground Plate (For 3rd I.F. Can)	.10

TRANSFORMERS AND COILS

9A1398	T1	Oscillator Coil Assembly	$1.25
9A1372	T2	1st I.F. Transformer and Can Assembly	1.05
9A1373	T3	3rd I.F. Transformer and Can Assembly	1.00
	T4	Output Transformer (See "Miscellaneous")	
9A1404	T5	Loop Aerial Assembly less Trimmer Condenser	1.05
		Antenna Transformer Assembly (See "Auto Installation Parts")	

CONDENSERS

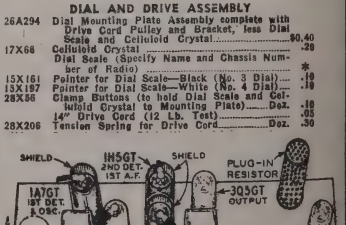
47X142	C1	150 mmf.		Molded	$0.10
17A116	C2	2.5-23 mmf. Loop Aerial Trimmer			.15
	C3	Part of Gang Condenser			
47X87	C4,C10,G15	100 mmf.		Molded	.10
B66403	C5,C9,C11 (C8)	.04 mf.	200 V.	Tubular	.10
		Part of 1st I.F. Can Assembly			
	C7	.01 mf.	200 V.	Tubular	.10
B66103	C6	40 mf.	35 V.)	Dry	
45X301	(C12A	200 mf.	35 V.)	Electrolytic	.80
	C12B				
	(C13)	Part of 3rd I.F. Can Assembly			
	(C14)				
47X172	(C16A	60 mmf.)		Dual Mica	.15
	(C16B	60 mmf.)			
B66502	C17,C18	.005 mf.	200 V.	Tubular	.10
D66502	C19	.005 mf.	400 V.	Tubular	.10
	(C20A	10 mf.	150 V.)	Dry	
45X297	(C20B	40 mf.	150 V.)	Electrolytic	.70
	C20C	20 mf.	150 V.)		
D66104	C21,C22,C23	.10 mf.	400 V.	Tubular	.15
D66103	C24	.01 mf.	400 V.	Tubular	.10
17A115	C25	2.5-25 mmf. (See "Auto Installation Parts")			.15
		(40 mf.	150 V.)	Dry	
45X283		(10 mf.	150 V.)	Electrolytic	.75
		(20 mf.	150 V.)	(USED ON 25 CYCLE MODELS ONLY)	
		(200 mf.	35 V.)	Dry	
45X284		(40 mf.	35 V.)	Electrolytic (USED ON 25 CYCLE MODELS ONLY)	.60
14A154		2 Section Gang Condenser			3.00

RESISTORS

B95204	R1	200,000 Ohm	0.5 W.	Carbon	$0.10
B95103	R2	10,000 Ohm	0.5 W.	Carbon	.10
B95153	R3	15,000 Ohm	0.5 W.	Carbon	.10
B95305	R4,R15,R17	3.0 Megohm	0.5 W.	Carbon	.10
B95405	R5,R6,R29	4.0 Megohm	0.5 W.	Carbon	.10
B95505	R7	5.0 Megohm	0.5 W.	Carbon	.10
B95205	R8,R9	2.0 Megohm	0.5 W.	Carbon	.10
86X289	R10	500,000 Ohm	Volume	Control	.50
B95503	R11	50,000 Ohm	0.5 W.	Carbon	.10
43X114	(R12	2200 Ohm	5 W.)	Plug-in	
	(R13	515 Ohm	12 W.)	Resistor	1.15
B95304	R14	25 Ohm	0.5 W.	Carbon	.10
B95103	R16	1.0 Megohm	0.5 W.	Carbon	.10
B95202	R20	2000 Ohm	0.5 W.	Carbon	.10
B95102	R21	1000 Ohm	0.5 W.	Carbon	.10
B95106	R22	10.0 Megohm	0.5 W.	Carbon	.10
B94141	R23,R24	140 Ohm	0.5 W.	Carbon	.15
B94401	R25,R27	400 Ohm	0.5 W.	Carbon	.15
B94751	R28	750 Ohm	0.5 W.	Carbon	.15
B94300	R29	30 Ohm	0.5 W.	Carbon	.15
B94152	R30	1500 Ohm	0.5 W.	Carbon	.15
43X104	R35	1400 Ohm	12 W.	Wire Wound (USED ON 25 CYCLE MODELS ONLY)	.60

DIAL AND DRIVE ASSEMBLY

26A294	Dial Mounting Plate Assembly complete with Drive Cord Pulley and Bracket, less Dial Scale and Celluloid Crystal	$0.40
17X66	Celluloid Crystal	.20
	Dial Scale (Specify Name and Chassis Number of Radio)	*
15X161	Pointer for Dial Scale—Black (No. 3 Dial)	.10
15X197	Pointer for Dial Scale—White (No. 4 Dial)	.10
28X56	Clamp Buttons (to hold Dial Scale and Celluloid Crystal to Mounting Plate) Doz.	.10
	14" Drive Cord (12 Lb. Test) Doz.	.85
28X206	Tension Spring for Drive Cord Doz.	.30



IMPORTANT—METAL BASE TUBES MUST BE USED IN THOSE SOCKETS AT WHICH SHIELDS ARE SHOWN.

Use only GENUINE factory tested parts to insure service jobs you can depend on and to obtain original set performance.

Prices Subject to Change Without Notice.

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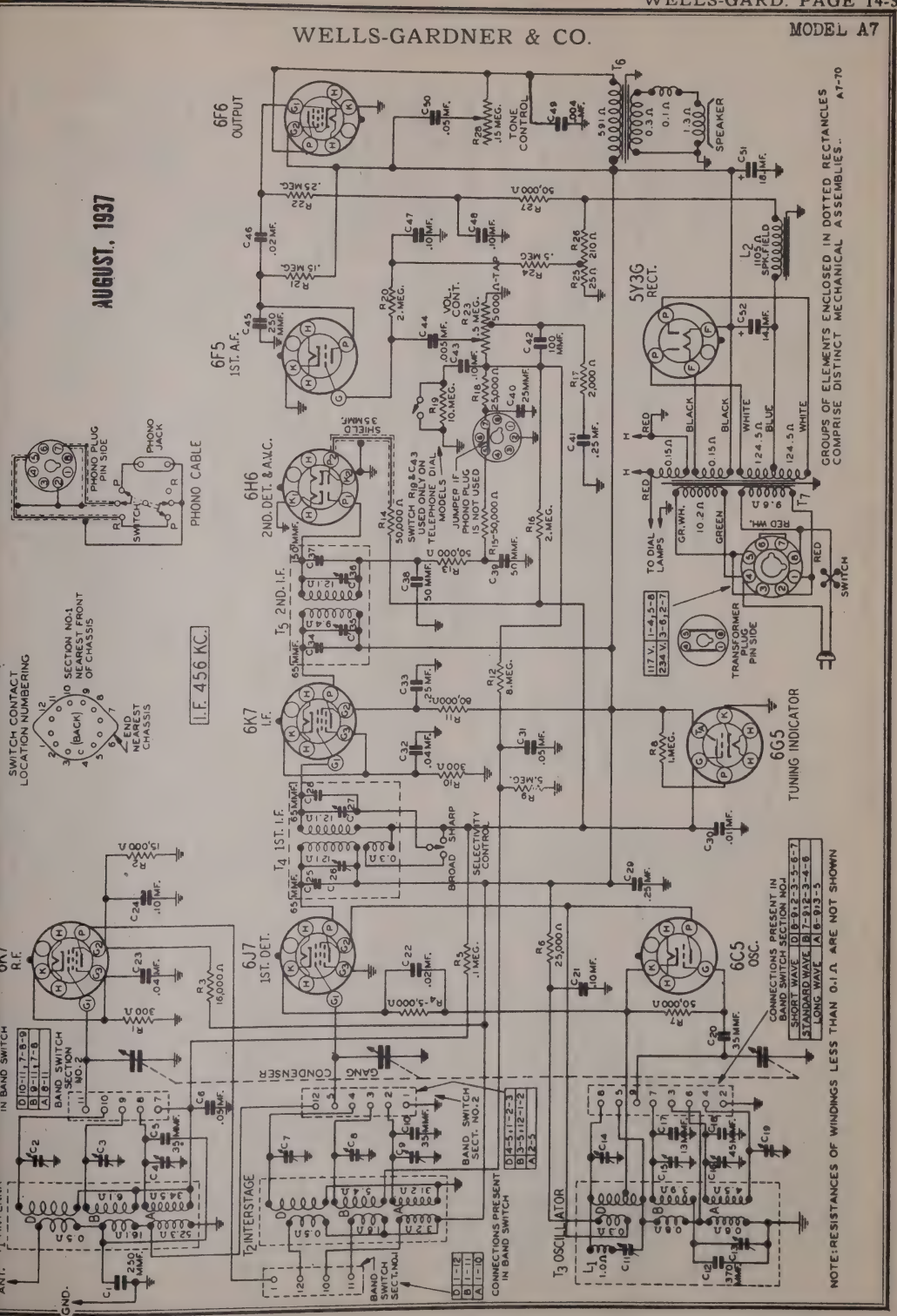
WELLS-GARDNER & CO.
MODEL A7
AUGUST, 1937
6F6 OUTPUT
6F5 1ST. A.F.
6H6 2ND. DET. & A.V.C.
6K7 I.F.
6J7 1ST. DET.
6K7 R.F.
6C5 OSC.
6G5 TUNING INDICATOR
5Y3G RECT.
T1 ANTENNA
T2 INTERSTAGE
T3 OSCILLATOR
T4 1ST. I.F.
T5 2ND. I.F.
T6
T7
L1
L2
I.F. 456 KC.
SWITCH CONTACT LOCATION NUMBERING
SECTION NO.1 NEAREST FRONT OF CHASSIS
END NEAREST CHASSIS
PHONO PLUG PIN SIDE
PHONO JACK
PHONO CABLE
SWITCH
JUMPER IF PHONO PLUG IS NOT USED
SWITCH R18,C43 USED ONLY ON TELEPHONE DIAL MODELS
TONE CONTROL
SPEAKER
VOL. CONT.
SELECTIVITY CONTROL
BROAD SHARP
GANG CONDENSER
TO DIAL LAMPS
TRANSFORMER PLUG PIN SIDE
117 V. 1-4,5-8
234 V. 3-6,2-7
SHIELD
GROUPS OF ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
A7-70
CONNECTIONS PRESENT IN BAND SWITCH
BAND SWITCH SECTION NO.2
BAND SWITCH SECT. NO.1
CONNECTIONS PRESENT IN BAND SWITCH SECTION NO.1
SHORT WAVE D 8-9,2-3-5-6-7
STANDARD WAVE B 7-9,2-3-4-6
LONG WAVE A 6-9,3-5
NOTE: RESISTANCES OF WINDINGS LESS THAN 0.1 Ω ARE NOT SHOWN

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ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator With a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

STEP (Follow Order as Given)	BAND SWITCH SETTING	DUMMY ANTENNA	SIGNAL GENERATOR FREQUENCY SETTING	SIGNAL GENERATOR CONNECTION AT RADIO	TRIMMERS ADJUSTED See Illustration	PROCEDURE INITIAL STEPS	PROCEDURE ADJUSTMENT
I.F.							
2nd I.F. Adj.	Range B	.1 mf.	456 KC	Grid of I.F. Tube	2nd I.F. (C35) & (C36)	Turn Rotor to Full Open	Adjust to Maximum Output
1st I.F. Adj.	Range B	.1 mf.	456 KC	Grid of 1st Det.	1st I.F. (C26) & (C27)	Turn Rotor to Full Open	Adjust to Maximum Output
RANGE A							
380 KC	Range A	200 mmf.	380 KC	Antenna Lead	Oscillator Range A (C16)	Turn Rotor to Full Open	Adjust to Maximum Output
350 KC	Range A	200 mmf.	350 KC	Antenna Lead	Int. Range A (C9) Antenna Range A (C4)	Turn Rotor to Max. Output	Adjust to Maximum Output
165 KC	Range A	200 mmf.	165 KC	Antenna Lead	165 KC (C19)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE B							
1830 KC	Range B	200 mmf.	1830 KC	Antenna Lead	Oscillator Range B (C15)	Turn Rotor to Full Open	Adjust to Maximum Output
1500 KC	Range B	200 mmf.	1500 KC	Antenna Lead	Ant. Range B (C3) Int. Range B (C8)	Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A	Adjust to Maximum Output
600 KC	Range B	200 mmf.	600 KC	Antenna Lead	600 KC (C13)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
RANGE D							
19,800 KC	Range D	400 Ohm	19,800 KC	Antenna Lead	Oscillator Range D (C14)	Turn Rotor to Full Open	Adjust to Maximum Output
16,000 KC	Range D	400 Ohm	16,000 KC	Antenna Lead	Ant. Range D (C2) Int. Range D (C7)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B
6000 KC	Range D	400 Ohm	6000 KC	Antenna Lead	6000 KC (C11)	Turn Rotor to Max. Output	Adjust to Maximum Output Rock Rotor — See Note B

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

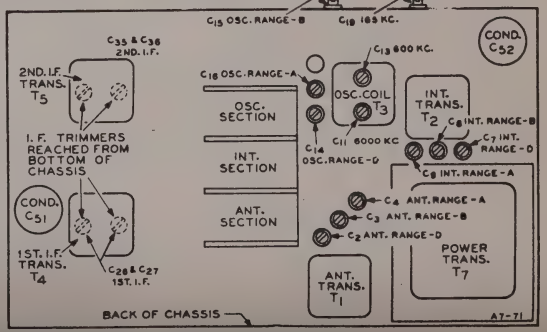
NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

In sets using a pointer or any other type of dial mechanism, it will be necessary to adjust the position of the indicator until it is at the 1500 KC mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.



WELLS-GARDNER & CO.

MODEL A7

CONDENSERS

TUBULAR

Part No.	Code	Capacitance	Voltage
46X80	C6	.05 mf.	180
46X105	C21	.10 mf.	360
46X187	C22	.02 mf.	180
46X211	C23	.04 mf.	180
46X181	C24	.10 mf.	240
46X121	C29	.25 mf.	360
46X124	C30	.01 mf.	180
46X80	C31	.05 mf.	180
46X211	C32	.04 mf.	180
46X121	C33	.25 mf.	360
46X197	C41	.25 mf.	180
46X98	C43	.10 mf.	180
46X147	C44	.005 mf.	360
46X202	C46	.02 mf.	360
46X98	C47	.10 mf.	180
46X98	C48	.10 mf.	180
46X114	C49	.004 mf.	600
46X108	C50	.05 mf.	600

MOLDED

Part No.	Code	Capacitance
47X69	C1	250 mmf.
47X93	C5	35 mmf.
47X93	C10	35 mmf.
47X94	C18	45 mmf.
47X56	C38	50 mmf.
47X56	C39	50 mmf.
47X72	C40	25 mmf.
47X57	C42	100 mmf.
47X65	C45	250 mmf.

ELECTROLYTIC

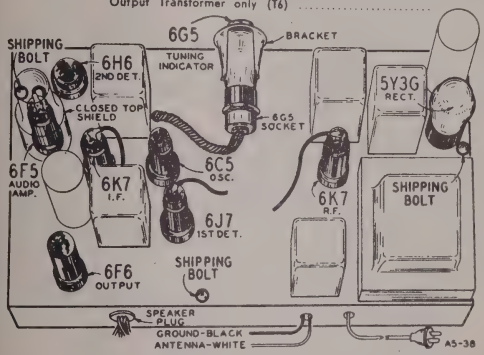
44X11	C51	18 mf.	300	
44X10	C52	14 mf.	400	

SPEAKERS

When ordering parts for speakers, specify part number of speaker, and letter preceding part number stamped on the speaker.

12A290 — 10" Dynamic Speaker Complete with Output Trans. (T6) Cone and Voice Coil for above Speaker ..... Output Transformer only (T6) .....

12A285 — 8" Dynamic Speaker Complete with Output Trans. (T6) Cone and Voice Coil for above Speaker ..... Output Transformer only (T6) .....



Location of Tubes

TRIMMER

17A73	C2	2-25	mmf.	Antenna Range "D"
	C3	2-25	mmf.	Antenna Range "B"
	C4	2-25	mmf.	Antenna Range "A"
17A73	C7	2-25	mmf.	Interstage Range "D"
	C8	2-25	mmf.	Interstage Range "B"
	C9	2-25	mmf.	Interstage Range "A"
17A69	C11	40-100	mmf.	Oscillator 6000 KC
	C13	40-120	mmf.	Oscillator 600 KC
17A76	C14	2-25	mmf.	Oscillator Range "D"
	C16	2-25	mmf.	Oscillator Range "A"
17A68	C15	1-12	mmf.	Oscillator Range "B"
17A66	C19	100-200	mmf.	165 KC Padder
17A70	C26	15-55	mmf.	1st I.F. Trimmers
	C27	15-55	mmf.	
17A70	C35	15-55	mmf.	2nd I.F. Trimmers
	C36	15-55	mmf.	

MISCELLANEOUS

47X89	C12	370	mmf.	Iron Clad
47X80	C17	13	mmf.	Compensating Capacitor
47X81	C20	35	mmf.	Iron Clad
47X91	C25	65	mmf.	Iron Clad
47X91	C28	65	mmf.	Iron Clad
47X91	C34	65	mmf.	Iron Clad
47X83	C37	150	mmf.	Iron Clad
14A70	3 Section Gang Condenser less Dial and Drive Assembly			

RESISTORS

CARBON

Part No.	Code	Resistance	Wattage			
A94301	R1	300 Ohm	0.2	A95503	R12	.8 Megohm 0.2
C94153	R2	15,000 Ohm	1.0	A95503	R13	50,000 Ohm 0.2
D94163	R3	16,000 Ohm	2.0	A95205	R14	50,000 Ohm 0.2
A94502	R4	5,000 Ohm	0.2	A94202	R15	50,000 Ohm 0.2
A95104	R5	100,000 Ohm	0.2	A95253	R16	2 Megohm 0.2
C94253	R6	25,000 Ohm	1.0	A95106	R17	2,000 Ohm 0.2
A94503	R7	50,000 Ohm	0.2	A95205	R18	25,000 Ohm 0.2
A95105	R8	1 Megohm	0.2	A95154	R19	10 Megohm 0.2
A94505	R9	5 Megohm	0.2	A95254	R20	2 Megohm 0.2
A94301	R10	300 Ohm	0.2	A95504	R21	150,000 Ohm 0.2
B95803	R11	80,000 Ohm	0.5	A95503	R22	250,000 Ohm 0.2
					R24	500,000 Ohm 0.2
					R27	50,000 Ohm 0.2

WIRE WOUND

43X83	R25	25 Ohm	0.25
	R26	210 Ohm	2.0

VARIABLE

36X236	R23	.5 Megohm	Volume Control and On-Off Switch
40X223	R28	.15 Megohm	Tone Control

TRANSFORMERS AND COILS

Part No.	Code	Description
9A863	T1	Antenna Transformer and Can Assembly
9A864	T2	Interstage Transformer and Can Assembly
9A865	T3	Oscillator Coil and Can Assembly
9A782	T4	1st I.F. Transformer and Can Assembly
9A777	T5	2nd I.F. Transformer and Can Assembly
	T6	Output Transformer only (See "Speakers")
53X161	T7	117-234 Volt, 40-60 Cycle, Universal Power Trans.
53X160	T7	117 Volt, 25 Cycle Power Transformer
53X159	T7	117 Volt, 60 Cycle Power Transformer

VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum — Antenna Shorted to Ground

Readings taken with 1000 Ohm-per-volt meter — Position of Band Switch: Standard Wave

TUBE	FUNCTION	VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated)							
		Prong No. 1	Prong No. 2	Prong No. 3	Prong No. 4	Prong No. 5	Prong No. 6	Prong No. 7	Prong No. 8
6K7	R.F.	0	6.2(1)	245	110	2.5		6.2(1)	2.5
6J7	1st Det.	0	6.2(1)	245	114	0		6.2(1)	6.2
6C5	Osc.	0	6.2(1)	114				6.2(1)	0
6K7	I.F.	0	6.2(1)	245	118	2.5		6.2(1)	2.5
6H6	2nd Det.	0	6.2(1)		0			6.2(1)	0
6F5	1st A.F.	0	6.2(1)		155			6.2(1)	0(2)
6F6	Power	0	6.2(1)	230	245	16(3)		6.2(1)	0
5Y3G	Rectifier	0	5.0(4)		680(5)		680(5)		5.0(4)
6G5	Tuning Indicator	Plate to Ground 20		Target to Ground 245		Cathode to Ground 0		Across Heater 6.2	

(1) A.C. voltage as read across heater terminals 2 and 7.

(2) Bias (1.5 volts) as read across resistor R25.

(3) Bias (16 volts) as read across resistors R25 and 26.

(4) A.C. voltage as read across filament terminals 2 and 8.

(5) A.C. voltage as read across terminals 4 and 6.

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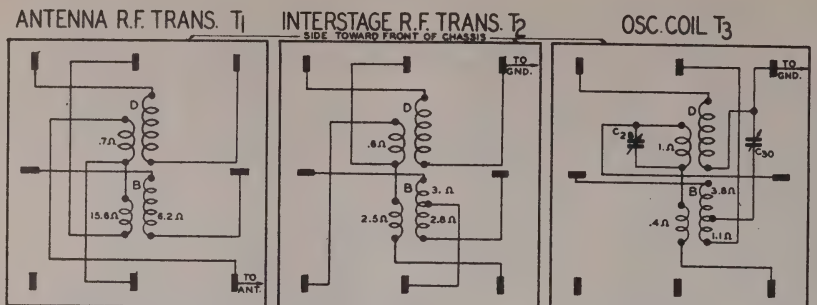

Fig. 4—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings

32 Volt Power Supply

This radio is designed for use on farms and in those places where the power supply consists of a 32 volt direct current generating plant.

Polarity of Power Supply

There is a red mark on the plug at the end of the power supply cord of the radio. The prong of the plug at which the red mark is placed must be plugged into the positive side of the line.

Use a receptacle on the 32 volt line from which the plug will not have to be removed after it has once been inserted correctly.

If the polarity of the line is not known, that is, if it is not known which side of the line is positive, a meter may be used to indicate the polarity. A voltmeter of 50 volt range or up is used. Connect the meter across the line. If the pointer deflects correctly, then the positive post of the meter is connected to the positive side of the line.

If the polarity of the line is not known and there is no way of determining it, insert the power supply plug, turn on the set, advance the volume control and proceed to tune the radio. If no sounds are heard from the speaker after the plug has been in two minutes, withdraw the plug, turn it around and re-insert it. This time sounds should be heard after the tubes have been heated.

Caution

If used on any other type of power supply than 32 volt DC, severe damage may be done to the receiver.

Do not turn the radio on unless all of the tubes and the dial lamps are in the proper sockets. Use only No. 51 bayonet pin base lamps.

Do not leave the plug inserted for more than five minutes if it is found that the radio does not operate.

Line Voltage Range

The radio will operate satisfactorily within a line voltage range of 25 to 42 volts.

Series Resistor

If the line voltage is higher than 42, it will be necessary to use a series resistor to cut it down. If the voltage varies, a variable resistor may be required.

Starting Current

When first turned on, the drain for a few seconds is slightly higher than normal until the tubes heat up. Some automatic plants are adjusted to start under a load of 200 to 300 watts. If a number of devices such as lights or motors are being used and the radio set is turned on the total drain may be sufficient to start the plant.

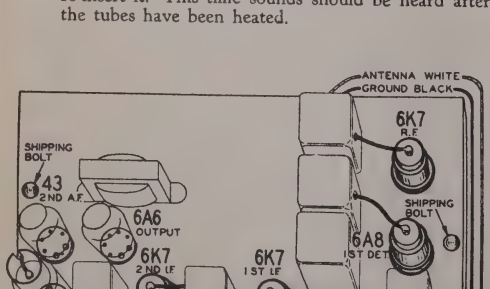

Fig. 6—Tube Arrangement

Dial Lamps

For the dial lamps, No. 51 bayonet pin base lamps must be used. These lamps are part of one section of the tube heater circuit (See Fig. 7) and any other lamps having a different current drain would upset the voltage system of this section.

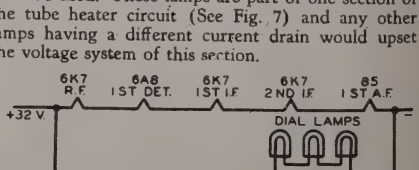

Fig. 7—Abridged Wiring Diagram Showing Tube Heater and Dial Lamp Wiring System

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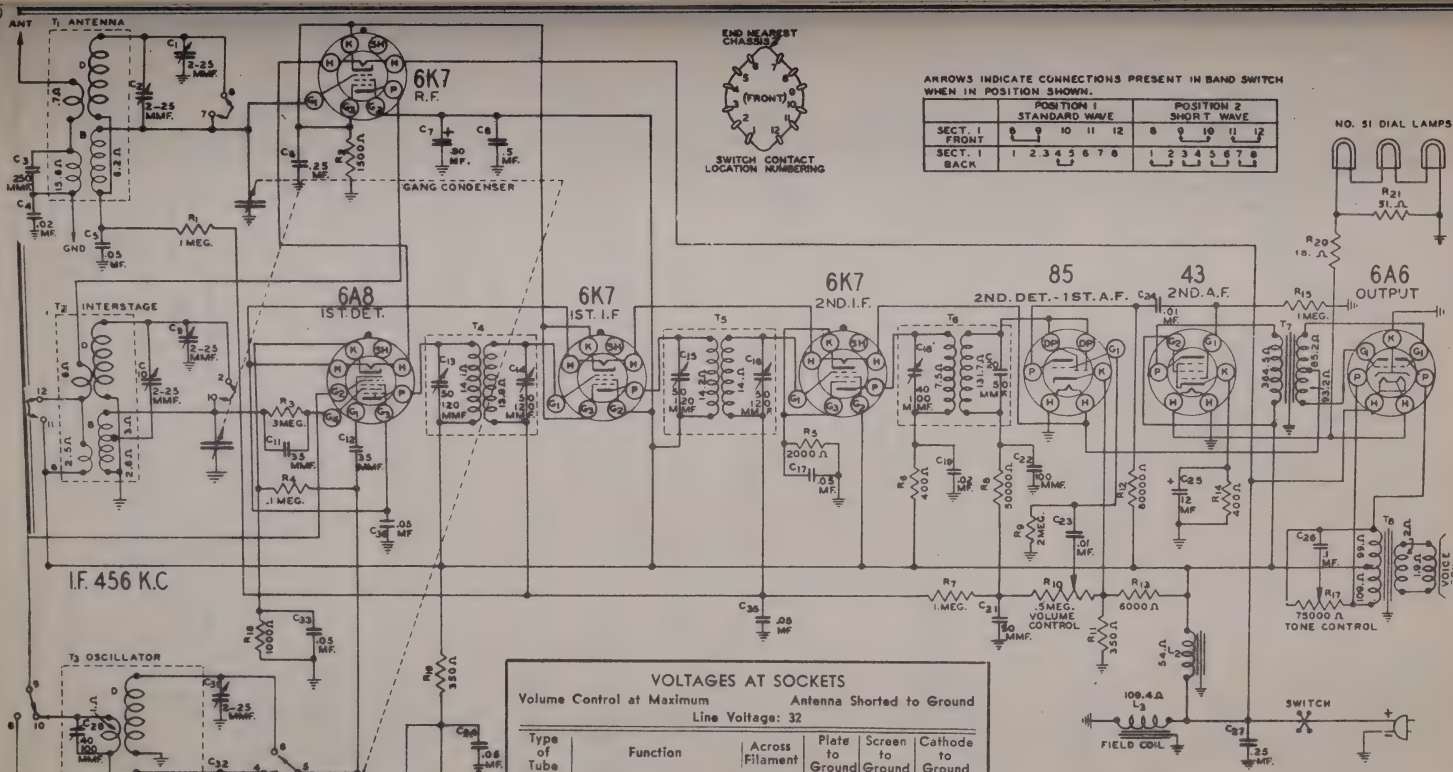

ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

	POSITION 1 STANDARD WAVE	POSITION 2 SHORT WAVE
SECT. 1 FRONT	8 9 10 11 12	8 9 10 11 12
SECT. 1 BACK	1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground — Line Voltage: 32

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Cathode to Ground
6K7	R.F.	6.3(1)	31	31	3.2
6A8	1st Det. and Osc.	6.3(1)	31 31(2)	20	1.25
6K7	1st I.F.	6.3(1)	31	31	3.2
6K7	2nd I.F.	6.3(1)	31	31	3.0
85	2nd Det. and 1st A.F.	6.3(1)	10		1.5
43	2nd A.F.	26.0(1)	28.2	31	3.2
6A6	Output	6.0(1)	31		6.4(3)

(1) Subject to Variation
(2) Anode Grid to Ground
(3) Center Tap of Output Transformer to Ground

Tuning Frequency Range

B Range ..... 528 to 1730 KC
D Range ..... 5650 to 16000 KC

Sensitivity

B Range ..... 4 Microvolts Absolute
D Range ..... 6 Microvolts Absolute

Power Consumption - 1.45 Amperes at 32 Volts DC
Power Output - - - - - - .17 Watts Undistorted
Selectivity - - 22 KC Broad at 1000 Times Signal
Intermediate Frequency - - - - - - - - 456 KC
Speaker - - - - - - - - - 8 inch Dynamic

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I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector (G_4).

Connect the ground lead of the radio to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the radio through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C32) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the interstage Range B trimmer (C10) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

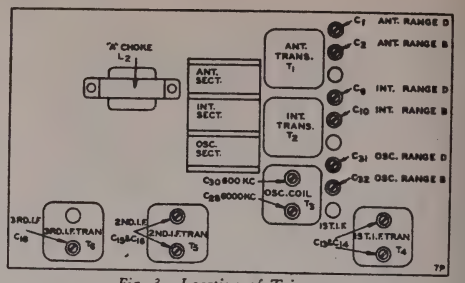

Fig. 3—Location of Trimmers

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer (C30) until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC. It may be necessary to increase the input signal to hear the image.

16,000 KC Adjustment

Set the signal generator for 16,000 KC.

Connect the antenna lead of the radio through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (short wave band).

Adjust the oscillator Range D trimmer (C31) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C1) to maximum. When adjusting these trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC (C28) trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

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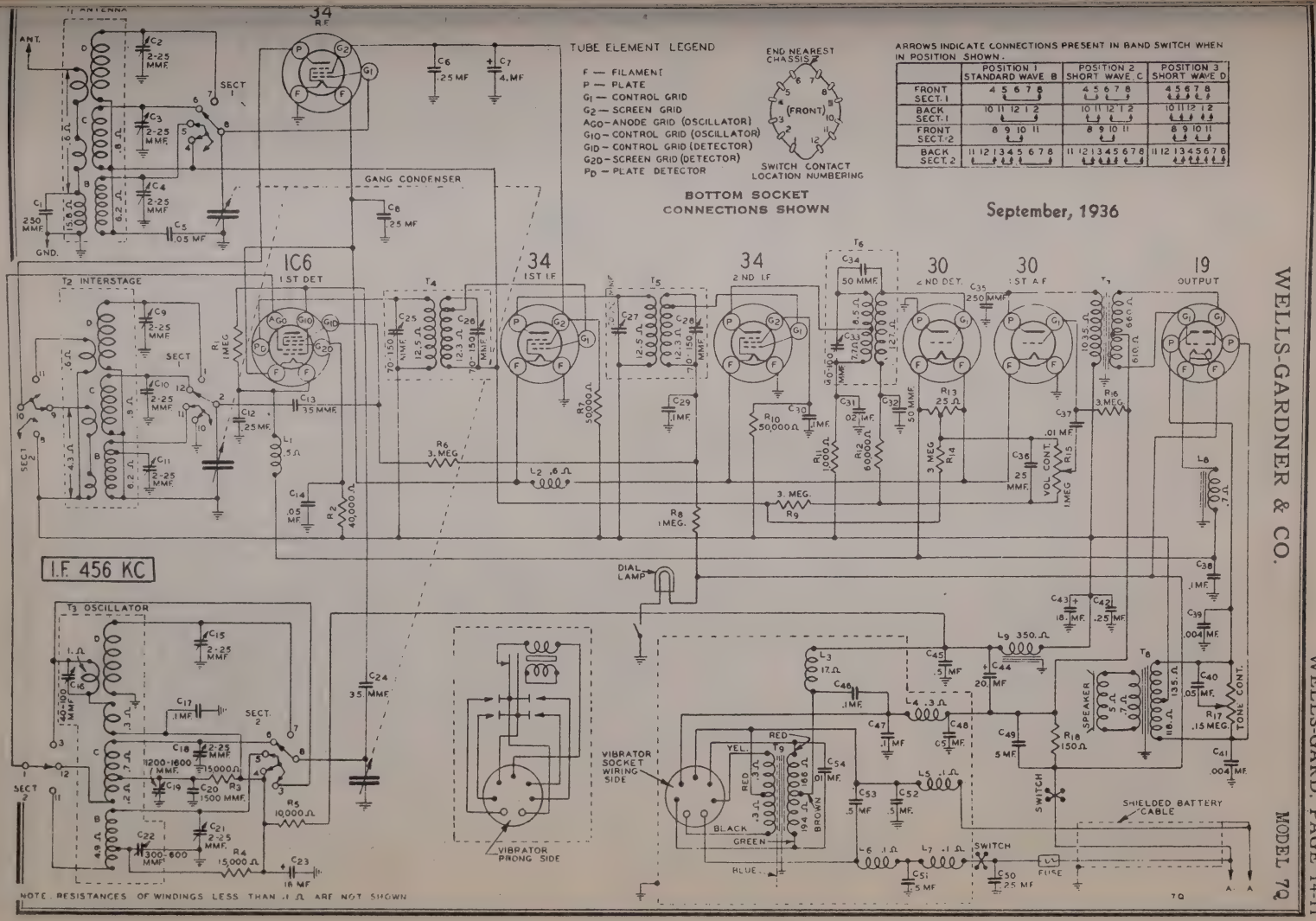
TUBE ELEMENT LEGEND
F — FILAMENT
P — PLATE
G1 — CONTROL GRID
G2 — SCREEN GRID
AGO — ANODE GRID (OSCILLATOR)
G10 — CONTROL GRID (OSCILLATOR)
G1D — CONTROL GRID (DETECTOR)
G2D — SCREEN GRID (DETECTOR)
PD — PLATE DETECTOR
END NEAREST CHASSIS
(FRONT)
SWITCH CONTACT LOCATION NUMBERING
ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.
POSITION 1 STANDARD WAVE B
POSITION 2 SHORT WAVE C
POSITION 3 SHORT WAVE D
FRONT SECT. 1
BACK SECT. 1
FRONT SECT. 2
BACK SECT. 2
BOTTOM SOCKET CONNECTIONS SHOWN
September, 1936
ANTENNA
ANT.
GND.
GANG CONDENSER
SECT 1
SECT 2
34 RF
IC6 1ST DET
34 1ST I.F.
34 2ND I.F.
30 2ND DET.
30 1ST A.F.
19 OUTPUT
T1
T2 INTERSTAGE
T3 OSCILLATOR
T4
T5
T6
T7
T8
T9
I.F. 456 KC
DIAL LAMP
VIBRATOR SOCKET WIRING SIDE
VIBRATOR PRONG SIDE
SPEAKER
TONE CONT.
VOL CONT.
SHIELDED BATTERY CABLE
SWITCH
FUSE
RED
YEL.
BLACK
GREEN
BLUE
BROWN
NOTE. RESISTANCES OF WINDINGS LESS THAN .1 Ω ARE NOT SHOWN
7Q

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Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual radios, tubes, test equipment used and battery voltage.

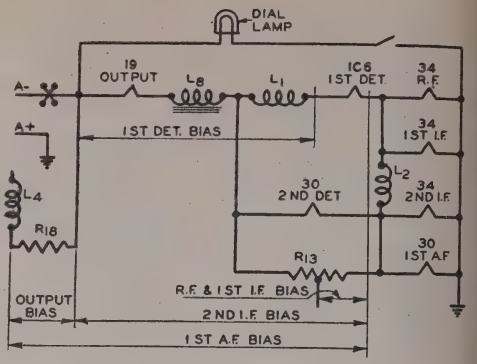


Fig. 5—Abridged wiring diagram showing filament wiring system and points at which no-signal bias voltages are obtained.

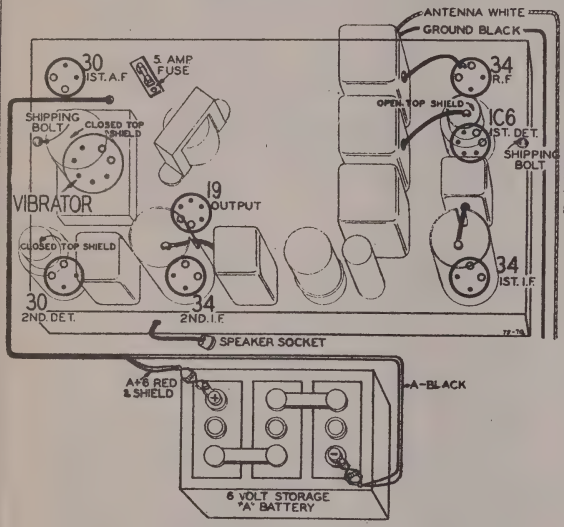


Fig. 4—Tube Arrangement and Battery Connections

Tubes

The tubes used in this radio are of the 2 volt series. All of them are of the filament or directly heated types. The filaments are connected in the series–parallel arrangement shown in Fig. 5.

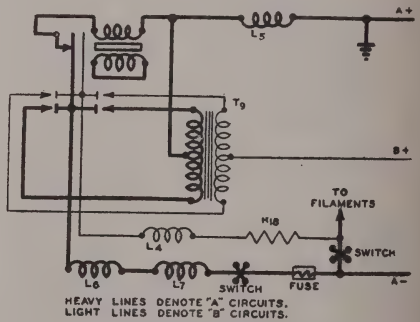


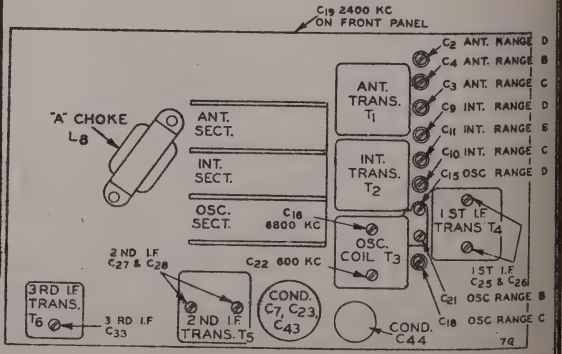
Fig. 6—Abridged wiring diagram showing action of synchronous vibrator

VOLTAGES AT SOCKETS

Volume Control at Maximum — Antenna Shorted to Ground
Battery - 6 Volts — Band Switch in Standard Wave Position

Type of Tube	Function	Across Filament	Plate to Ground	Screen to Ground	Bias Voltage See Notes
34	R.F.	2.0	145	55	1.0(1)
IC6	1st Det.-Osc.	2.0	145 90(2)	60	2 (3)
34	1st I.F.	2.0	145	55	1.0(1)
34	2nd I.F.	2.0	140	90	4.0(3)
30	2nd Det.	2.0			
30	1st A.F.	2.0	140		9 (4)
19	Power	2.0	140		5 (5)

(1) As read from negative filament leg to tap of resistor R13.
(2) Anode grid to ground.
(3) As read from negative filament leg to A—.
(4) Total voltage drop from negative filament leg to low potential end of resistor R18.
(5) As read across resistor R18.



Location of Trimmers

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WELLS-GARDNER & CO.

Series 7Q

7 Tube - 3 Band

6 Volt Synchronous Vibrator Radio

Alignment and Calibration

The radios are properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 6700, 6000, 2400, 18,400, 15,000 and 6800 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector G_{1D}.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the volume control to the maximum position

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 3.

Range B Alignment

After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.

1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C21) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

Adjust the interstage Range B trimmer (C11) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

6700 KC Adjustment

Set the signal generator for 6700 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C18) until maximum output is obtained. See Fig. 3 for location of this trimmer.

6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

2400 KC Adjustment

Set the signal generator for 2400 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 2400 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Range D Alignment

18,400 KC Adjustment

Set the signal generator for 18,400 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C19) until maximum output is obtained. See Fig. 3 for location of this trimmer.

15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage and antenna Range D trimmers, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

6800 KC Adjustment

Set the signal generator for 6800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6800 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer

General Service Data

Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and gears to see that they are turning properly and that they are not being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

Circuit

This radio is designed to operate from a 6 volt storage battery and uses a synchronous vibrator and a transformer to provide the required high voltage. The tubes used are of the 2 volt type and are connected in a series parallel arrangement across the 6 volt battery.

Three bands are covered with a tuning range in each band as shown in the specifications above. Three band coverage is accomplished by means of three sets of R.F. and oscillator coils and a two section triple throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R.F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively. The band switch sections are designated as section one and section two.

The band switch completes connections to the coils in use. It short circuits the R.F. transformer secondaries and oscillator grid coils of lower frequency not in use. It also short circuits the interstage R.F. transformer Range B and C primaries when in the Range D position. The Range D oscillator plate coil is short circuited by the band switch when it is in Range B and C positions.

The antenna transformer with tuned secondary feeds into a type 34 R.F. amplifier tube. The output of this tube is fed through the interstage R.F. transformer with tuned secondary into the control grid circuit of a 1C6 pentagrid converter tube which functions as the oscillator and 1st detector.

The oscillator potential on the oscillator control grid of this tube modulates the electron stream from the cathode in such a manner as to impress on it the oscillator frequency which is always 456 KC above the frequency to which the R.F. amplifier is tuned. The electron stream is also modulated at the signal frequency by the detector control grid. As a result of the beating of the two frequencies, the intermediate or beat frequency of 456 KC is present in the plate circuit of this tube.

Two stages of I.F. amplification are employed using type 34 tubes. The primaries and secondaries of the first and second I.F. transformers and the primary of the 3rd I.F. transformer are tuned by small trimmer condensers.

A type 30 tube functions as a diode second detector and as the automatic volume control tube. AVC voltage is applied to the R.F. and 1st I.F. tubes.

The audio voltage developed across the volume control resistor R15 is applied to the control grid of the type 30 1st A.F. tube.

The output stage employs a type 19 tube. This tube is a Class "B" power amplifier and combines 2 triodes in one envelope. A P.M. dynamic reproducer is used.

Filament Wiring—Fig. 5 is an abridged wiring diagram which shows the tube filament and dial lamp wiring system and also indicates the points at which the no-signal bias voltages are obtained.

Synchronous Vibrator—The action of the synchronous vibrator used in the power unit is shown in the abridged wiring diagram Fig. 6. When the switch is closed, the armature is drawn over as a result of the current through the vibrator coil. When this occurs, the two contacts at the lower right side of the armature are closed and the circuit through the vibrator coil is broken. The spring action then causes the armature to spring back and the two contacts at the lower left side are closed. The circuit through the vibrator coil again is completed and the armature is drawn over to start the next cycle.

The "A" current (heavy lines, Fig. 6) flows first through one side of the power transformer primary and then through the other side in the opposite direction. An AC voltage is induced in the secondary as a result. That portion of the armature shown in light lines rectifies the current in the secondary circuit.

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SPECIFICATIONS

Power Consumption	1.4 Amperes at 6.3 Volts
Power Output	1.1 Watt Undistorted
Selectivity	24 KC Broad at 1000 times Signal
Intermediate Frequency	456 KC.
Speaker	6 inch P.M. Dynamic—Mantel Models 8 inch P.M. Dynamic—Console Models

Tuning Frequency Range

B Range	528 to 1730 KC.
C Range	2300 to 6700 KC.
D Range	6500 to 18400 KC.

Sensitivity

B Range Average	2.0 Microvolts Absolute
C Range Average	4.0 Microvolts Absolute
D Range Average	8.0 Microvolts Absolute

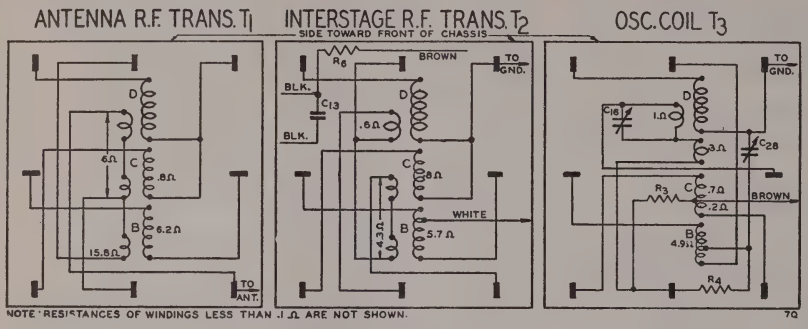

Fig. 7—R.F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

Servicing Power Unit

The power unit is that portion of the chassis assembly contained within the large rectangular shield can and the circuit for which is shown within the dotted lines at the lower right side of the schematic diagram, Fig. 2.

Continuity Resistance Check—The power transformer, choke coil circuits and condenser shorts may be checked by utilizing the vibrator socket terminals and various points on the "A" or "B" lines, without removal of the shield can. For example: when checking the continuity or resistance of the upper half of the transformer secondary, contact may be made with the test prods at the proper vibrator socket terminal, as shown on the circuit diagram, and at the positive terminal of the 20 mf. electrolytic condenser, C44.

Removing Transformer and Vibrator Socket Assembly—Take off the filter unit shield can by removing the four self tapping screws at the right side (from front) of the chassis base and the five hex nuts from the bolts at the top of the chassis.

Unsolder the ground connections from the two lugs on the inside of the chassis base (right side from front). Unsolder the black and white coded wire from the terminal strip lug nearest the front of the chassis. This terminal strip is mounted on the transformer cover. Now unsolder the bracket holding the terminal strip to the transformer cover.

Remove the four nuts from the bolts holding the transformer assembly to the chassis. Do not remove these bolts from the transformer core. Then lift the assembly to free it from the chassis so that all parts of the assembly are readily accessible.

Proceed with replacement of the power transformer or with any other necessary service or replacements and then reassemble.

Replacement of Buffer Condenser C54—This condenser is located in the top of the transformer and vibrator assembly just underneath the vibrator socket. To replace, remove the assembly as explained in the preceding article.

In addition, the two screws holding the vibrator socket to the transformer cover assembly should be taken out. The condenser is then easily replaced.

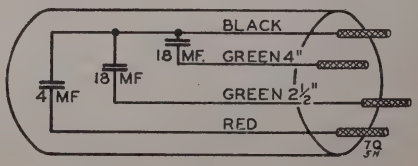

Fig. 8—Electrolytic Condenser Internal Connections

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MODEL Federal Recorder and Record Changer

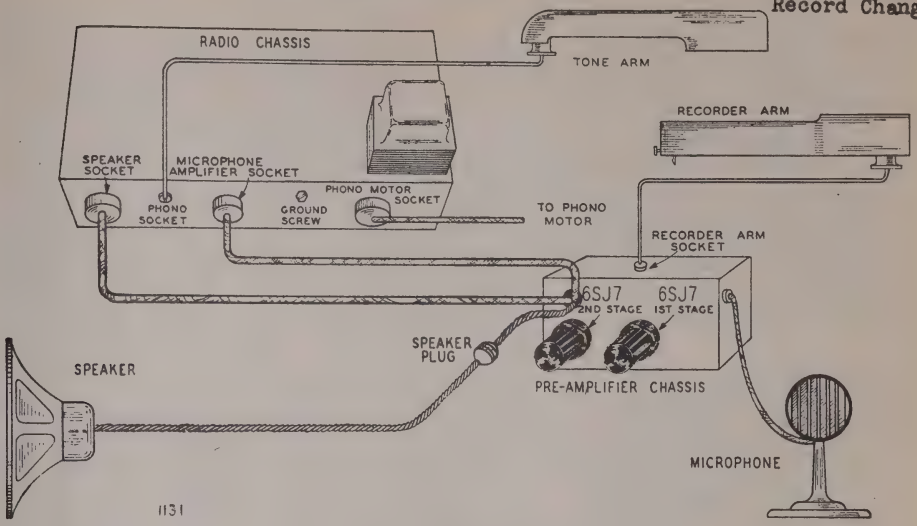

Fig. 4—Cable Connections

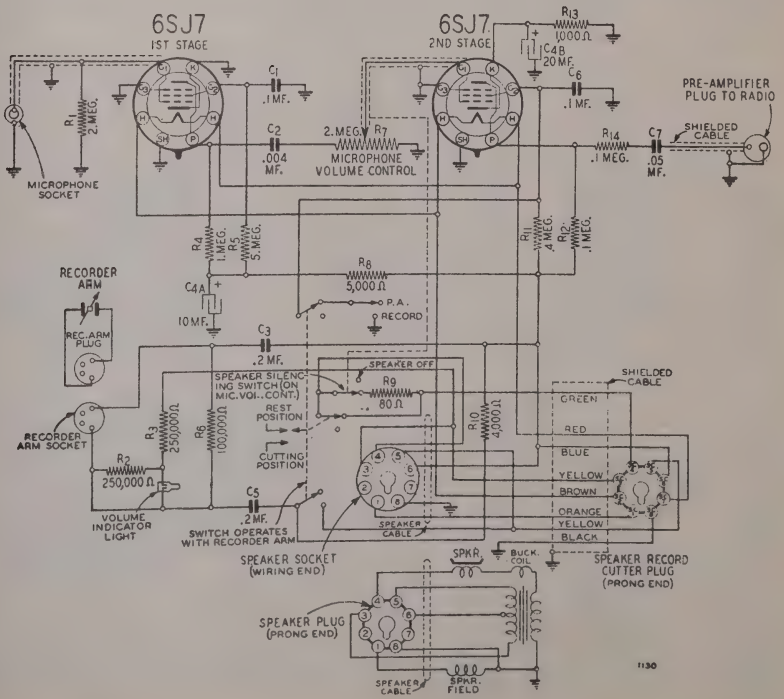

Fig. 5—Schematic Circuit Diagram

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OPERATING THE RECORD MAKER

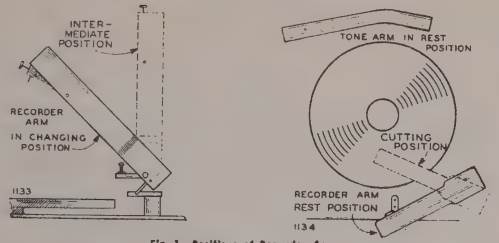

Fig. 1—Positions of Recorder Arm

1. TO MAKE A RECORD FROM A RADIO PROGRAM

A—Lift up hook on front support post and move indicator to Manual position.

B—Recorder arm in rest position—See Fig. 2.

C—Tone arm in rest position—See Fig. 1.

D—Microphone Volume Control in OFF position—See Fig. 2.

E—P.A.-Record Switch in RECORD position—See Fig. 2.

F—Phono-Radio Knob (On radio panel) in RADIO position.

G—Tune in the desired radio program carefully to room volume.

H—Place a blank record disc on the turntable with the small pin in the turntable extending through the hole in the disc.

I—The Tone Control on the radio panel should, for most recordings, be in the TREBLE position.

J—Lift up the cutting end of the recorder arm at the same time turning in a clock-wise direction about 1 inch, to vertical or intermediate position and leave it in this position. See that the cutting needle is properly in place (See article "Recording Needles," page 5). The volume of the radio program will be reduced. Bring the volume up with the Radio Volume Control until the red indicator light, at left of Microphone Volume Control, just flashes on loud passages. Then back the volume down a *slight* amount so that the red indicator light does not flicker.

K—Push the Motor Switch to the ON position (Fig. 2) and allow the turntable to come up to full speed.

L—Grasp and rotate recorder arm towards turntable and *carefully* let it down with the needle point on the blank record about ¼ inch from the outside edge of the blank record.

M—Watch the volume indicator light as the recording is being made. It is not necessary to continuously adjust the position of the Radio Volume Control—merely make sure that the red light does not flicker. A slight flicker on very loud passages only will not be harmful.

N—The thread which forms at the cutting needle may be pushed gently toward the center with a soft brush while the record is being cut. Considerable care must be taken that the operator does not tangle this thread around the cutting needle or that he does not slow up the turntable by touching it with his hands, as either condition will cause poor recordings. After the recording is completed, remove the thread from the record.

O—The record can be cut until the cutting needle is about 1½ inches from the center of the record or until a short distance before the paper label is reached. Shortly before the needle reaches its final position, reduce the volume to zero with the Radio Volume Control (without turning the knob to the OFF position) and cut 3 to 5 blank grooves on the record. Then return the recorder arm to the rest position by lifting to an angle of about 50° (Fig. 1). Rotate it counterclockwise as far as it will go and then let it down gently on the post. Push the Motor Switch Knob to the OFF position.

2. TO MAKE A RECORD USING THE MICROPHONE

Voice or music that can be picked up by the microphone with sufficient volume can be recorded. Keep the room quiet, as all extraneous noises picked up by the microphone will be on the record.

A—Set indicator to Manual position.

B—Recorder arm in rest position—See Fig. 1.

C—Tone arm in rest position—See Fig. 1.

D—Microphone Volume Control in OFF position—See Fig. 2.

E—P.A.-Record Switch in RECORD position—See Fig. 2.

F—Phono-Radio Knob (On radio panel) in PHONO position.

G—Insert the plug on the end of the microphone cord in the microphone socket (Fig. 2) on the motor panel and push this plug all the way down.

H—Turn the radio On-Off Switch (On the radio panel) to the ON position.

I—Place a blank record disc on the turntable with the small pin in the turntable extending through the hole in the disc.

J—The Tone Control on the radio panel should, for most recordings, be in the TREBLE position.

K—Keep the microphone at least one yard away from the radio loudspeaker at all times. If the recording is to be speech, keep the lips about 6 inches (for cutting) away from the microphone. If the recording is to be music or other sound, place the microphone near the sound source, moving it closer or farther away as the volume requires.

L—Lift up the cutting end of the recorder arm, at the same time turning in a clockwise direction about 1 inch, to vertical or intermediate position and leave in this position. See that the cutting needle is properly in place (See article "Recording Needles," Page 5).

Turn the Microphone Volume Control past the point at which the speaker silencing switch is felt to operate. This switch is at about the halfway mark on the control. Speak or start the music or sound into the microphone.

After the Microphone Volume Control knob has been turned past the point at which the switch is thrown, the sound can no longer be heard through the radio speaker but the sound intensity will be shown by the red indicator light. Turn the Microphone Volume Control until the speech or sound picked up by the microphone causes the red indicator light to flicker. Then turn the Microphone Volume Control down slowly until the red light just disappears.

If in reducing the microphone volume, the knob is turned below the point at which the switch is felt to operate, the sound will again be heard through the radio speaker. The recording continues and no harm will result if the microphone is kept at least one yard from the radio speaker. If brought closer, a howl may occur.

M—Push the Motor Switch to the ON position (Fig. 2) and allow the turntable to come up to full speed.

N—Rotate the recorder arm and *carefully* let it down with the needle point on the blank record about ¼ inch from the outside edge of the blank record.

O—After 1 or 2 blank grooves have been cut in the record, start the speech, music, or sound into the microphone. Watch the volume indicator light as the recording is being made. It is not necessary to continuously adjust the position of the Microphone Volume Control—merely make sure that the red light does not flicker. A slight flicker on very loud passages only, will not be harmful.

P—Remove thread as explained in Article 1, Step N.

Q—The record can be cut until the cutting needle is about 1½ inches from the center of the record or until a short distance before the paper label is reached. Shortly before the needle reaches its final position, reduce the volume to zero with the Microphone Volume Control and cut 3 to 5 blank grooves on the record. Then return the recorder arm to the rest position by lifting to an angle of about 50° (Fig. 1). Rotate it counterclockwise as far as it will go and then let it down gently on the post. Push the Motor Switch to the OFF position.

3. TO PLAY BACK THE HOME RECORDING; TO PLAY ORDINARY PHONOGRAPH RECORDS

The record made in Articles 1 and 2 may be played back immediately.

Also, ordinary commercial records may be played in the following manner:

A—Recorder arm in rest position—See Fig. 1.

B—Turn Phono-Radio Knob on radio panel to PHONO position.

C—Push Motor Switch to ON position.

D—Lift tone arm and set arm down gently with needle in outside groove of record.

E—Adjust volume by means of Radio Volume Control to desired intensity.

F—Adjust tone by means of Radio Tone Control to desired quality.

G—Lift up tone arm at end of recording, set it in its rest position, and push Motor Switch to OFF position.

4. TO USE MICROPHONE AND RADIO AS A PUBLIC ADDRESS SYSTEM

A—Recorder arm in rest position—See Fig. 1.

B—Tone arm in rest position—See Fig. 1.

C—Microphone Volume Control in OFF position—See Fig 2.

D—P.A.-Record Switch in P.A. Position.

E—Phono-Radio Knob (On radio panel) in PHONO position.

F—Insert the plug on the end of the microphone cord in the microphone socket (Fig. 2) on the motor panel and push this plug all the way down.

G—Turn the Radio On-Off Switch (On the radio panel) to the ON position.

H—Turn the Microphone Volume Control to about the half-way mark. The speaker silencing switch at about the mid-point of the Microphone Volume Control is not effective when the recorder arm is in the rest position.

Keep the microphone at least one yard away from the radio speaker at all times. The lips should be about 2 inches (for public address) away from the microphone.

I—Speak into the microphone and adjust the volume by means of the Microphone Volume Control to the proper intensity. If this control is turned too high, a howl may result. Should this happen, turn down the microphone volume slightly, move the lips closer to the microphone, and move the microphone farther away from the radio speaker.

5. TO USE THE MICROPHONE FOR MAKING ANNOUNCEMENTS WHEN PLAYING THE RADIO OR PHONOGRAPH

Follow all the steps as given in Article 4 except that for radio reception the Phono-Radio Knob is in RADIO position.

Reduce the radio or phonograph volume by means of the Radio Volume Control when making an announcement.

6. TO USE THE MICROPHONE FOR SUPERIMPOSING AN ANNOUNCEMENT OR ACCOMPANYING THE PROGRAM WHEN MAKING A RECORD OF A RADIO PROGRAM

The microphone can be used for superimposing an announcement on the record at any time when making a record of a radio program.

A musical instrument or a singing voice may be used to accompany a radio program while recording it.

A—Instructions for cutting the record are given in Article 1. Be sure P.A.-Record Switch is in RECORD position.

B—Insert the plug on the end of the microphone cord in the microphone socket (Fig. 2) on the motor panel and push this plug all the way down.

C—Keep the microphone at least one yard away from the radio speaker at all times. The lips should be about 6 inches away from the microphone.

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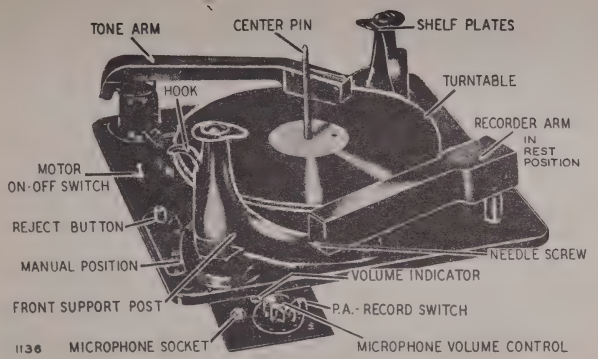

Fig. 2—Phonograph and Recorder Unit

D—If an announcement or title is to be inserted, reduce the volume of the radio program with the Radio Volume Control to any desired level, just before the announcement is to be made or the title is to be put in.

If a musical instrument or singing voice is to be used to accompany the radio program, the latter may be reduced with the Radio Volume Control or may be left at normal volume.

E—Turn the Microphone Volume Control up to just below the point at which the speaker silencing switch is felt to operate. This switch is at about the half-way mark on the control. (Continuing to turn this knob in a clockwise direction would throw the switch, and the sound could no longer be heard through the radio speaker but the recording would continue.

F—Speak, or start the sound into the microphone and observe the indicator light. To increase volume, speak louder and get closer to the microphone. To decrease volume, of course, reverse these procedures and turn down the Microphone Volume Control. Keep volume just below point at which red indicator light flickers.

G—When the announcement or accompaniment is completed, turn the Microphone Volume Control to the OFF position and if additional radio program recording is wanted, turn up the Radio Volume Control to just below the point at which the red indicator light flickers.

7. TO MAKE A RECORD FROM ANOTHER RECORD

WITH AN ELECTRIC RECORD PLAYER CONNECTED TO RADIO

If you have an electric record player, play the record to be copied on this record player.

Remove the phono-pickup plug from the back of radio chassis and insert plug from electric record player into phono socket. (See Fig. 4)

Follow all the instructions as given in Article 1, except that radio-phono switch on the radio should be in the PHONO position.

WITH A MICROPHONE AND SEPARATE ELECTRIC PHONOGRAPH

If you have a small phonograph of the electric type, play the record to be copied on this phonograph. Place the recorder microphone about 12 inches away, then proceed to make the new record in the usual manner with the microphone—See Article 2.

This method, however, will result in poorer reproductions than those obtained using an electric record player connected to the radio.

RECORDING TECHNIQUE

Making records has been likened to popular photography. It takes time to master the essentials of the art and learn how to do a real good job. The Federal Record-Maker has been so simplified that any one can start making satisfactory records right away, but to make the best, it is necessary to learn more of the technique of the art.

Follow the step-by-step instructions as given in this booklet, slowly and carefully.

ADDITIONAL INFORMATION

RECORDING NEEDLES

IMPORTANT—Use only long-shank recording needles.

Handle recording needles carefully. They are very sharp and can be easily damaged. Every precaution must be taken to protect the cutting point at all times; in cutting, the arm should be lowered *gently* on the blank with the turntable *running*.

Note that these needles have a long "flat" on one side of the shank. To install a recording needle, first loosen the needle screw—See Fig 2. Place the recording needle all the way in the hole on the underside of recorder arm, with the flat portion of the needle shank toward the needle screw. Tighten the needle screw firmly. If the needle is in backward or at a wrong angle, it will not cut properly, and will damage the record and the needle.

A recording needle is considered worn when the background hiss becomes objectionable or when the thread becomes ragged. In general, the ordinary steel recording needle will have a satisfactory life of from ½ to 1½ hours, depending upon the original quality of the needle and the type of blank used.

Important: After a recording needle has been used for a short time, it may become loose in the cutting head; it is good practice to retighten after each recording.

TIMING YOUR RECORDS

The following is the approximate maximum time for each record:

6" size...Each side 1½ min.
8" size...Each side 3 min.
10" size...Each side 4½ min.

For best results, you should rehearse your selection and time it for recording. This will permit you to space your selection nicely on the record and also insure against using up the record before your selection is finished. After your selection is finished, do not lift the needle at once but allow it to cut several extra grooves while you remain silent.

ADJUSTING THICKNESS OF THREAD (PRESSURE ADJUSTMENT)

The pressure on the cutting needle can be varied by the adjusting knob located inside the cutting arm, shown in **Fig. 3**. This pressure determines the thickness of the thread cut from the blank record.

All recorders are adjusted at the factory to cut grooves approximately .0015 inches deep. When cut at this depth, the thread will be approximately as thick as a human hair.

You can get a fairly good idea of the depth of the cut by examining the record with a magnifying glass. The width of the groove should be about equal to the space between grooves if the cutting needle is sharp and the cutting head is correctly adjusted.

The thickness of the thread is increased by rotating the pressure adjusting knob in a clockwise direction, while looking down on arm, See Fig. 3. Turning this counter-clockwise will decrease the thickness of the thread. Before making any pressure adjustment, be sure that a good cutting needle is used and that it is properly inserted.

ADJUSTING HEIGHT OF RECORDER ARM

In **Fig. 3** is shown the screw and locking nut for adjusting the height of the recorder arm above the turntable. This height is adjusted at the factory and ordinarily does not require readjustment.

To check for proper height, grasp the needle screw and lift it until the cartridge assembly is felt to touch the recorder arm. The needle point will then be approximately ⅛ inch above the record surface.

If, due to variations in recording needle length, the height must be adjusted, loosen the locking nut, adjust the screw to the proper height and retighten the nut.

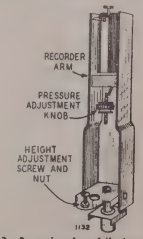

Fig. 3—Recorder Arm Adjustments

MAINTENANCE

The Federal Record Maker normally requires little attention. However, after a number of records have been cut the turntable should be removed and any cutting threads found wrapped around the shafts of the rubber drive wheel and turntable must be cleared away. Both the shaft for the turntable and rubber drive wheel should be lubricated occasionally, depending on amount of use, with a good machine oil.

CAUTION—Do not allow oil to come in contact with rubber surface of drive wheel.

REPLACEMENT PARTS LIST

MISCELLANEOUS

Part No.	Description
7A119	Neon Lamp for Red Volume Indicator
15X173	Red Celluloid Indicator
3A303	Tube Sockets—Octal (8 prong)
3A305	Microphone Socket—Single Pin Tip
3A308	Cutter Socket
3A172	P. A.—Record Switch
2A213	Record Cutter Changeover Switch
37X104	Trip Arm and Hub Assembly for Changeover Switch
38X141	Blue Collar on Changeover Switch
16A314	Knob for Microphone Volume Control

CONDENSERS

D65104	C1, C6	.10 mf.	400 Volt	Tubular
D66402	C2	.004 mf.	200 Volt	Tubular
D66204	C3, C5	.20 mf.	400 Volt	Tubular
45X287	C4A	10 mf.	450 Volt	Dry Electrolytic
	C4B	20 mf.	25 Volt	
D66303	C7	.05 mf.	400 Volt	Tubular

RESISTORS

B65255	R1	2 Megohm	0.5 Watt	Carbon
B63254	R2, R3	250,000 Ohm	0.5 Watt	Carbon
B64105	R4	1 Megohm	0.5 Watt	Carbon
B64505	R5	2 Megohm	0.5 Watt	Carbon
B64104	R6, R14	100,000 Ohm	0.5 Watt	Carbon
36X202	R7	2 Megohm	Microphone Volume Control and Switch	
B63503	R8	5,000 Ohm	0.5 Watt	Carbon
B65605	R9	50 Ohm	0.5 Watt	Carbon
D54402	R10	4,000 Ohm	2.0 Watt	Carbon
B54604	R11	400,000 Ohm	0.5 Watt	Carbon
B65104	R12	100,000 Ohm	0.5 Watt	Carbon
B64102	R13	1000 Ohm	0.5 Watt	Carbon

MICROPHONE AND CABLES

20A94	Recording Microphone Complete with Stand and Cable	
13X408	Recorder Cable Complete with Molded Octal Plug	
13X410	Pre-Amplifier Cable Complete with 2 Prong Plug	
13X404	Speaker Socket and Cable Assembly	

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MODEL Federal Recorder and Record Changer
WELLS-GARD. PAGE 14-17

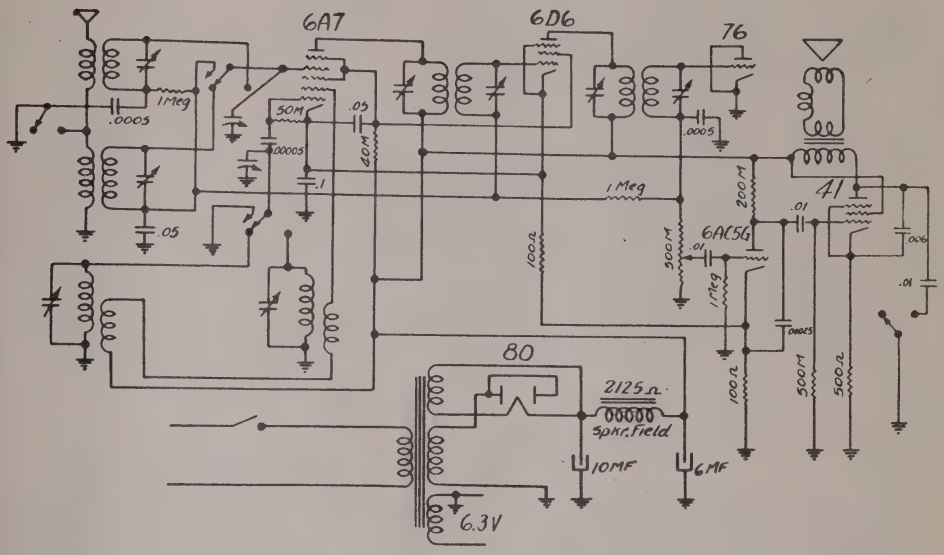
WESTERN AUTO SUPPLY CO.

MODEL D721 Early
MODEL D909

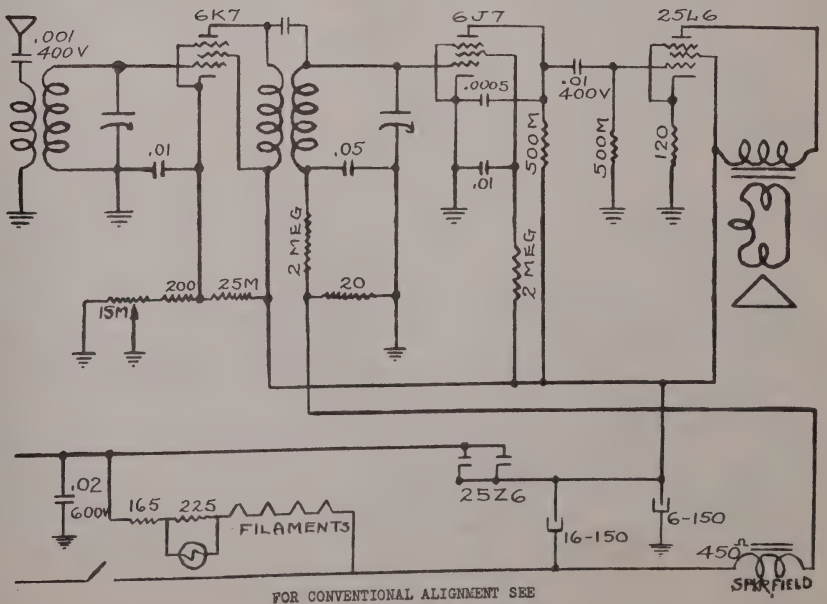
I.F. 456 K.C.

FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION OF VOLUME V111

MODEL D721



MODEL D909



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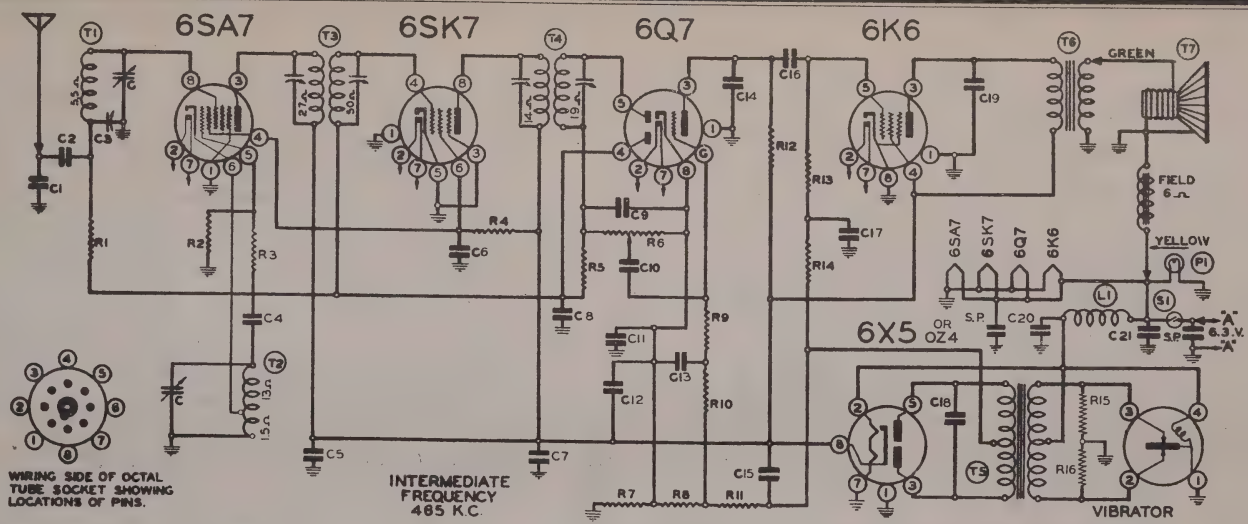

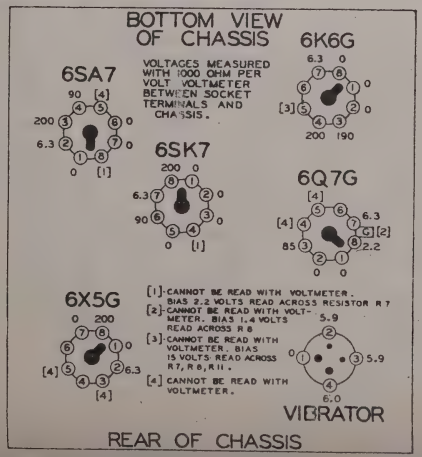

Code No.	Part No.	Description
		RESISTORS
R1	13011	250M ohm - ½ w. 20%
R2	130176	20M ohm - ½ w. 10%
R3	130272	10 ohm - ½ w. 10%
R4	130245	10M ohm - 1 w. 10%
R5	1304	3 megohm - ½ w. 20%
R6	101110	1 megohm volume control
R7	130174	50 ohm - ½ w. 10%
R8	130211	30 ohm - ½ w. 10%
R9	130209	2 megohm - ½ w. 20%
R10	130210	1 megohm - ½ w. 20%
R11	130212	250 ohm - 1 watt 10%
R12	13011	250M ohm - ½ w. 20%
R13	13011	250M ohm - ½ w. 20%
R14	13011	250M ohm - ½ w. 20%
R15	13060	100 ohm - ½ w. 10%
R16	13060	100 ohm - ½ w. 10%
		CONDENSERS
C	10269	2 gang variable condenser
C1	1293	.00002 Mica 20%
C2	10055	.01 x 400 v. 25%
C3	12434	Antenna Trimmer
C4	12912	.00025 Mica 20%
C5	1001	.1 x 400 v. 25%
C6	10020	.1 x 200 v. 25%
C7	1295	.0001 Mica

Code No.	Part No.	Description
C8	1009	.05 x 200 v. 25%
C9	1295	.0001 Mica 20%
C10	10078	.01 x 200 v. 25%
C11	10020	.1 x 200 v.
C12	11950	8 mfd. lytic
C13	10078	.01 x 200 v.
C14	1292	.0005 Mica
C15	11950	8 mfd. lytic
C16	10055	.01 x 400 v. 25%
C17	10019	.006 x 600 v.
C18	10034	.005 x 1200 v.
C19	10087	.01 x 600 v.
C20	10031	.5 x 120 v. + 50-10%
C21	10031	.5 x 120 v. + 50-10% C12 and C15 in same unit.
		PARTS
T1	11195B	Antenna coil complete
T2	110107	Oscillator coil complete
T3	108139	Input I. F. 465 kc. - complete
T4	108121	Output I. F. 465 kc. - complete
T5	104131	Power Transformer
T6	10567	Output Transformer
T7	114114	5" Dynamic Speaker
L1	10568	"A" Filter Choke
P1	10797	6.8 v. pilot light
S1		Off-on Switch on Volume Control
SP		Spark Plates

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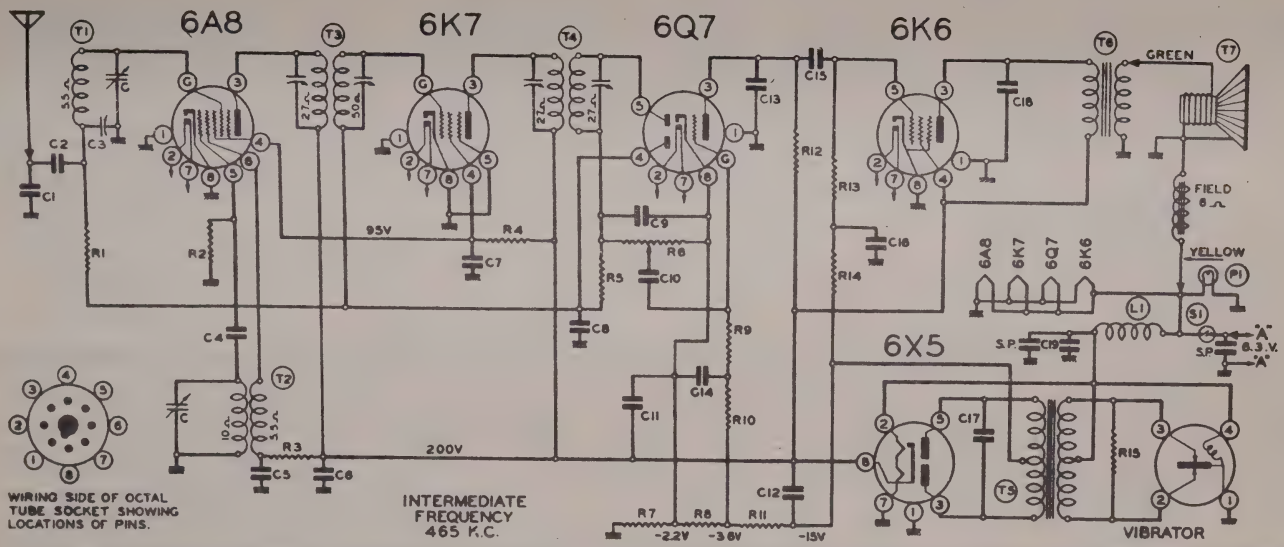
MODEL D746

2nd Production



Code No.	Part No.	Description
		RESISTORS
R1	130-186	250M ohm - 1/10 w. 20%
R2	130-117	50M ohm - 1/10 w. 20%
R3	130-164	30M ohm - ½ w. 20%
R4	130-213	25M ohm - 1 watt 10%
R5	130-126	3 megohm - 1/10 w. 20%
R6	101-110	1 megohm volume control
R7	130-174	50 ohm - ⅓ w. 10%
R8	130-211	30 ohm - ⅓ w. 10%
R9	130-209	2 megohm - ½ w. 20%
R10	130-210	1 megohm - ½ w. 20%
R11	130-212	250 ohm - 1 watt 10%
R12	130-186	250M ohm - 1/10 w. 20%
R13	130-186	250M ohm - 1/10 w. 20%
R14	130-186	250M ohm - 1/10 w. 20%
R15	130-84	200 ohm - ½ w. 20%

		CONDENSERS
C	102-69	2 gang variable condenser
C1	129-3	.00002 Mica 20%
C2	100-55	.01 x 400 v. 25%
C3	124-34	Antenna Trimmer
C4	129-12	.00025 Mica 20%
C5	100-20	.1 x 200 v. 25%
C6	100-85	.05 x 400 v. 25%
C7	100-20	.1 x 200 v. 25%
C8	100-9	.05 x 200 v. 25%
C9	129-5	.0001 Mica 20%
C10	100-78	.01 x 200 v. 25%
C11	119-50	8. mfd. lytic
C12	119-50	8. mfd. lytic
C13	129-2	.0005 Mica 20%
C14	100-78	.01 x 200 v. 25%
C15	100-55	.01 x 400 v. 25%
C16	100-19	.006 x 600 v. 25%
C17	100-34	.005 x 1200 v. 10%
C18	100-87	.01 x 600 v. 25%
C19	100-31	.5 x 120 v. 50-10% C11 and C12 in same unit
		PARTS
T1	111-95	Antenna coil complete
T2	110-76	Oscillator coil complete
T3	108-96D	Input I.F. 465 kc. - complete
T4	108-95C	Output I.F. 465 kc. - complete
T5	104-131	Power Transformer
T6	105-67	Output Transformer
T7	114-114	5" Dynamic Speaker
L1	105-19	"A" Filter Choke
P1	107-97	6.8 v. pilot light
S1		Off-on Switch on Volume Control
SP		Spark Plates

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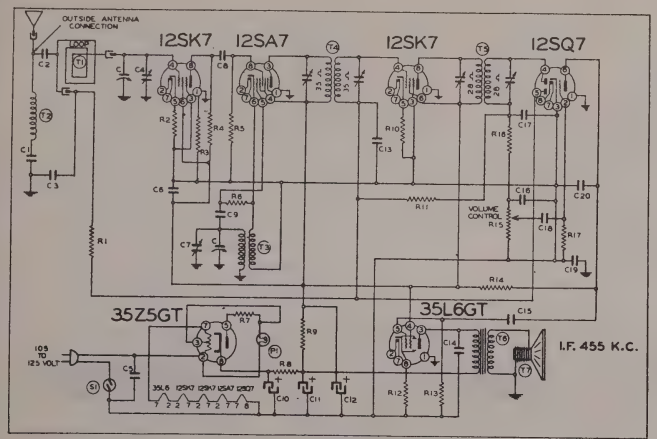
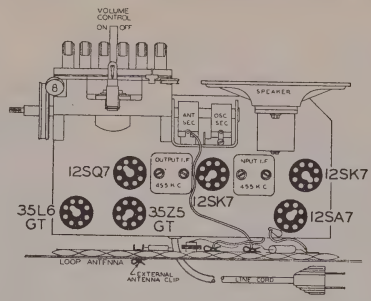
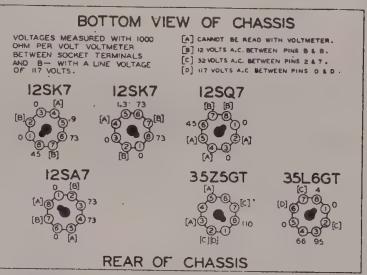




BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B— WITH A LINE VOLTAGE OF 117 VOLTS.

[A] CANNOT BE READ WITH VOLTMETER.
[B] 12 VOLTS A.C. BETWEEN PINS 5 & 8.
[C] 32 VOLTS A.C. BETWEEN PINS 2 & 7.
[D] 117 VOLTS A.C. BETWEEN PINS 5 & 8.



REAR OF CHASSIS

R1	130100	150M ohms—½ w.	
R2	130168	100 ohms—½ w.	
R3	130100	150M ohms—½ w.	
R4	130218	5M ohms—½ w.	
R5	13020	100M ohms—½ w.	
R6	13094	50M ohms—½ w.	
R7	130215	25 ohms—½ w.	
R8	130296	200 ohms—1 watt	
R9	130297	1200 ohms—1 watt	
R10	130166	150 ohm—½ w.	
R11	1304	3 megohm—½ w.	
R12	130166	150 ohm—½ w.	
R13	1303	500M ohm—½ w.	
R14	1309	200M ohm—½ w.	
R15	101211	1 megohm—volume control and switch	
R16	13012	50M ohm—½ w.	
R17	130257	5 megohm—½ w.	
C	102116	Two gang variable condenser	
C1	10011	.01 x 400 v.	
C2	129132	.000125 mica	
C3	10026	.02 x 400 v.	
C4		B.C. Antenna Trimmer	
C5	1001	.1 x 400 v.	
C6	1006	.25 x 200 v.	
C7		B.C. Oscillator Trimmer	
C8	1295	.0001 mica	
C9	1295	.0001 mica	
C10	11994	40 ufd.—150 w.v. lytic	
C11	11994	20 ufd.—150 w.v. lytic	
C12	11994	20 ufd.—150 w.v. lytic	
C13	1009	.05 x 200 w.	
C14	10026	.02 x 400 v.	
C15	100106	.004 x 600 v.	
C16	12939	.00005 mica	
C17	1295	.0001 mica	
C18	10025	.002 x 600 v.	
C19	100110	.2 x 400 v.	
C20	1295	.0001 mica	

C10, C11, C12 are in same unit

ALIGNMENT PROCEDURE

IMPORTANT:—See alignment instructions

- Volume control—Maximum all adjustments.
- Connect *B* - of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mfd.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Four Trimmers on Top	Output and Input I.F.	Adjust to maximum output
BROAD-CAST BAND	1650 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Trimmer bottom of rear section of gang. (See bottom of radio)	Broadcast Oscillator	Adjust to maximum output
	1400 Kc.	See Note "A"		Set dial at 1400 Kc.	Trimmer bottom of front section of gang. (See bottom of radio)	Broadcast Antenna	Adjust to maximum output

NOTE "A" Lay the output lead from the generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the generator.

FREQUENCY RANGE
530 to 1650 K.C.

Power Consumption.....35 Watts
Power Output.....1 Watt Undistorted, 1.7 Watts Maximum
Intermediate Frequency.....455 K.C.

ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltage, defective tubes, condensers and resistors. In order to properly align this radio, the chassis should be removed from the cabinet.

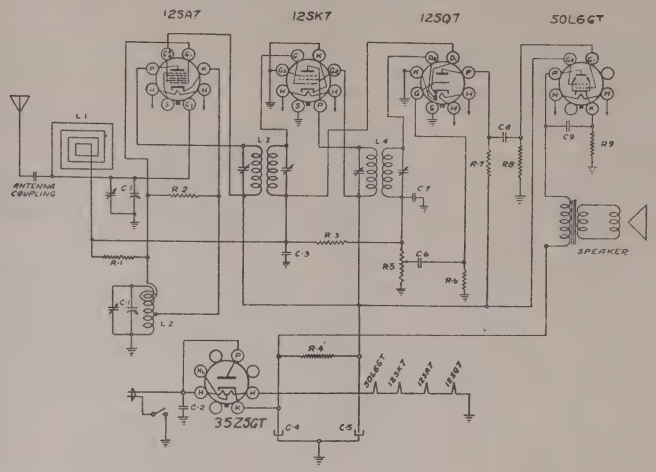
It is important during alignment that the same distance between the loop antenna and the chassis be maintained as when the chassis is installed in the cabinet.

Slight adjustments to the oscillator and antenna circuits can be made without removing the chassis from the cabinet through two holes which are provided on the bottom of the cabinet.

The two adjustments on the variable gang condenser can be reached with a long insulated type screw driver through these two holes.

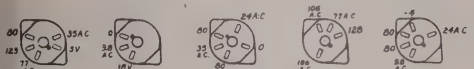
MODELS D1109, D2106

WESTERN AUTO SUPPLY CO.

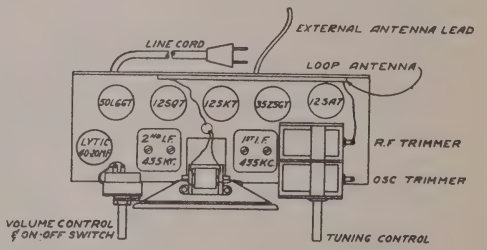


BOTTOM VIEW OF CHASSIS

VOLTAGES MARKED AT SOCKET TERMINALS ARE MEASURED WITH 1000 OHM PER VOLT METER ON 11 VOLT LINE WITH NO SIGNAL (ANTENNA LEAD SHORTED TO CHASSIS)



REAR OF CHASSIS



GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TRIMMERS TO TUNE	REMARKS
IF 455 KC	12SA7 GRID	.1 mfd.	H. F. End	IF Transformers	Tune to
1620 KC	Antenna	200 mmf.	H. F. End	4 Trimmers	Max.
1400 KC	"	"	1400	Oscillator	Set Limit
				Trimmer	Of Band
				Antenna	Tune to
				Trimmer	Max.

Repeat above Alignment Procedure at least once more.

PARTS LIST AND PRICES

Part No.	Circuit Diagram Reference	Description	List Price Each
9019		Book—Instruction	$0.20
9003		Cabinet	2.50
2163		Cable—Drive	.10
8013	L2	Coil—Oscillator	.80
9007	L1	Coil—Loop Antenna Assembly with Back	1.25
9008	R5	Control—Volume and Switch	1.00
9009	C1	Condenser—Variable	2.00
8948	C4, C5	Condenser—Elect. 40 mfd—20 mfd. 150V	1.00
824	C6	Condenser—Paper .002 mfd.—600V	.20
563	C2	Condenser—Paper .05 mfd.—400 V	.20
576	C8, C9	Condenser—Paper .02 mfd—400V	.20
580	C3	Condenser—Paper .05 mfd.—200V	.20
1286	C7	Condenser—Mica 250 mmf	.20
8036		Cord—AC Line	.25
9020		Crystal—Dial	.20
9005		Indicator	.25
9021		Knob	.15
9024		Pointer	.20
8039	R1, R6	Resistor ½ W—15 Meg.	.15
6997	R3	Resistor ½ W—2 Meg.	.15
8060	R7, R8	Resistor ½ W—500 M	.15
8061	R2	Resistor ½ W—20 M	.15
8326	R9	Resistor ½ W—150 M	.20
8393	R4	Resistor—1 W—2 M	.20
2908		Spring—Pointer Drive	.10
9015	L3	Transformer 1st I.F.	1.75
9016	L4	Transformer 2nd I.F.	1.75
9017		Speaker—4" P. M.	2.50
9018		Carton	.60

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

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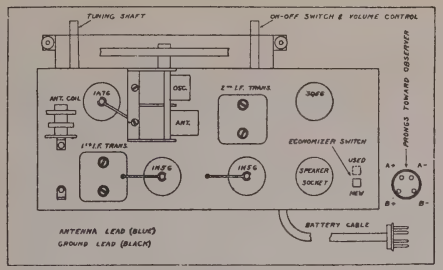


Fig. 1—Top View

VOLTAGE CHART

All voltages measured with a 1,000 ohm per volt meter on 150 volt scale. For the following voltages the "B" battery section of the power pack should read 94½ volts under load.

1A7 TUBE	Volts
Plate—P—to ground	86½
Screen—G3 & G5—to ground	31
Grid—G1—to ground	—3
Grid—G2—to ground	86½

1N5G	
Plate—P—to ground	86½
Screen—G2—to ground	86½

1H5G	
Plate—P—to ground	24

3Q5G	
Plate—P—to ground	84
Screen—G2—to ground	86½
Grid—G—to ground	—21½

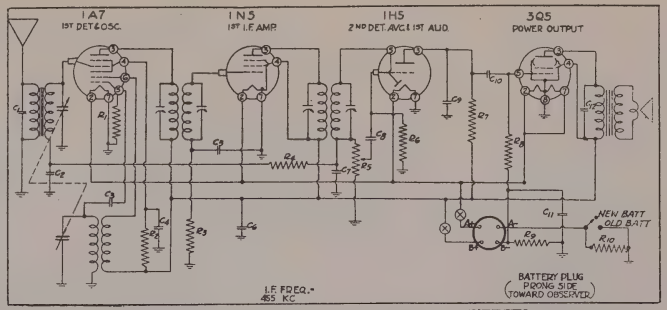
Speaker (Part No. P4919) 5" PM Type.

D.C. voice coil resistance.....3.1 ohms
Voice coil impedance at 400 cycles.....3.5 ohms

Antenna Coil (Part No. G-5724).

Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, AVC; No. 2, grid; No. 3, Ant.; No. 4, ground. No. 4 is grounded to the mounting bracket.

Primary—No. 3 and No. 4—Resistance 24.6 ohms.
Secondary—No. 1 and No. 2—Resistance 2.2 ohms
A gimmik coil of 5.5 mmfd. connects to terminals No. 2 and No. 3.



RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts	No.
R1	200,000	½	R6	5 Meg.	¼	C1
R2	30,000	½	R7	1 Meg.	¼	C2
R3	5 Meg.	½	R8	1 Meg.	¼	C3
R4	1 Meg.	¼	R9	440 10%	¼	C4
R5	500,000	V.C.	R10		½	C5
						C6

CONDENSERS

Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
.00005	Mica	C7	.00025	Mica
.05	200	C8	.01	400
.00005	Mica	C9	.00025	Mica
.1	200	C10	.01	400
.002	400	C11	20 (Elect.)	25
.1	200	C12	.005	400

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 KC.	.1 MFD.	Grid of 1N5G tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I.F.	Adjust to maximum output
	455 KC.	.1 MFD.	Grid of 1A7G tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I.F.	Adjust to maximum output
BROADCAST	1730 KC.	200 mmf.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Top of front section of gang (See Fig. 1)	Oscillator	Adjust to maximum output
	1400 KC.	200 mmf.	Antenna lead	Set dial at 1400 KC.	Trimmer—Top of rear section of gang (See Fig. 1)	Antenna	Adjust to maximum output

This is all that is necessary for the alignment unless the plates of the gang have been bent out of shape. In case of bent plates, set the signal generator and receiver to 600KC and bend the plates into the position for maximum output.

Attenuate the signal from the signal generator to prevent the leveling off-action of the AVC. After each band is completed, repeat the procedure as a final check.

Frequency Range
535 to 1730 K.C.
Power output .27 watt undistorted—.35 watt maximum
Intermediate Frequency 455 K.C.

Oscillator Coil (Part No. 2412) (Red Dot).

Looking at the connection end (with dot) starting at the chassis in a clockwise direction the terminals are: No 1, grid; No. 2, plate; No. 3, B+; No. 4, ground.

Primary—No. 2 and No. 3—Resistance 2.2 ohms.
Secondary—No. 4 and No. 1—Resistance 5.3 ohms

First I.F. Transformer (Part No. P3048)

Primary—Blue white, plate; red white B+—Resistance 12.1 ohms.
Secondary—White, grid; black white, AVC—Resistance 24.9 ohms.

Second I.F. Transformer (Part No. P2606)

Primary—Blue white, plate: red white B+—Resistance 15.1 ohms.
Secondary—White, grid; black white, AVC—Resistance 11.8 ohms.

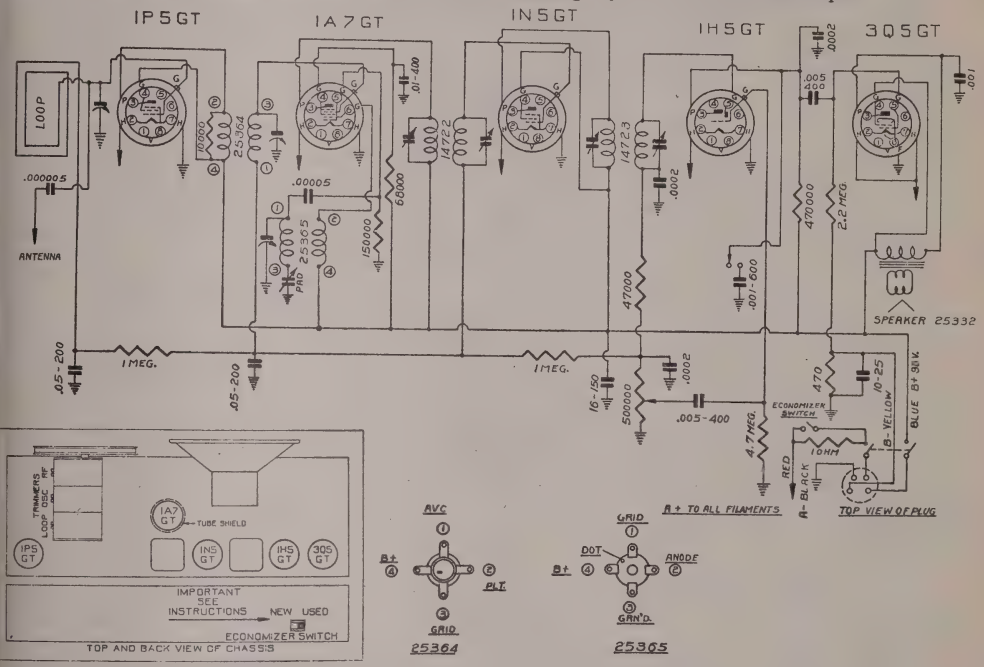
MODELS D1126, D1144

MODELS D1125, D2121

WESTERN AUTO SUPPLY CO.

ALIGNMENT DATA
MODELS D-1125 and D-2121

To properly align, first align the I. F. transformers in the conventional manner applying a test oscillator adjusted to 456 kc through a .1 MFD condenser to the grid of 1A7 with tuning condenser at minimum capacity. For the balance of alignments it is advisable to remove chassis from cabinet and suspend the loop above the chassis by means of a cord maintaining same relative position it would normally occupy in the cabinet. The test oscillator is coupled very loosely to the loop, one means is to drape the lead from oscillator over the loop so that it is near the loop winding but not necessarily touching. The trimmer of oscillator (center section) is then adjusted to 1650 kc with the plates completely out of mesh. The antenna and R. F. sections are trimmed at 1500 kc. The padder is adjusted to 600 kc. The tuning condenser is rocked while the padder is being adjusted for maximum output.



ALIGNMENT CHART FOR MODELS D1126 D1144

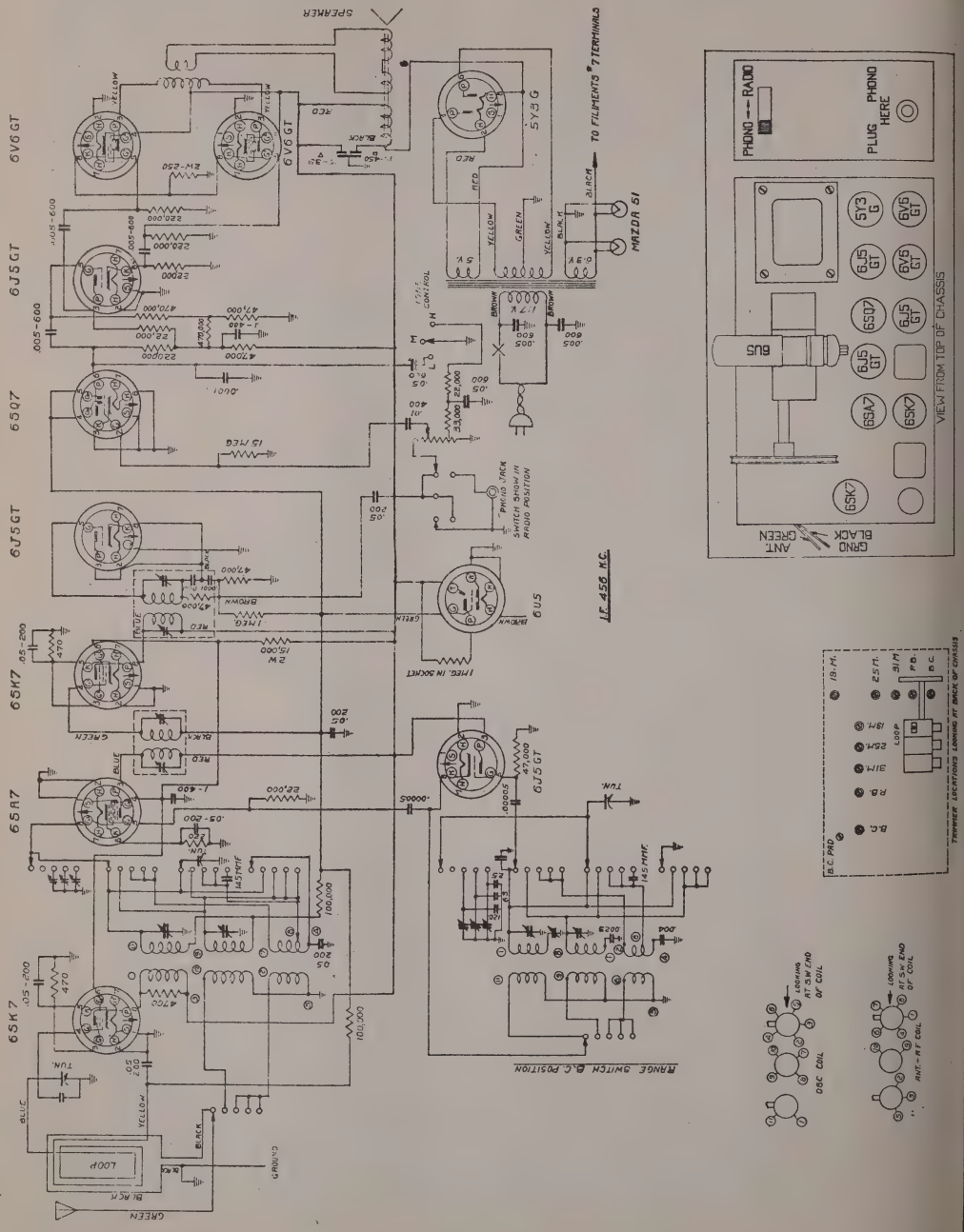
Generator	Connection at Radio	Dummy Antenna	Range Switch	Dial	Trimmers to Tune	Sensitivity	Remarks
I. F. 456 K.C.	Center Stator of Variable	.1 MFD.	A	H. F. End	I. F. Transformers	65—70MV.	Tune to Max.
B. C. 1725 K.C.	Antenna	200 MMF.	A	H. F. Limit of Travel	B. C. Oscillator		Set Band Limit
1400 K.C.	Antenna	200 MMF.	A	1400	B. C. R. F. and Loop	3-5 MV.	See Note A
600 K.C.	Antenna	200 MMF.	A	Rock Rotor	Padder	3-5 MV.	
P.B. 6.0 M.C.	Antenna	400 Ohm	B	6.0 M.C.	P. B. Osc. P. B. Ant.	25 MV.	See Note B
2.2 M. C.	Antenna	400 Ohm	B	2.2 M. C.	Check	40 MV.	See Note B
31M. 9.6 M.C.	Antenna	400 Ohm	C	9.6 M. C.	31M. Ant. 31M. Osc.	25 MV.	See Note B
25M. 11.6 M.C.	Antenna	400 Ohm	D	11.6 M. C.	25M. Ant. 25M. Osc.	30 MV.	See Note B
19M. 15.2 M.C.	Antenna	400 Ohm	E	15.2 M. C.	19M Ant. 19M. Osc.	40 MV.	See Note B

Note "A" — If the pointer is not at 1400 KC with a 1400 KC signal it may be loosened from the dial cord and moved to correct the calibration. This should be checked across the band to arrive at the optimum condition.

Note "B" — Care should be taken not to align on the image frequency. This may be checked by rotating the dial of the signal generator. Another signal should be heard at dial frequency plus 912 KC. This signal should be checked carefully on all short wave bands, making sure the lowest frequency signal agrees with the dial setting in frequency and that it is the strongest of the two.

MODELS D1126,
D1144

WESTERN AUTO SUPPLY CO.



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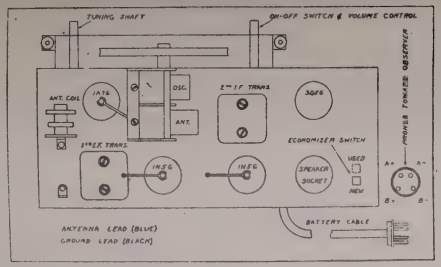


Fig. 1—Top View

VOLTAGE CHART

All voltages measured with a 1,000 ohm per volt meter on 150 volt scale. For the following voltages the "B" battery section of the power pack should read 94½ volts under load.

1A7 TUBE	Volts
Plate—P—to ground	86½
Screen—G3 & G5—to ground	31
Grid—G1—to ground	—3
Grid—G2—to ground	86½
1N5G	
Plate—P—to ground	86½
Screen—G2—to ground	86½
1H5G	
Plate—P—to ground	24
3Q5G	
Plate—P—to ground	84
Screen—G2—to ground	86½
Grid—G—to ground	—2½

Speaker (Part No. P4572) 6" PM Type.

D.C. voice coil resistance ..... 7.3 ohms
Voice coil impedance at 400 cycles ..... 8.0 ohms

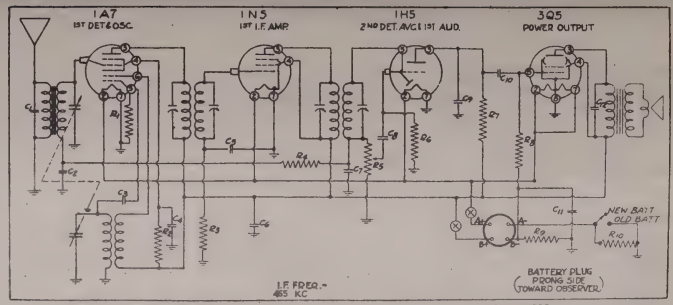
Antenna Coil (Part No. G-5724).

Looking at the connection end starting at the chassis in a clockwise direction the terminals are: No. 1, AVC; No. 2, grid; No. 3, Ant.; No. 4, ground. No. 4 is grounded to the mounting bracket.

Primary—No. 3 and No. 4—Resistance 24.6 ohms

Secondary—No. 1 and No. 2—Resistance 2.2 ohms

A gimmik coil of 5.5 mmfd. connects to terminals No. 2 and No. 3.



RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	200,000	½	R6	5 Meg.	½
R2	80,000	½	R7	1 Meg.	½
R3	5 Meg.	½	R9	1 Meg.	½
R4	1 Meg.	½	R8	440 10%	½
R5	500,000	V.C.	R10	¾	½

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.00005	Mica	C7	.00025	Mica
C2	.05	200	C8	.01	400
C3	.00005	Mica	C9	.00025	Mica
C4	.1	200	C10	.01	400
C5	.002	400	C11	20 (Elect.)	25
C6	.1	200	C12	.005	400

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 KC.	.1 MFD.	Grid of 1N5G tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I.F.	Adjust to maximum output
	455 KC.	.1 MFD.	Grid of 1A7G tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I.F.	Adjust to maximum output
BROAD-CAST	1730 KC.	200 mmf.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Top of front section of gang (See Fig. 1)	Oscillator	Adjust to maximum output
	1400 KC.	200 mmf.	Antenna lead	Set dial at 1400 KC.	Trimmer—Top of rear section of gang (See Fig. 1)	Antenna	Adjust to maximum output

This is all that is necessary for the alignment unless the plates of the gang have been bent out of shape. In case of bent plates, set the signal generator and receiver to 600KC and bend the plates into the position for maximum output.

Attenuate the signal from the signal generator to prevent the leveling off-action of the AVC. After each band is completed, repeat the procedure as a final check.

Frequency Range

535 to 1730 K.C

Power output .27 watt undistorted—.35 watt maximum

Intermediate Frequency 455 K.C.

Oscillator Coil (Part No. 2412) (Red Dot).

Looking at the connection end (with dot) starting at the chassis in a clockwise direction the terminals are: No. 1, grid; No. 2, plate; No. 3, B+; No. 4, ground.

Primary—No. 2 and No. 3—Resistance 2.2 ohms.

Secondary—No. 4 and No. 1—Resistance 5.3 ohms

First I.F. Transformer (Part No. P3048)

Primary—Blue white, plate; red white B+—Resistance 12.1 ohms.

Secondary—White, grid; black white, AVC—Resistance 24.9 ohms.

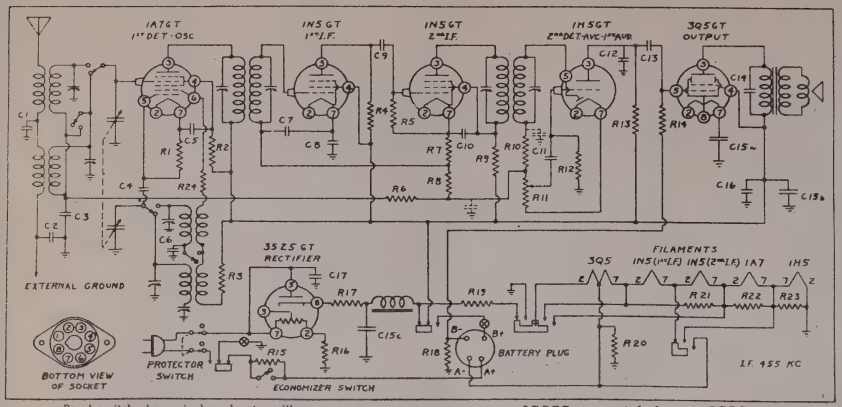
Second I.F. Transformer (Part No. P2606)

Primary—Blue white, plate; red white B+—Resistance 15.1 ohms.

Secondary—White, grid; black white, AVC—Resistance 11.8 ohms.

MODELS D1136, D1169

WESTERN AUTO SUPPLY CO.



Band switch shown in broadcast position.

AC-DC-Battery switch shown in AC-DC position.

RESISTORS

No.	Ohms	Watts
R1	200,000	½
R2	50,000	½
R3	150	½
R4	20,000	½
R5	1,000,000	½
R6	2,000,000	½
R7	5,000,000	½
R8	5,000,000	½
R9	5,000	½
R10	70,000	½
R11	1,000,000	V.C.
R12	10,000,000	½
R13	1,000,000	½
R14	2,000,000	½
R15	0.5	½
R16	550	15
R17	30	½
R18	500	½
R19	1,950	5
R20	3,000	½
R21	500	½
R22	200	½
R23	110	½
R24	100	½

CONDENSERS

No.	Capacity (Mfd.)	Volts
C1	.0001	Mica
C2	.01	400
C3	.05	200
C4	.0001	Mica
C5	.01	400
C6	.004	Mica
C7	.01	400
C8	.25	200
C9	.0001	Mica
C10	.01	400
C11	.01	400
C12	.0001	Mica
C13	.01	400
C14	.002	800
C15a	40.	25
C15b	30.	150
C15c	30.	150
C16	.05	400
C17	.05	400

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 KC.	.1 Mfd.	Grid of 1N5GT I.F. tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	455 KC.	.1 Mfd.	Grid of 1A7GT tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
SHORT WAVE	18,100 KC.	400 ohms	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Upper left, front of chassis	Short Wave Oscillator	Adjust to receive signal
	16,100 KC.	400 ohms	Antenna lead	Tune Signal	Trimmer—Center, front of chassis	Short Wave Antenna	Adjust to maximum output
BROAD-CAST	1730 KC.	200 Mmf.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Lower left, front of chassis	Broadcast Oscillator	Adjust to maximum output
	1400 KC.	200 Mmf.	Antenna lead	Set dial at 1400 KC.	Trimmer—Right, front of chassis	Broadcast Antenna	Adjust to maximum output
	600 KC.	200 Mmf.	Antenna lead	Set dial at 600 KC.	Trimmer—Top of chassis (See Fig. 1)	Oscillator Series Pad	Adjust to maximum rock dial See Note 'A'

When removing the chassis it is first necessary to remove the "Protector Switch" located on the left side of the cabinet. When checking the chassis on AC or DC it is necessary to insert a piece of metal, similar to the one on the cardboard back, into the "Protector Switch" to close the line circuit.

Speaker (Part No. P5001) 8" PM Type.

D.C. voice coil resistance.....5.3 ohms
Voice coil impedance at 400 cycles.....6.0 ohms

B.C. and S.W. Oscillator Coil (Part No. P-4566)

In a clockwise direction starting at the mounting lug on same side as single lug on other end, the connections are: No. 1, plate; No. 2, grid; No. 3, S.W. pad; No. 4, B.C. pad; No. 5, grid, No. 6, switch; other end, No. 7, B+.

S.W. Primary—No. 1 and No. 6—Resistance..... .8 ohm
B.C. Primary—No. 7 and No. 6—Resistance..... 3.8 ohms
S.W. Secondary—No. 2 and No. 3—Resistance..... .05 ohm
B.C. Secondary—No. 5 and No. 4—Resistance..... 4.5 ohms

First I.F. Transformer (Part No. P-4569)
Primary—Blue white, plate; red white B+—Resistance 12.1 ohms.
Secondary—White, grid; black white, AVC—Resistance 24.9 ohms.

Second I.F. Transformer (Part No. P-4420)
Primary—Blue white, plate; red white B+—Resistance 15.1 ohms.
Secondary—White, grid; black white, AVC—Resistance 11.8 ohms.

B.C. and S.W. Antenna Coil (Part No. P4582)

Starting with the lug that is connected to ground lead in a clockwise direction, the terminals are: No. 1, ground; No. 2, cond.; No. 3, pad; No. 4, grid; No. 5, grid; No. 6, ant.

S.W. Primary—No. 6 and No. 2—Resistance..... .35 ohm
B.C. Primary—No. 1 and No. 2—Resistance.....24.1 ohms
S.W. Secondary—No. 3 and No. 4—Resistance..... .07 ohm
B.C. Secondary—No. 3 and No. 5—Resistance..... 2.9 ohms

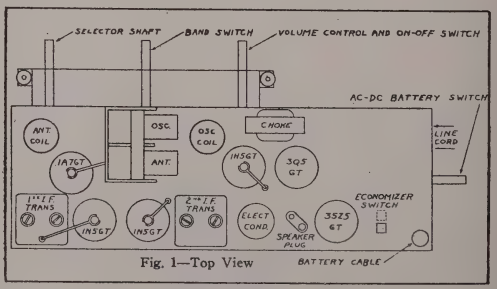


Fig. 1—Top View

VOLTAGE CHART

1A7GT TUBE

	Volts
Plate (3) to ground	98
Screen (4) to ground	60
Grid (6) to ground	99

1N5GT (1st I.F.) TUBE

Plate (3) to ground	76
Screen (4) to ground	100

1N5GT (2nd I.F.) TUBE

Plate (3) to ground	91
Screen (4) to ground	93

3Q5GT TUBE

Plate (3) to ground	97
Screen (4) to ground	100

35Z5GT TUBE

Plate (5) to ground	117 (AC)
Cathode (8) to ground	120

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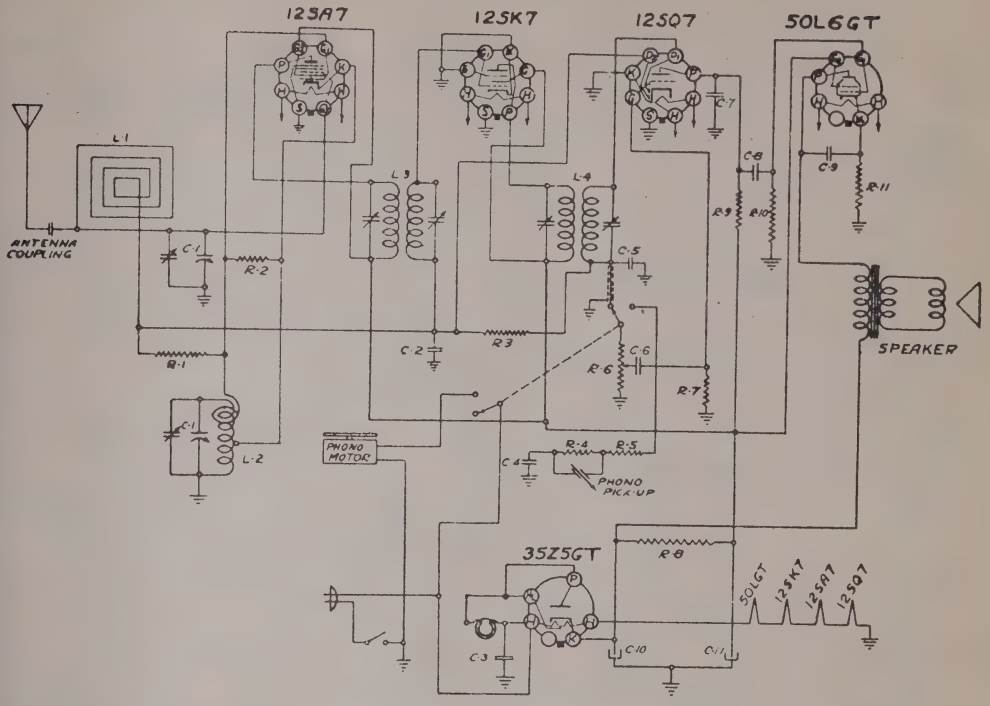
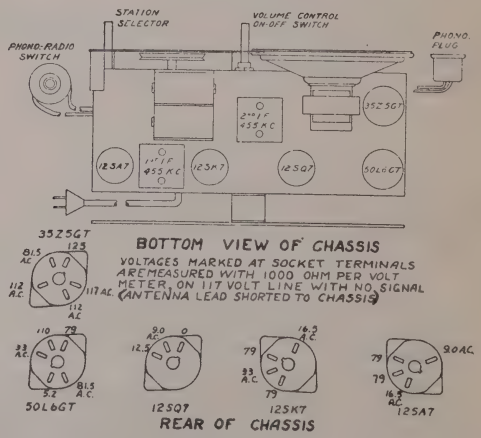
MODELS D1170, D2142

WESTERN AUTO SUPPLY CO.



PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Part No.	Circuit Diagram Reference	Description	List Price Each
9032	L-1	Coil-Loop Antenna Assembly	1.00
8031	L-2	Coil-Oscillator	.80
9051	R-6	Control-Volume and Switch	1.00
9033	C-1	Condenser-Variable	2.00
8525	C10, C11	Condenser-Elect. - 40 mf. - 20 mf. - 150V.	1.00
824	C-6	Condenser-Paper .002 mfd.—600V.	.20
563	C-3	Condenser-Paper .05 mfd. —400V.	.20
576	C-8 C-9	Condenser-Paper .02 mfd.—400V.	.20
580	C-2	Condenser-Paper .05 mfd.—200V.	.20
572	C-4	Condenser-Paper .1 mfd.—200V.	.20
1286	C-5, C-7	Condenser-Mica 250 mmf.	.20
8039	R-1, R-7	Resistor 1/3 W-15 Meg.	.15
8062	R-3	Resistor 1/3 W-3 Meg.	.15
6722	R-9, R-10	Resistor 1/3 W-½ Meg.	.15
7121	R12	Resistor 1/3 W-20M.	.15
8393	R-8	Resistor 1 W-2 M.	.20
7326	R-11	Resistor ½ W-150 ohm	.15
6721	R-4, R-5	Resistor 1/3 W-200 M.	.15



GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TRIMMERS TO TUNE	REMARKS
IF 455 KC	12SA7 GRID	.1 mfd.	H. F. End	IF Transformers 4 Trimmers	Tune to Max.
1620 KC	Antenna	200 mmf.	H. F. End	Oscillator Trimmer	Set Limit Of Band
1400 KC	"	"	1400	Antenna Trimmer	Tune to Max.

Repeat above Alignment Procedure at least once more.

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VOLTAGE CHART

All voltages measured with a 1,000 ohm per volt meter on the 150 volt scale. Line voltage 117 volts A.C. Volume control maximum and no signal tuned in. Power consumption 30 watts, radio only, with changer 48 watts.

	Volts
12SA7 TUBE	
Plate (3) to ground	93
Screen (4) to ground	95
12SK7 TUBE	
Plate (8) to ground	93
Screen (6) to ground	95
50L6 TUBE	
Plate (3) to ground	118
Screen (4) to ground	95
Cathode (8) to ground	5.5
35Z5 TUBE	
Filament (8) to ground	122

Speaker (Part No. P4792) 5" PM Type.
D.C. voice coil resistance.....3.5 ohms

Voice coil impedance at 400 cycles.....3.8 ohms

Oscillator Coil (Part No. P4780)
Looking at the connection end in a clockwise direction starting at the chassis the terminals are No. 1, end of winding; No. 2, start of winding; No. 3, tap.

No. 2 and No. 1—Resistance 4.9 ohms.

No. 3 and No. 1—Resistance 4.3 ohms.

First I.F. Transformer (Part No. P3923)
Primary—Blue, plate; red, B+ Resistance.....20.4 ohms

Secondary—White, grid; Black. AVC Resistance.....20.3 ohms

Second I.F. Transformer (Part No. P3924)
Primary—Blue, plate; red B+ Resistance.....22.2 ohms

Secondary—White, diode; black; AVC Resistance.....22.1 ohms

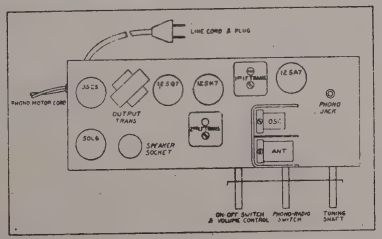
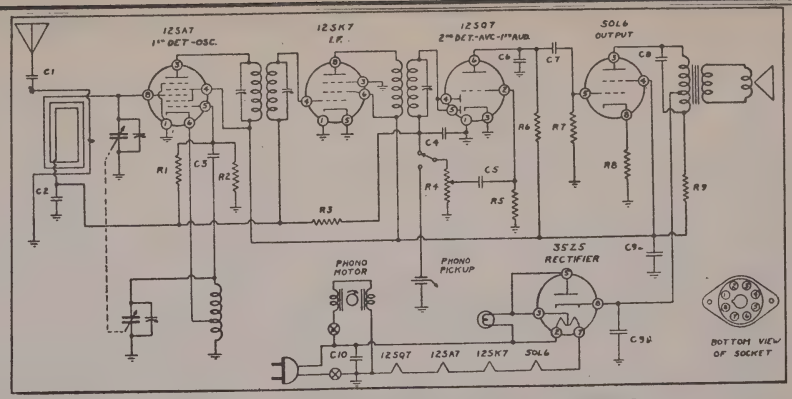


Fig. 1—Top View

FOR RADIO PRODUCTS RC-50 RECORD CHANGER - SEE RIDER'S BOOK, "AUTOMATIC RECORD CHANGERS AND RECORDERS"



RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	10,000,000	¼	R6	250,000	¼
R2	25,000	¼	R7	500,000	¼
R3	2,000,000	¼	R8	150—10%	¼
R4	500,000	V.C.	R9	1,000	½
R5	5,000,000	¼			

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.001	800	C7	.01	400
C2	.05	200	C8	.02	400
C3	.00005	Mica	C9a	50. Elec.	150
C4	.00025	Mica	C9b	30. Elec.	150
C5	.005	600	C10	.05	400
C6	.0005	Mica			

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mfd., 200 mmf.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 KC.	.1 Mfd.	Grid of 12SK7 I.F. tube	Rotor full open (Plates out of mesh)	One trimmer on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	455 KC.	.1 Mfd.	Grid of 12SA7 tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
BROAD-CAST	1,630 KC.	200 Mmf.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Top of gang	Oscillator	Adjust to maximum output
	1,400 KC.	200 Mmf.	Antenna lead	Set dial at 1400 KC.	Trimmer—Top of gang	Broadcast Antenna	Adjust to maximum output

Frequency Range—535 to 1630 K.C.

Attenuate the signal from the signal generator to prevent the leveling-off action of the A.V.C.

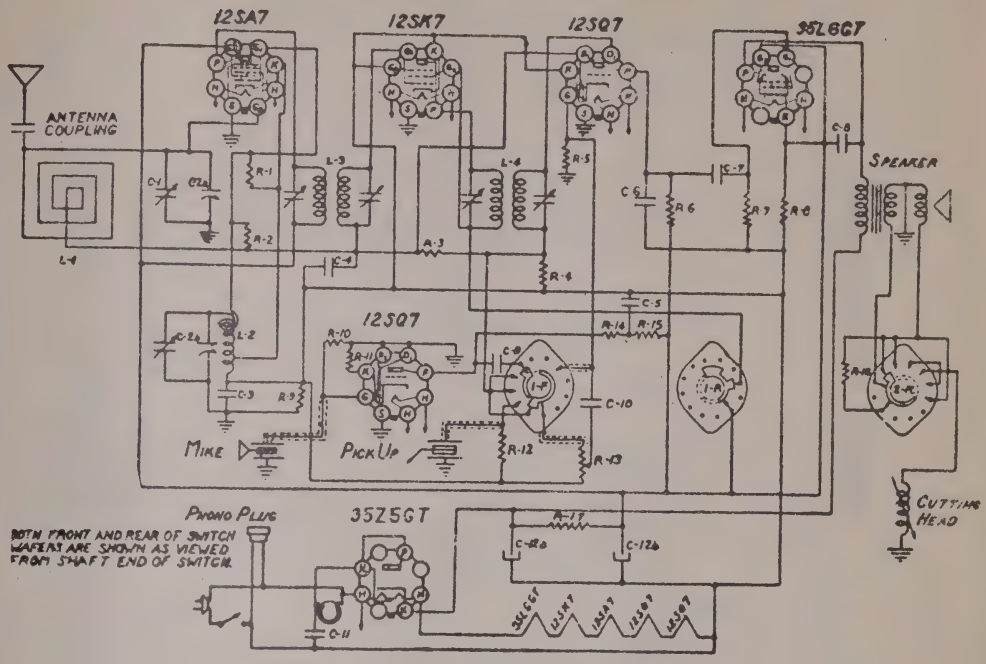
Power output 1.3 watts undistorted—2.0 watts maximum.

Intermediate Frequency 455 K.C.

Total Power Consumption—48 watts.

WESTERN AUTO SUPPLY CO.

MODELS D1173, D2155



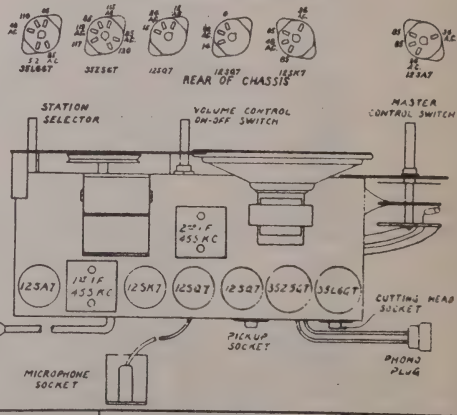
FOR PARTS LIST SEE INDEX

TUBES

1-12SA7 CONVERTER (OSCILLATOR AND FIRST DETECTOR)
1-12SK7 I.F. AMPLIFIER
1-12SQ7 SECOND DETECTOR AND FIRST AUDIO
1-12SQ7 MICROPHONE PRE-AMPLIFIER
1-35L6GT POWER OUTPUT
1-35Z5GT RECTIFIER

BOTTOM VIEW OF CHASSIS

VOLTAGES MARKED AT SOCKET TERMINALS ARE MEASURED WITH 1000 OHM PER VOLT METER, ON A 117 VOLT LINE WITH NO SIGNAL. (ANTENNA LEAD IS SHORTED TO THE CHASSIS) VOLTAGES MEASURED FROM "B-" TO LUG



ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output Meter.
3. A non-metallic screw driver.
4. Dummy Antenna—.1 mfd., 200 mmf.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TRIMMERS TO TUNE	REMARKS
IF 455 KC.	12SA7 Grid	.1 mfd.	H. F. End	IF Transformers 4 Trimmers	Tune to Max.
1620 KC.	Antenna	200 mmf.	H. F. End	Oscillator Trimmer	Set Limit of Band
1400 KC.	Antenna	200 mmf.	1400	Antenna Trimmer	Tune to Max.

Repeat above Alignment Procedure at least once

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TRUETONE MODEL D 2155

FORMERLY MODEL D1173

PARTS LIST AND PRICES

Part No.	Circuit Diagram Reference	Description	List Price Each
9231		Back	$ .25
9232		Book—Instruction	.20
8462		Bushing-Stem—Motor Mounting	.03
9234		Cabinet	12.00
2163		Cable—Drive	.15
9076	L1	Coil—Loop Antenna Assembly	1.00
8031	L2	Coil—Oscillator	.80
9221	R13	Control—Volume and Switch	1.00
8036		Cord—AC Line	.25
5562	C1	Condenser—Antenna Trimmer	.20
9223	C2a, b	Condenser—Variable	2.00
8525	C12a,b	Condenser—Electrolytic 40-20-150 V	1.00
3352	C3	Condenser—Paper .2-400 V	.20
563	C11	Condenser—Paper .05-400 V	.20
576	C7, C8	Condenser—Paper .02-400 V	.20
3137	C9	Condenser—Paper .001-400 V	.20
824	C10	Condenser—Paper .002-600 V	.20
572	C5	Condenser—Paper .1-200 V	.20
580	C4	Condenser—Paper .05-200 V	.20
1286	C6	Condenser—Mica 250 mmfd.	.20
8941		Connector—Microphone—with bracket and lead	.40
9043		Crystal—Dial	.20
981		Grommet—Condenser Mounting	.02
9029		Indicator	.40
9031		Indicator—Back Plate	.30
9247		Knob—Master Control	.15
2750		Knob—Motor Switch	.15
9246		Knob—Tuning	.15
9248		Knob—Volume	.15
8158		Lamp—Pilot No. 47 Mazda	.15
8285		Microphone No. X-20	6.00
9275		Needles—Cutting (Furnished by W. A.)	
9276		Needles—Playing (Furnished by W. A.)	
9236		Plate—Instruction	.20
8477		Plate—Motor on-off	.15
8287		Plug—1 Prong Large (Play)	.15
8288		Plug—1 Prong Small (Cut)	.15
8493		Plug—Phono Motor	.15
9036		Pointer	.20
9013		Pulley—Drive	.20
9086		Pulley—Idler	.10
9277		Records—Blank (Furnished by W.A.)	
8923		Recorder Unit—Complete	25.00
7326	R8	Resistor—150 ohm 1/2 W	.20
3807	R16	Resistor—35 ohm 1/2 W Flexohm	.20
9093	R17	Resistor—1500 ohm 1 W	.20
9225	R11	Resistor—2 M 1/3 W	.15
8580	R12	Resistor—100M 1/3 W	.15
7122	R9	Resistor—200M 1/3 W	.15
6722	R14	Resistor—500M 1/3 W	.15
6721	R6,7,15	Resistor—50M 1/3 W	.15
8970	R4	Resistor—2 Meg 1/3 W	.15
8062	R3,10	Resistor—3 Meg. 1/3 W	.15
8039	R2,5	Resistor—15 Meg. 1/3 W	.15
7121	R1	Resistor—20 M 1/3 W	.15
9228		Shaft—Drive	.20
9230		Speaker—5" P M	3.00
2908		Spring—Pointer Drive	.06
8430		Socket—Phono Motor	.20
6267		Socket—1 Prong—Large (Playing)	.10
8266		Socket—1 Prong—Small (Cutting)	.10
7573		Socket—Dial Lamp	.15
9226		Switch—Master Control	1.25
8454		Switch—Motor	.75
8042	L3	Transformer—1st I.F.	1.75
8043	L4	Transformer—2nd I.F.	1.75

RECORDER UNIT PARTS

86943	Hex Nut for Pivot Post	.15	869463
86947	Motor Mounting Screw	.02	869464
86948	Adjusting Screw (Follower Arm)	.02	869465
869413	Turntable Shaft Locking Screw	.02	869466
869417	Recorder Arm Rest	.60	869467
869418	Follower Arm Complete	1.00	
869424	Pickup Cartridge	5.00	869469
869426	Tone Arm, Complete	6.00	869470
869428	Cutter Head Tension Spring	.25	869472
869434	Recorder Arm, Complete	11.00	869474
869438	Pivot Post Return Spring	.15	869481
869449	Tone Arm Post	1.25	869482
869450	10" One-Piece Turntable	3.00	869484
869456	Turntable Drive Disc Stud Clip	.03	869485
869458	Lead Screw & Pinion Assembly	1.80	869486
	Turntable Drive Disc Tension Spring	.06	
	Turntable Shaft	1.30	
	Auxiliary Shaft Housing, Complete	4.00	
	Turntable Drive Disc	1.00	
	Turntable Drive Disc Mounting Bracket Assembly	.30	
	Retractable Pin Spring	.06	
	Retractable Pin	.15	
	Rotor Shaft Pulley 9	.30	
	Rotor Shaft Pulley Set Screw	.05	
	Motor—60 Cycle	11.00	
	Motor—50 Cycle	12.00	
	Magnetic Cutter Head with Leads	9.00	
	Cutter Head Set Screw (Large)	.20	
	Tone Arm Cartridge Set Screw	.20	

TRUETONE MODEL DW 2090

FORMERLY MODEL DE3002

PARTS LIST AND PRICES

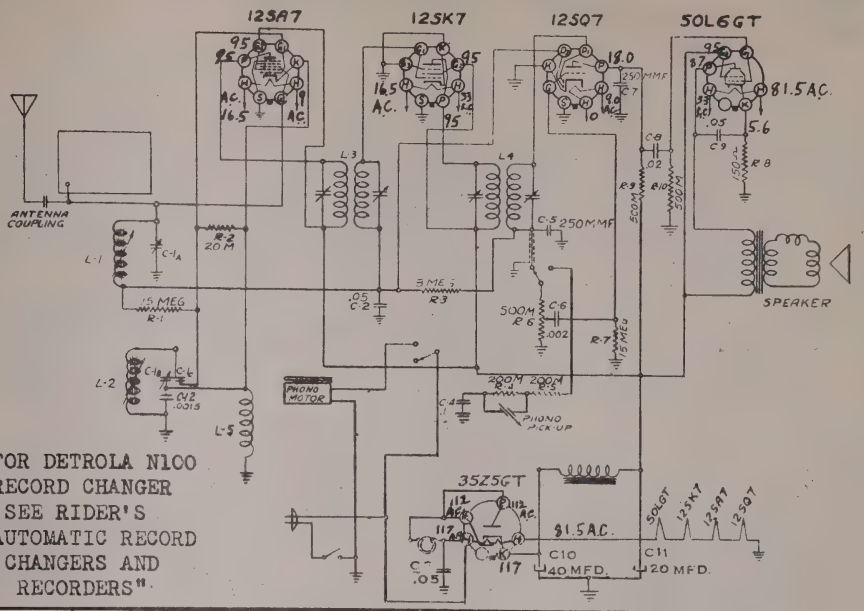
Part No.	Circuit Diagram Reference	Description	List Price Each
9353		Arm—Tone—with Crystal	$ 6.00
		Battery Pack ("A" and "B") Wizard D235	.20
		Book — Instruction	.20
9159		Bracket—Chassis Mounting	.15
5344		Bracket—Condenser and Indicator Mounting	.45
9141		Cabinet	12.00
9158		Cable — Battery Pack	.25
9262		Cable—Drive—30"	.15
2163		Coil— Antenna	.90
4874	L1	Coil — Oscillator	.80
6256	L2	Condenser—Variable—With Pulley	2.25
9145	C1a,b	Condenser—Paper .001 mfd.—400 V	.20
3137	C7	Condenser—Paper .01 mfd.—400 V	.20
568	C8,C9	Condenser—Paper .002 mfd—400 V	.20
3547	C10	Condenser—Paper .05 mfd.—200 V	.20
580	C2,C4	Condenser—Mica 50 mmf	.20
2780	C11	Condenser—Mica 100 mmf	.20
1285	C3	Condenser—Mica 250 mmf	.20
1286	C6	Condenser—Electrolytic 10 mfd.—150 V	.50
9146	C5	Control—Volume and Switch	1.00
9143	R4	Cup—Needle	.30
8683		Dial Lamp Mounting Assembly	.20
9147		Escutcheon and Crystal	.80
9161		Grommet—Variable Condenser	.03
7209		Indicator	.45
9148		Knob	.15
9021		Lamp—Dial G. E. 1/8 W. Neon	.15
9149		Phonograph Unit—Complete with Turntable, Crank, and Mounting Hardware	8.00
9162		Plug—Phono Pickup	.15
8288		Pointer	.20
9150		Pulley—Idler	.10
6244		Resistor—300 ohm, 1/3 W	.15
6890	R10	Resistor—50M, 1/3 W	.15
8580	R1	Resistor—100M, 1/3 W	.15
7122	R2,R11	Resistor—200M, 1/3 W	.15
6721	R5,R6	Resistor—1 Meg. 1/3 W	.15
6723	R8	Resistor—2 Meg. 1/3 W	.15
8970	R9	Resistor—3 Meg. 1/3 W	.15
8062	R3	Resistor—10 Meg. 1/3 W	.15
6562	R7	Retainer—"C" Washer	.01
1207		Shaft—Drive	.20
8427		Speaker—6 1/2" P. M.	4.00
9157		Spring—Pointer Drive	.06
8648		Switch—Phono—Radio	.75
9152		Switch—Tone Control	.70
9151		Transformer—1st I. F.	1.75
9155	L3	Transformer—2nd I. F.	1.75
9156	L4	Vellum for Translucent Window	.02
9268			

TUBES

1-1A7 CONVERTER (OSCILLATOR AND FIRST DETECTOR
1-1N5 I.F. AMPLIFIER
1-H5 SECOND DETECTOR AND FIRST AUDIO
2-3Q5 POWER OUTPUT

WESTERN AUTO SUPPLY CO.

MODELS D1174, D2245

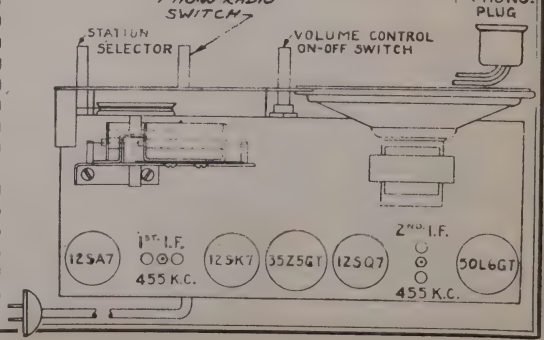


FOR DETROLA N1CO RECORD CHANGER SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TRIMMERS TO TUNE	REMARKS
IF 455 KC	12SA7 GRID	.1 mfd.	H. F. End	IF Transformers 4 Trimmers	Tune to Max.
1720 KC	Antenna	200 mmf.	H. F. End	Oscillator Trimmer	Set Limit
1400 KC	"	"	1400	Antenna Trimmer	Of Band Tune to Max.

PARTS LIST AND PRICES

Part No.	Circuit Diagram Reference	Description	List Price Each
N-200		Record Changer—Complete	
9575		Capacity Plate Assembly	.65
9736		Book—Instruction	.20
9031		Bracket-Indicator Back Plate	.30
9490	L1,L2	Tuner—Permeability with Pulley	2.20
9737		Cabinet	18.00
2163		Cable-Drive	.15
9722	L5	Coil—Cathode Choke	.40
9051	R6	Control—Volume and Switch	1.00
9510	C1a, b	Condenser—Dual Trimmer	.50
9363	C10, C11	Condenser—Elect.—40 mf.—20 mf.—150V.	1.00
9672	C12	Condenser—Paper .0015 mfd.—400V	.20
824	C6	Condenser—Paper .002 mfd.—600V	.20
563	C3	Condenser—Paper .05 mfd.—400V	.20
576	C8, C9	Condenser—Paper .02 mfd.—400V	.20
580	C2	Condenser—Paper .05 mfd.—200V	.20
572	C4	Condenser—Paper .1 mfd.—200V	.20
1286	C5, C7	Condenser—Mica—250 mmf.	.20
1285	C1c	Condenser—Mica—100 mmf.	.20
8036		Cord—AC Line	.25
9732		Indicator	.40
9021		Knob	.15
6158		Lamp—Pilot—Mazda #47	$ .15
242		Plug—Phono Motor	.15
9150		Pointer	.20
9086		Pulley—Idler	.10
8039	R1, R7	Resistor 1/3 W—15 Meg.	.15
8062	R3	Resistor 1/3 W—3 Meg.	.15
6722	R9, R10	Resistor 1/3 W—1/2 Meg.	.15
7121	R2	Resistor 1/3 W—20 M.	.15
7326	R8	Resistor 1/2 W—150 ohm	.15
6721	R4, R5	Resistor 1/3 W—200 M.	.15
1207		Retainer—Shaft	.01
9734		Switch—Phono-Radio	.75
9038		Shaft—Drive	.20
7477		Spring—Pointer Drive	.08
9472	L3	Transformer—1st I. F.	1.75
9473	L4	Transformer—2nd I. F.	1.75
9594		Speaker—5" Dynamic	3.50
9739		Carton	1.20
9738		Dial Crystal	.20



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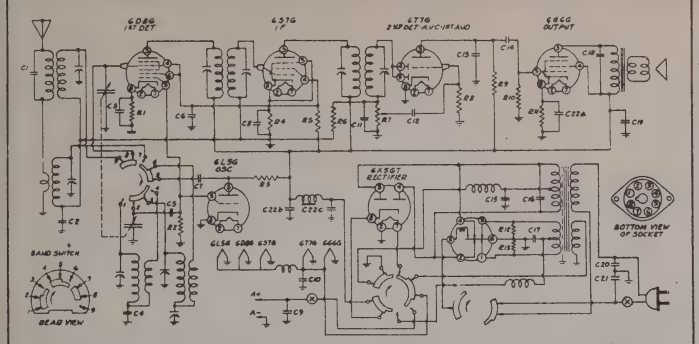

Band switch shown in broadcast position in schematic and in short wave position in pictorial view in lower left corner.

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	800	½	R8	15,000,000	½
R2	60,000	½	R9	250,000	½
R3	15,000	½	R10	500,000	½
R4	1,000	½	R11	500	½
R5	20,000	½	R12	100	½
R6	1,000,000	½	R13	100	½
R7	500,000	V.C.			

CONDENSERS

No.	Capacity (Mid.)	Volts	No.	Capacity (Mid.)	Volts
C1	.0001	Mica	C13	.00025	Mica
C2	.05	200	C14	.01	400
C3	.05	200	C15	.1	400
C4	.004—5%	Mica	C16	.015	1000
C5	.0001	Mica	C17	.5	130
C6	.1	400	C18	.006	600
C7	.0005	Mica	C19	.1	400
C8	.05	200	C20	.05	400
C9	.5	10	C21	.05	400
C10	.0008	Mica	C22a	20.	25
C11	.0001	Mica	C22b	30.	250
C12	.01	400	C22c	20.	250

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mfd., 200 mmfd., 400 ohms.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 KC.	.1 Mfd.	Grid of 6S7G I.F.	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I. F.	Adjust to maximum output
	455 KC.	.1 Mfd.	Grid of 6D8G tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I. F.	Adjust to maximum output
SHORT WAVE	18,100 KC.	400 ohms	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Top of chassis (See Fig. 1)	Short Wave Oscillator	Adjust to receive signal
	16,000 KC.	400 ohms	Antenna lead	Tune Signal	Trimmer—Top of chassis (See Fig. 1)	Short Wave Antenna	Adjust to maximum output
BROADCAST	1730 KC	200 Mmf.	Antenna lead	Rotor full open (Plates out of mesh)	Trimmer—Top of chassis (See Fig. 1)	Broadcast Oscillator	Adjust to maximum output
	1400 KC.	200 Mmf.	Antenna lead	Set dial at 1400 KC.	Trimmer—Top of chassis (See Fig. 1)	Broadcast Antenna	Adjust to maximum output
	600 KC.	200 Mmf.	Antenna lead	Set dial at 600 KC.	Trimmer—Top of chassis (See Fig. 1)	Oscillator Series Pad	Adjust to maximum rock dial See Note 'A'

Note "A"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of intensity is obtained. Attenuate the signal from the signal generator to prevent the leveling-off action of the A.V.C. Do not bend variable condenser to correct tracking.

Frequency Range—535 to 1730 and 5,750 to 18,100 K.C.
Power output .6 watt undistorted—1.1 watt maximum.
Intermediate Frequency 455 K.C.

Speaker (Part No. P-4233) 6" PM Type.

D. C. voice coil resistance.....5.1 ohms
Voice coil impedance at 400 cycles.....5.5 ohms

B.C. and S.W. Oscillator Coil (Part No. P-4226)

Looking at the mounting bracket end in a clockwise direction starting at the chassis, the connections are: No. 1, pad; No. 2, open. Looking at the other end in a clockwise direction starting at the chassis the connections are: No. 3, plate; No. 4, plate; No. 5, pad; No. 6, grid; No. 7, grid.

S.W. Primary—No. 4 and No. 5—Resistance .44 ohm.
B.C. Primary—No. 1 and No. 3—Resistance 1.3 ohms.
S.W. Secondary—No. 5 and No. 6—Resistance .09 ohm.
B.C. Secondary—No. 1 and No. 7—Resistance 5.8 ohms.

B.C. and S.W. Antenna Coil (Part No. P-4225)

Starting with the lug that is connected direct to ground in a clockwise direction, the terminals are: No. 1, ground; No. 2, open; No. 3, pad; No. 4, grid; No. 5, grid; No. 6, ant.

S.W. Primary—No. 6 and No. 2—Resistance .35 ohm.
B.C. Primary—No. 1 and No. 2—Resistance 24.1 ohms.
S.W. Secondary—No. 3 and No. 4—Resistance .07 ohm
B.C.—Secondary—No. 3 and No. 5—Resistance 2.9 ohms.

First I.F. Transformer (Part No. P-4245)

Primary—Blue, plate; red, B+—Resistance 26.2 ohms
Secondary—White, grid; black, AVC—Resistance 26.6 ohms

Second I.F. Transformer (Part No. P-4244)

Primary—Blue, plate; red, B+—Resistance 15.1 ohms.
Secondary—White, grid; black, AVC—Resistance 11.8 ohms.

VOLTAGE CHART

All voltages measured with a 1000 ohm per volt meter on 250 volt scale. Volume control maximum and no signal tuned in.

	117 V.A.C.	6.2 V. Bat.
6D8G TUBE		
Plate (3) to ground	160	146
Screen (4) to ground	82	76
Cathode (8) to ground	4.3	3.3
6S7G TUBE		
Plate (3) to ground	160	146
Screen (4) to ground	82	76
Cathode (8) to ground	4.1	3.2
6B6G TUBE		
Plate (3) to ground	152	139
Screen (4) to ground	163	148
Cathode (8) to ground	7.5	6.9
6X5GT TUBE		
Cathode (8) to ground	169	154

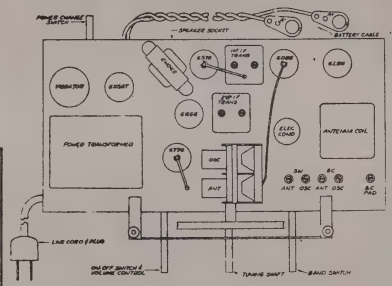

Fig. 1—Top View

Part No.	Circuit Reference	Description
		PAPER CONDENSERS
P1322	C18	.005 mfd. 600 volt
P184	C13, C14	.01 mfd. 400 volt
P2134	C16	.015 mfd. 1000 volt (oil filled)
P148	C2, C3, C8	.05 mfd. 200 volt
P334	C20, C21	.05 mfd. 400 volt
P278	C8, C15, C19	.1 mfd. 400 volt
P385	C9	.5 mfd. 10 volt
P2133	C17	.5 mfd 120 volt
		MOULDED MICA CONDENSERS
P480	C1, C5, C11	.0001 mfd.
P817	C13	.00025 mfd.
P236	C7, C10	.0005 mfd.
P1683	C4	.004 mfd. 5%
		VARIABLE CONDENSERS
P4222		Gang condenser
P3484		Trimmer strip
P4132		Padding condenser
		ELECTROLYTIC CONDENSERS
P4224	C22a C22b C22c	20 mfd 25 volt 20 mfd. 250 volt 20 mfd. 250 volt

		RESISTORS
P3800	R12, R13	100 ohm ½ watt
P3838	R11	500 ohm ½ watt
P3825	R1	800 ohm ½ watt
P3828	R4	1,000 ohm ½ watt
P3836	R3	5,000 ohm ½ watt
P3844	R5	20,000 ohm ½ watt
P3855	R2	60,000 ohm ½ watt
P3868	R9	250,000 ohm ½ watt
P3876	R10	500,000 ohm ½ watt
P3882	R6	1,000,000 ohm ½ watt
P3891	R8	15,000,000 ohm ½ watt
		VARIABLE RESISTORS
P4231	R7	Volume control and switch
		TRANSFORMERS AND COILS
P4225		B.C. and S.W. antenna coil
P4226		B.C. and S.W. oscillator coil
P4245		1st I.F. transformer
P4244		2nd I.F transformer
P4220		Power transformer
		MISCELLANEOUS
P3005		Tube socket
P945		Speaker socket
P824		Vibrator socket
P4138		Electrolytic mounting base
P929		Line cord
P4042		Glass dial
P3993		Tenite escutcheon
P3090		Escutcheon screw
P4119		Dial background
P1585		Snap buttons, for dial background
P4032		Pointer
P4214		Drive shaft
P1390		Horseshoe washer
G5581		Dial drum and hub
P2078		Cord tension spring
P4228		Iron core filter choke
G5612		Hash choke
G5130		Filament choke
G5128		"B" choke
P4230		Power change switch
P4229		Band sw tch

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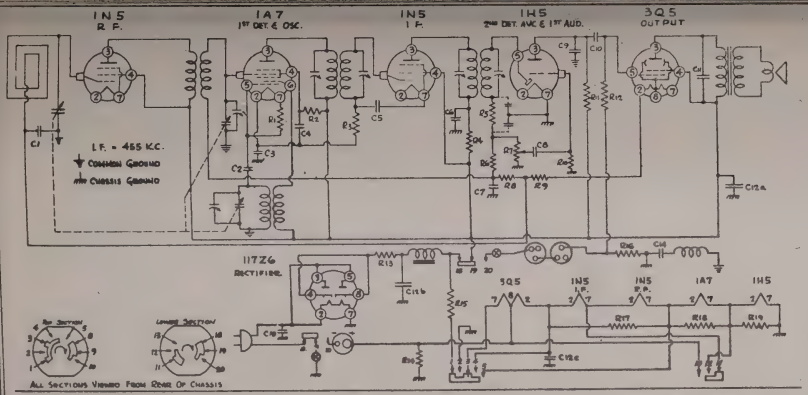


BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I.F.	455 KC.	.1 MFD.	Grid of 1N5GT I.F. tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Output I.F.	Adjust to maximum output
See Note "A"	455 KC.	.1 MFD.	Grid of 1A7GT tube	Rotor full open (Plates out of mesh)	Two trimmers on top (See Fig. 1)	Input I.F.	Adjust to maximum output
BROAD-CAST	1600 KC.	.05 MFD.	Grid of 1N5GT R.F. tube	Rotor full open (Plates out of mesh)	Trimmer—Side of gang-rear	Oscillator	Adjust to maximum output
See Note "B"	1400 KC.	.05 MFD.	Grid of 1N5GT R.F. tube	Set dial at 1400 KC.	Trimmer—Side of gang-center	R.F.	Adjust to maximum output

This is all that is necessary for the alignment unless the plates of the gang have been bent out of shape. In case of bent plates, set the signal generator and receiver to 600 KC and bend the plates into the position for maximum output.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC. After each band is completed, repeat the procedure as a final check.

NOTE "A"—Use battery operation for all adjustments.

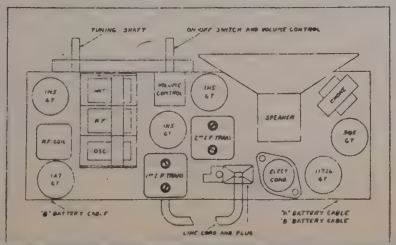
NOTE "B"—The oscillator trimmer is reached thru the hole in the R.F. coil can.

Frequency Range
540 to 1600 K.C.

Power output (on batteries) .27 watt undistorted—.35 watt maximum.

Power output (AC-DC) .27 watt undistorted — .35 watt maximum.

Intermediate Frequency 455 K.C. Power consumption 25 watts.



RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	200,000	½	R11	1,000,000	½
R2	50,000	½	R12	2,000,000	½
R3	5,000,000	½	R13	30—10%	½
R4	5,000	½	R14	1,000	½
R5	70,000	½	R15	2,150—10%	5
R6	3,000,000	¼	R16	400—10%	½
R7	1,000,000	V.C.	R17	500—10%	½
R8	5,000,000	½	R18	200—10%	½
R9	10,000,000	¼	R19	110—10%	½
R10	15,000,000	½			

CONDENSERS

No.	Capacity (Mid.)	Volts	No.	Capacity (Mid.)	Volts
C1	.05	200	C9	.00025	Mica
C2	.00005	Mica	C10	.001	600
C3	.25	200	C11	.002	600
C4	.01	400	C12a	50. Elect.	150
C5	.001	600	C12b	30. Elect.	150
C6	.05	400	C12c	100. Elect.	25
C7	.05	200	C13	.05	400
C8	.001	600	C14	.2	200

Speaker (Part No. P4795) 5" PM Type
D.C. voice coil resistance.....2.4 ohms
Voice coil impedance at 400 cycles.....2.7 ohms

R. F. Coil (Part No. P4853)

Primary—Red; green—Resistance .....112.8 ohms
Secondary—Black; white—Resistance ..... 5.9 ohms

Oscillator Coil (Part No. P3967)

Looking at the connection end (with dot) in a clockwise direction starting at the chassis the terminals are No. 1 grid; No. 2, plate; No. 3, B+; No. 4, ground.
Primary—No. 2 and No. 3—Resistance 2.2 ohms.
Secondary—No. 4 and No. 1—Resistance 4.9 ohms.

First I.F. Transformer (Part No. P4818)

Primary—Red, B+; blue, plate—Resistance 11.8 ohms
Secondary—White, grid; black, AVC—
Resistance 23.9 ohms

Second I.F. Transformer (Part No. P4819)

Primary—Blue, plate; red, B+ — Resistance 15.1 ohms
Secondary—White, grid; other end inside can—
Resistance 11.8 ohms

Power Change Switch

The power change switch connects the tube filaments in series (9 volt) on AC-DC operation and parallel (1½ volt) on battery operation.

VOLTAGE CHART

All voltages measured with a 1,000 ohm per volt meter on the 150 volt scale. Line voltage 117½ volts A.C. Volume control maximum and no signal tuned in.

1N5 (RF) TUBE

	Volts
Plate (3) to common ground.....	94
Screen (4) to common ground.....	102
Filament (2) to (7)	1.4

1A7 TUBE

Plate (3) to common ground.....	100
Screen (4) to common ground.....	62
Anode grid (6) to common ground	100
Filament (2) to (7)	1.4

1N5 (IF) TUBE

Plate (3) to common ground.....	95
Screen (4) to common ground.....	102
Filament (2) to (7)	1.38

117Z6 TUBE

Plate (3) or (5) to common ground.....	117.5 (AC)
Cathode (4) or (8) to common ground.....	128
Filament (2) to (7)	117.5 (AC)

1H5 TUBE

Plate (3) to common ground..	38
Filament (2) to (7)	1.4

3Q5 TUBE

Plate (3) to common ground..	98
Screen (4) to common ground	102
Filament (7) to (8)	1.38
Filament (2) to (8)	1.33

MODELS D1281,D3230
MODEL D2269

WESTERN AUTO SUPPLY CO.

MODEL D 2269

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.

Dummy antenna—.1 mf., .05 mf., .200 mmfd.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 KC.	.1 MFD.	Grid of 1N5GT I.F. tube	Rotor full open (Plates out of mesh)	C, D (See Fig. 1)	Output I.F.	Adjust to maximum output
See Note "A"	455 KC.	.1 MFD.	Grid of 1A7GT tube	Rotor full open (Plates out of mesh)	A, B (See Fig. 1)	Input I.F.	Adjust to maximum output
BROAD-CAST	1600 KC.	.05 MFD.	Grid of 1N5GT R.F. tube	Rotor full open (Plates out of mesh)	E gang-rear	Oscillator	Adjust to maximum output
	1400 KC.	.05 MFD.	Grid of 1N5GT R.F. tube	Set dial at 1400 KC.	F	R.F.	Adjust to maximum output
	1400 KC.	200 MMFD.	ANT. LEAD	Set dial at 1400 KC.	G	Antenna	Adjust to maximum output

This is all that is necessary for the alignment unless the plates of the gang have been bent out of shape. In case of bent plates, set the signal generator and receiver to 600 KC and bend the plates into the position for maximum output.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC. After each band is completed, repeat the procedure as a final check.

NOTE "A"—Use battery operation for all adjustments.

Frequency Range 540 to 1600 K.C.

Power output (on batteries) .27 watt undistorted—.35 watt maximum.

Power output (AC-DC) .27 watt undistorted — .35 watt maximum.

Intermediate Frequency 455 K.C. Power consumption 25 watts.

D 3230

FORMERLY MODEL D 1281

PLEASE NOTE THAT ALTHOUGH OUR D3230 (FORMERLY D1281) AND OUR D3130 (FORMERLY D1181) USE THE SAME FACTORY MODEL NUMBER THEY DIFFER IN THAT THE D3230 USES A PERMEABILITY TUNED R.F. COIL.

ALIGNMENT PROCEDURE

- Volume control - Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.

Dummy antennas—.1 mf., .05 mf.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 KC.	.1 MFD.	Grid of 1N5GT I.F. tube	Rotor full open (Plates out of mesh)	C, D (See Fig. 1)	Output I.F.	Adjust to maximum output
See Note "A"	455 KC.	.1 MFD.	Grid of 1A7GT tube	Rotor full open (Plates out of mesh)	A, B (See Fig. 1)	Input I.F.	Adjust to maximum output
BROAD-CAST	1600 KC.	.05 MFD.	Grid of 1N5GT R.F. tube	Rotor full open (Plates out of mesh)	E gang-rear	Oscillator	Adjust to maximum output
	1400 KC.	.05 MFD.	Grid of 1N5GT R.F. tube	Set dial at 1400 KC.	F	R.F.	Adjust to maximum output
See Note "B"	1400 KC.	Loop Radiator	No connection to radio	Set dial at 1400 KC.	G	Antenna	Adjust to maximum output

This is all that is necessary for the alignment unless the plates of the gang have been bent out of shape. In case of bent plates, set the signal generator and receiver to 600 KC and bend the plates into the position for maximum output.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC. After each band is completed, repeat the procedure as a final check.

NOTE "A"—Use battery operation for all adjustments.

NOTE "B"—Use three turn loop, in series with 400 ohm resistor, connected to signal generator output.

Frequency Range 540 to 1600 K.C.

Power output (on batteries) .27 watt undistorted—.35 watt maximum.

Power output (AC-DC) .27 watt undistorted — .35 watt maximum.

Intermediate Frequency 455 K.C. Power consumption 25 watts.

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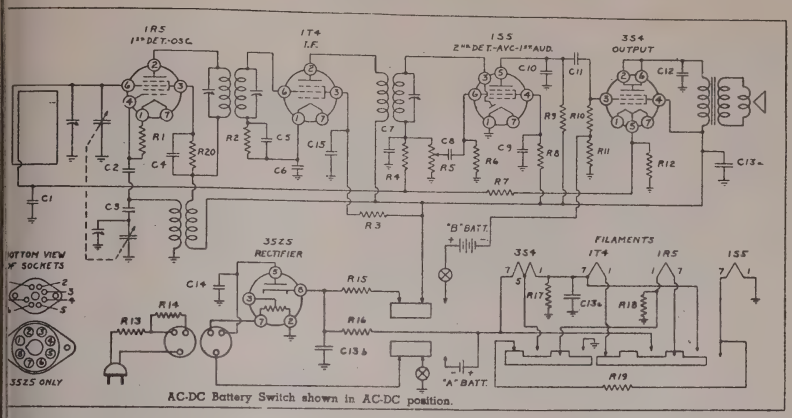
MODELS D1183, D3123



AC-DC Battery Switch shown in AC-DC position.

RESISTORS

No.	Ohms	Watts
R1	100,000	¼
R2	5,000,000	½
R3	25,000—10%	½
R4	5,000,000—10%	¼
R5	1,000,000	V.C.
R6	10,000,000	¼
R7	10,000,000—10%	¼
R8	4,000,000	¼
R9	1,000,000	¼
R10	2,000,000	½
R11	750—10%	¼
R12	3,000—10%	½
R13	80 } part of	
R14	350 } line cord	
R15	2,000—10%	½
R16	1,750—10%	4
R17	1,700—10%	¼
R18	1,000—10%	¼
R19	55—10% (wire wound)	½
R20	10,000	¼

CONDENSERS

No.	Capacity (Mfd.)	Volts
C1	.05	200
C2	.0001	Mica
C3	.000410-2%	Mica
C4	.01	120
C5	.01	120
C6	.1	120
C7	.00025	Mica
C8	.01	200
C9	.05	200
C10	.00005	Mica
C11	.005	200
C12	.01	200
C13a	20.	150
C13b	30.	150
C13c	100.	12
C14	.05	400
C15	.01	120

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I.F.	455 KC.	.1 MFD.	Grid of 1T4 I.F. tube	Rotor full open (Plates out of mesh)	One Trimmer on End of Chassis	Output I.F.	Adjust to maximum output
See Note "A"	455 KC.	.1 MFD.	Grid of 1R5 tube	Rotor full open (Plates out of mesh)	Two Trimmers on Side of Chassis	Input I.F.	Adjust to maximum output
BROAD-CAST	1630 KC.		Inductive Coupled	Rotor full open (Plates out of mesh)	Upper Section, Side of Gang	Oscillator	Adjust to maximum output
See Note "B"	1400 KC.		Inductive Coupled	Set dial at 1400 KC.	Lower Section, Side of Gang	Antenna	Adjust to maximum output

NOTE "A"—Use battery operation for all adjustments.

NOTE "B"—Align broadcast band with chassis in cabinet and loop antenna connected.

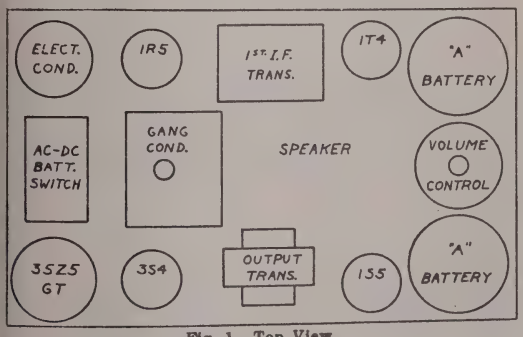


Fig. 1—Top View

VOLTAGE CHART

	Volts
1R5 TUBE	
Plate (2) to ground	66
Screen (3) to ground	45
Filament (7) to (1)	1.4
1T4 TUBE	
Plate (2) to ground	66
Screen (3) to ground	45
Filament (7) to (1)	1.3
1S5 TUBE	
Filament (7) to (1)	1.3
3S4 TUBE	
Plate (2) or (6) to ground	66
Screen (4) to ground	67.5
Filament (1) to (5)	1.3
Filament (7) to (5)	1.3
3SZ5 TUBE	
Cathode (8) to ground	90
Filament (7) to ground	37.5 (AC)

SERVICE INFORMATION

Speaker (Part No. P4620A) 3" PM Type

D.C. voice coil resistance.....2.8 ohms
Voice coil impedance at 400 cycles.....3.0 ohms

Oscillator Coil (Part No. P4722)

Looking at the connection end in a clockwise direction starting at the mounting bracket the terminals are: No. 1, ground (direct to mounting bracket); No. 2, plate; No. 3, B+; No. 4, grid.

Primary—No. 2 and No. 3—Resistance.....3.4 ohms
Secondary—No. 1 and No. 4—Resistance...2.6 ohms

First I.F. Transformer (Part No. P4610)

The primary leads are on one end (opposite sides) and the secondary leads on the other end. The red dots indicate the end of the windings. The primary and secondary windings are identical.

Resistance (primary or secondary).....16.7 ohms

Second I.F. Transformer (Part No. P4712)

Looking at the coil starting at the lug nearest the red dot in a clockwise direction, the terminals are: No. 1, start of pri.; No. 2, start of sec.; No. 3, end of sec.; No. 4, end of pri.

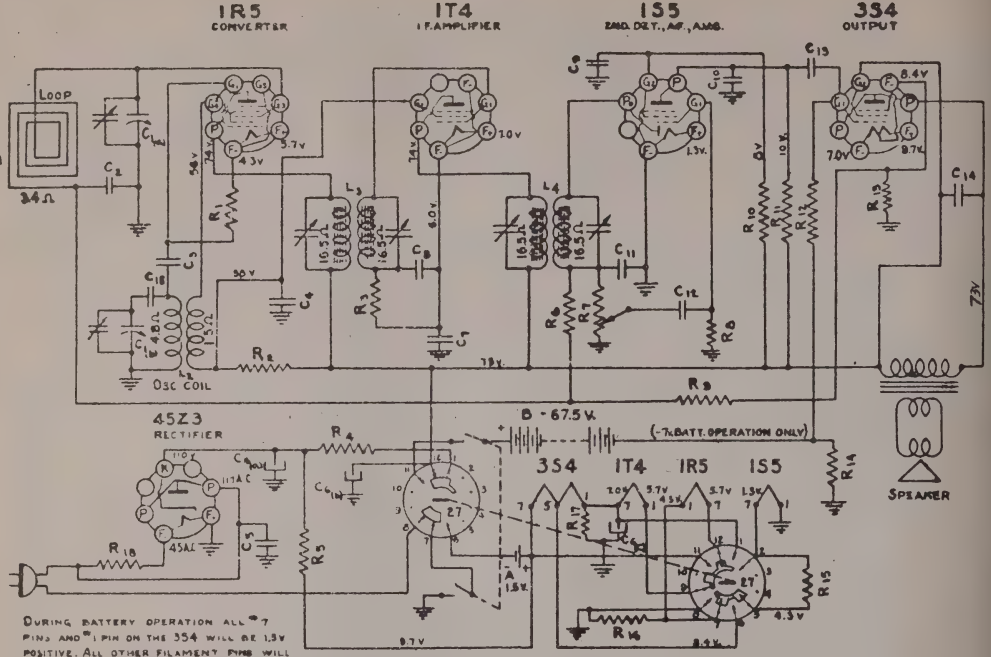
Primary—No. 1 and No. 4—Resistance.....43.3 ohms
Secondary—No. 2 and No. 3—Resistance...34.2 ohms

Power Change Switch

The power change switch connects the tube filaments in series (7½ volt) on AC-DC operation and parallel (1½ volt) on battery operation.

MODELS D1184, D3124

WESTERN AUTO SUPPLY CO.



Chassis Parts

L2	Coil, Oscillator	
R18	Cord Line with Plug, 960 OHM @ .075 AMP	
	Cam—Latch	
R7	Control—Volume	
R1	Resistor—100M 1/3 Watt	
R11	Resistor—1 MEG 1/3 Watt	
R12	Resistor—2 MEG 1/3 Watt	
R6, R10	Resistor—4 MEG 1/3 Watt	
R3	Resistor—5 MEG 1/3 Watt	
R8	Resistor—10 MEG 1/3 Watt	
R9	Resistor—6 MEG 1/3 Watt	
R15	Resistor—55 Ohm, ½ Watt	
R14	Resistor—700 Ohm, 1/3 Watt	
R5	Resistor—2200 Ohm, Wire Wound	
R16	Resistor—1M 1/3 Watt	
R17	Resistor—1700 Ohm, 1/3 Watt	
R13	Resistor—3M 1/3 Watt	
R4	Resistor—3M 1 Watt	
R2	Resistor—5M 1/3 Watt	
C1	Condenser—Variable	
C6,A,B,C	Condenser—Elect 30 Mfd-150V 20 Mfd-150V 100 Mfd- 12V	
C4, C8	Condenser—Paper— .01-120V	
C7	Condenser—Paper— .25- .75V	
C13	Condenser—Paper—.005-600V	
C2, C9	Condenser—Paper— .05-200V	
C14	Condenser—Paper— .01-400V	
C5	Condenser—Paper— .05-400V	
C12	Condenser—Paper—.001-600V	
C11	Condenser—Mica 250 MMF	
C10	Condenser—Mica 50 MMF	
C3	Condenser—Mica 100 MMF	
C15	Condenser—Mica 485±2% MMF.	
	Insulation—Bottom Shield	
	Insulation—I. F. Transformers	
	Latch	

ALIGNMENT PROCEDURE

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TRIMMERS TO TUNE	REMARKS
IF 455 K. C.	IR 5 Grid	1 Mfd	H. F. End	IF Transformers 4 Trimmers	Tune to Max.
1600 KC	IR 5 Grid		H. F. End (1600)	Oscillator Trimmer	Set limit of band
1400 K. C.	Standard Loop or single turn from generator loosely coupled		1400	Antenna Trimmer	Tune to Max.

Repeat above Alignment Procedure at least once more.

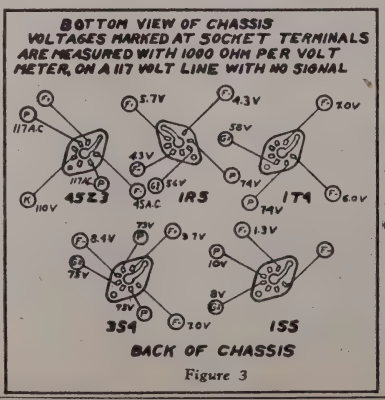


Figure 3

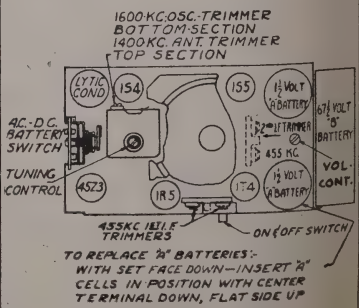


Figure 1

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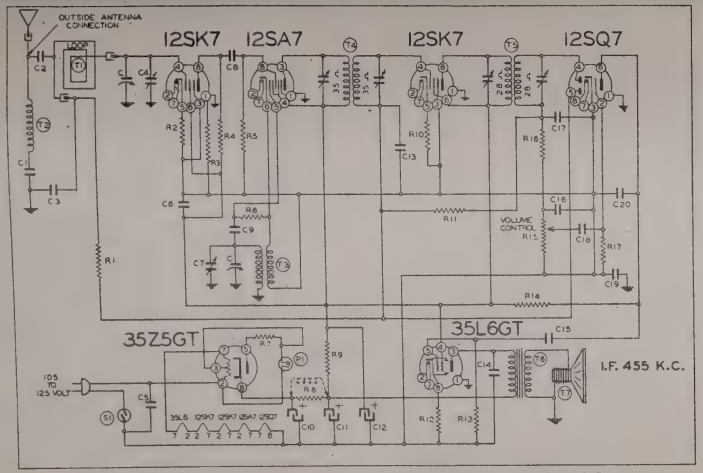
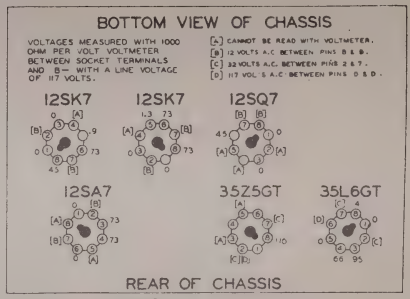


NOTE: On some sets R8 is replaced by a speaker field; R9 is also eliminated and C11 and C12 are connected in parallel.

Part No.	Circuit Diagram Reference	Description	List Price Each
		CONDENSERS	
1001	C5	.1 x 400 Volt Tubular Condenser	.25
1006	C6	.25 x 200 Volt Tubular Condenser	.25
1009	C13	.05 x 200 Volt Tubular Condenser	.25
10011	C1	.01 x 400 Volt Tubular Condenser	.25
10025	C18	.002 x 600 Volt Tubular Condenser	.25
10026	C3, C14	.02 x 400 Volt Tubular Condenser	.25
100106	C15	.004 x 600 Volt Tubular Condenser	.25
100110	C19	.2 x 400 Volt Tubular Condenser	.25
11994	C10, C11, C12	40 Mfd.—20 Mfd.—20 Mfd.—Electrolytic Condenser (For 60 Cycles)	1.50
11995	C10, C11, C12	60 Mfd.—40 Mfd.—40 Mfd.—Electrolytic Condenser (For 25 Cycles)	2.00
NOTE: 11995 not needed for 25 cycles when set uses electrodynamic speaker.			
1295	C8, C9, C17, C20	.0001 Mica Type Condenser—20%	.25
12939	C16	.00005 Mica Type Condenser—20%	.25
129132	C2	.000125 Mica Type Condenser—5%	.25
		RESISTORS	
1303	R13	500M Ohm—½ Watt Resistor—20%	.20
1304	R11	3 Megohm—½ Watt Resistor—20%	.20
1309	R14	200M Ohm—½ Watt Resistor—20%	.20
13012	R16	50M Ohm—½ Watt Resistor—20%	.20
13020	R5	100M Ohm—½ Watt Resistor—20%	.20
13094	R6	50M Ohm—½ Watt Resistor—10%	.20
130100	R1, R3	150M Ohm—½ Watt Resistor—20%	.20
130166	R10, R12	150 Ohm—½ Watt Resistor—10%	.20
130168	R2	100 Ohm—½ Watt Resistor—10%	.20
130215	R7	25 Ohm—½ Watt Resistor—10%	.20
130218	R4	5M Ohm—½ Watt Resistor—10%	.20
130257	R17	5 Megohm—½ Watt Resistor—25%	.20
130287	R9	1200 Ohm—1 Watt Resistor—10%	.20
130296	R8	200 Ohm—1 Watt Resistor—10%	.20
1012f1	R15, S1	1 megohm—volume control and switch	1.00


BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B— WITH A LINE VOLTAGE OF 117 VOLTS.
[A] CANNOT BE READ WITH VOLTMETER.
[B] 12 VOLTS A.C. BETWEEN PINS B & B.
[C] 32 VOLTS A.C. BETWEEN PINS 2 & 7.
[D] 117 VOL. S A.C. BETWEEN PINS D & D.
12SK7
12SK7
12SQ7
12SA7
35Z5GT
35L6GT
REAR OF CHASSIS

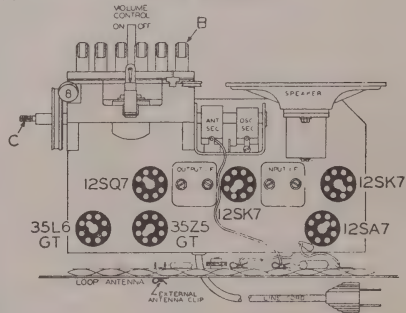


FIG. 1

ALIGNMENT PROCEDURE

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Variable Condenser Setting	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Four Trimmers on Top (See Fig. 1)	Output and Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1650 Kc.	.1 MFD.	Grid of 12SA7	Rotor full open (Plates out of mesh)	Trimmer bottom of rear section of gang. (See bottom of radio)	Broadcast Oscillator	Adjust to maximum output
	1400 Kc.	See Note "A"		Set dial at 1400 Kc.	Trimmer bottom of front section of gang. (See bottom of radio)	Broadcast Antenna	Adjust to maximum output

NOTE "A" Lay the output lead from the generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the generator.

● Connect B— of radio chassis to ground post of signal generator through .1 Mfd. condenser.

FREQUENCY RANGE
530 to 1650 K.C.

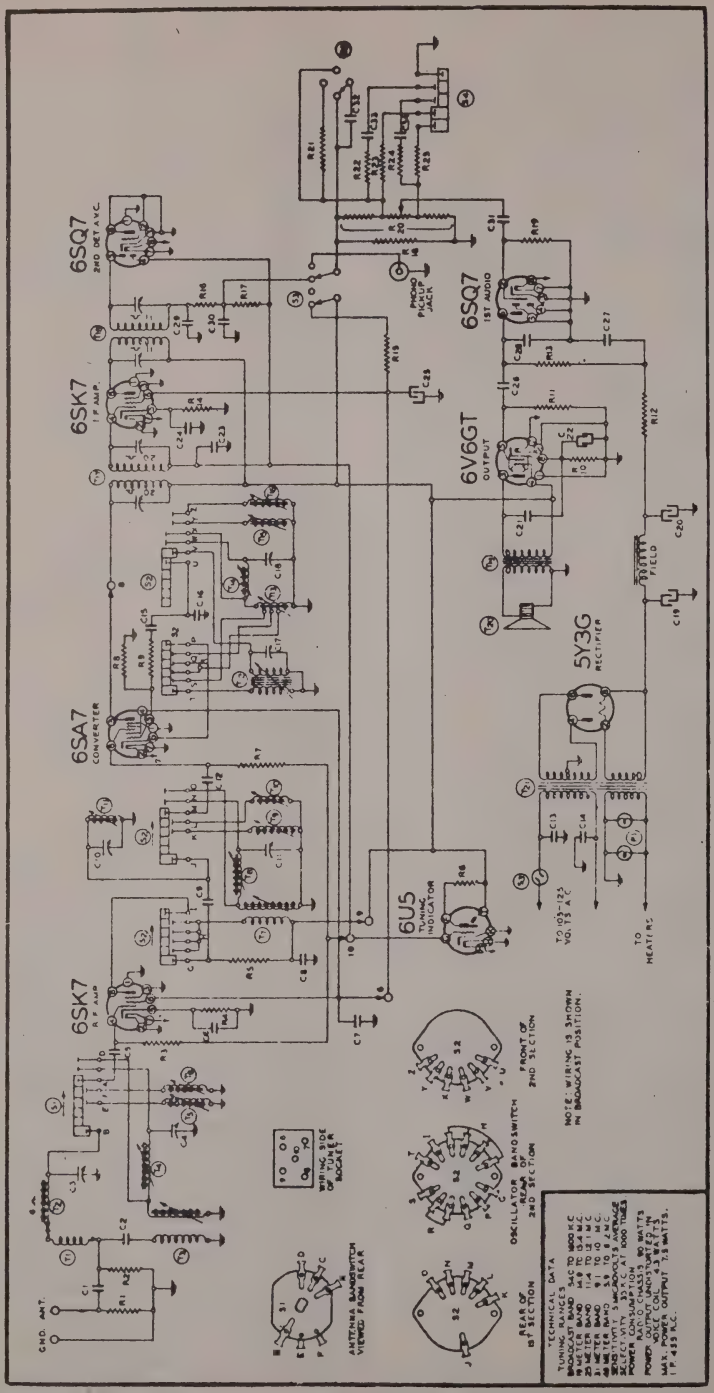
Power Consumption ..... 35 Watts

Power Output ..... 1 Watt Undistorted, 1.7 Watts Maximum

Intermediate Frequency ..... 455 K.C.

MODEL D1210

WESTERN AUTO SUPPLY CO.



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WESTERN AUTO SUPPLY CO.

MODEL D121C

Part No.	Schematic Diagram Reference	Description	No. Used In Set	Selling Price Each

MAIN CHASSIS PARTS LIST

CONDENSERS

10019	C31	.006 x 600 V. Tubular Condenser	1	.25
10013	C26	.05 x 400 V. Tubular Condenser	1	.25
10065	C21	.015 x 600 V. Tubular Condenser	1	.25
10026	C23	.02 x 400 V. Tubular Condenser	1	.25
10020	C24	.1 x 200 V. Tubular Condenser	1	.25
10061	C13, C1	.02 x 600 V. Bakelite Condenser	2	.35
1002	C33	.0003 x 600 V. Tubular Condenser	1	.25
100139	C34	.0015 x 200 V. Tubular Condenser	1	.25
1001	C27	.1 x 400 V. Tubular Condenser	1	.25
11991B	C22	Electrolytic Filter Condenser—40 Mfd. x 25 Volts	1	.50
119109	C19, C20, C25	Electrolytic Filter Condenser—15 Mfd. x 450 V.; 15 Mfd. x 450 V.; 10 Mfd. x 350 V.	1	1.50
		or		
119109B	C19, C20, C25	Electrolytic Filter Condenser—15 Mfd. x 450 V.; 15 Mfd. x 450 V.; 10 Mfd. x 350 V.	1	1.50
12951	C32	.000125 Mica Type Condenser	1	.25
1295	C28	.0001 Mica Type Condenser	1	.25
1292	C1	.0005 Mica Type Condenser	1	.25
129165	C29, C30	.00005 Dual Mica Condenser	1	.25

RESISTORS

101277	R20	Volume Control—Less Shaft—(2.8 Megohm)	1	1.00
115829		Shaft for Volume Control	1	.05
13070	R14	500 Ohm—½	1	.20
13012	R12, R16	50M Ohm—½	2	.20
1304	R17	3 Megohm—½	1	.20
130227	R10	250 Ohm—1	1	.20
1303	R11, R18, R25	500M Ohm—½	3	.20
13011	R13	250M Ohm—½	1	.20
130257	R19	5 Megohm—½	1	.20
130191	R21	1.5 Megohm—½	1	.20
130351	R22	80M Ohm—½	1	.20
1307	R24	40M Ohm—½	1	.20
130352	R23	150M Ohm—½	1	.20
1301	R1, R2	25M Ohm—½	2	.20
10662	R15	Resistor Strip. 12,500 Ohms—3 Watts	1	.35

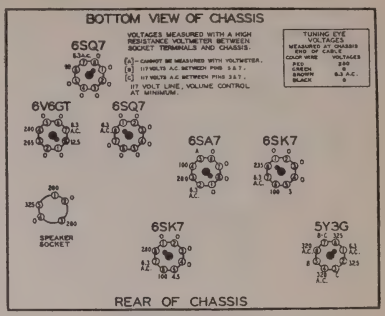
TUNER CHASSIS PARTS LIST

CONDENSERS

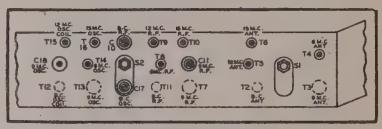
10020	C6	.1 x 200 Volt Tubular Condenser	1	.25
10047	C2	.002 x 600 Volt Tubular Condenser	1	.25
10074	C7, C8	.1 x 400 Volt Tubular Condenser	2	.35
124138	C11	9 Mc., R.F. Adjustable Trimmer Condenser	1	.20
124139	C10	B.C., R.F. Adjustable Trimmer Condenser	1	.25
124143	C3, C4	B.C., and 9 Mc. Dual Adjustable Antenna Trimmer Condenser	1	.30
124144	C17	B.C. Oscillator Adjustable Trimmer Condenser	1	.20
124145	C18	9 Mc. Oscillator Adjustable Trimmer Condenser	1	.35
1292	C5, C12	.0005 Mica Type Condenser—20%	1	.25
12938	C15	.00005 Mica Type Condenser—10%	1	.25
129168	C9	.00001 Mica Type Condenser—20%	1	.25
129167	C16	.0002 Silver Mica Type Condenser—3%	1	.35

RESISTORS

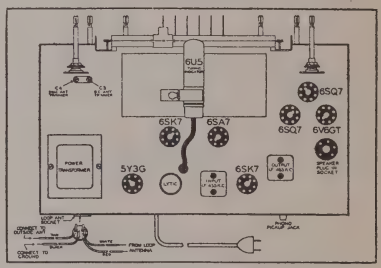
13019	R3, R7	1 Megohm—½ Watt Resistor—20%	1	.20
130218	R5	5M Ohm—½ Watt Resistor—10%	1	.20
130232	R8	25M Ohm—½ Watt Resistor—10%	1	.20
130239	R4	250 Ohm—¼ Watt Resistor—10%	1	.20
	R6	1 Megohm—In Tuning Eye Cable	1	.20
130174	R9	50 Ohm—½ Watt Resistor	1	.20



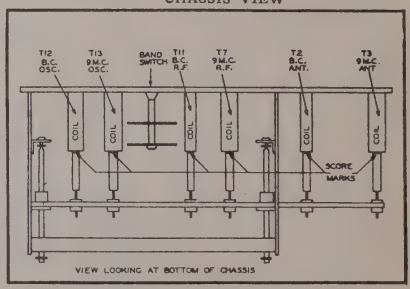
VOLTAGE CHART



TRIMMER VIEW



CHASSIS VIEW



IRON CORE ADJUSTMENT VIEW

ALIGNMENT PROCEDURE

- Tone control—Treble.
- Volume control—Maximum all adjustments.
- Use an all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Band Switch	Dial Pointer Setting	Trimmers Adjusted To Maximum
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 (I.F.)	Broadcast	Set Dial at 1600 Kc.	On Top of Output I.F.
	455 Kc.	.1 MFD.	Grid of 6SA7	Broadcast	Set Dial at 1600 Kc.	On Top of Input I.F.
31 METER BAND	9.6 Mc.	400 ohms	Antenna lead	31M	Set Dial at 9.6 Mc.	(See Trimmer View) C18—Osc. (See Trimmer View) T11—R.F. (See Chassis View) C4—Ant.
49 METER BAND	6.1 Mc.	400 ohms	Antenna lead	49M	Set Dial at 6.1 Mc.	(See Trimmer View) T14—Osc. (See Trimmer View) T8—R.F. (See Trimmer View) T4—Ant.
25 METER BAND	11.8 Mc.	400 ohms	Antenna lead	25M	Set Dial at 11.8 Mc.	(See Trimmer View) T15—Osc. (See Trimmer View T9—R.F. (See Trimmer View) T5—Ant.
19 METER BAND	15.2 Mc.	400 ohms	Antenna lead	19M	Set Dial at 15.2 Mc.	(See Trimmer View) T16—Osc. (See Trimmer View) T10—R.F. (See Trimmer View) T6—Ant.
BROAD-CAST BAND	1600 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1600 Kc.	(See Trimmer View) C17—Osc. (See Trimmer View) C10—R.F. (See Chassis View) C3—Ant.
	1400 Kc.	200 mmf.	Antenna lead	Broadcast	Set Dial at 1400 Kc.	Rotate Core T11—R.F. Rotate Core T2—Ant. (See Iron Core Adjustment View)

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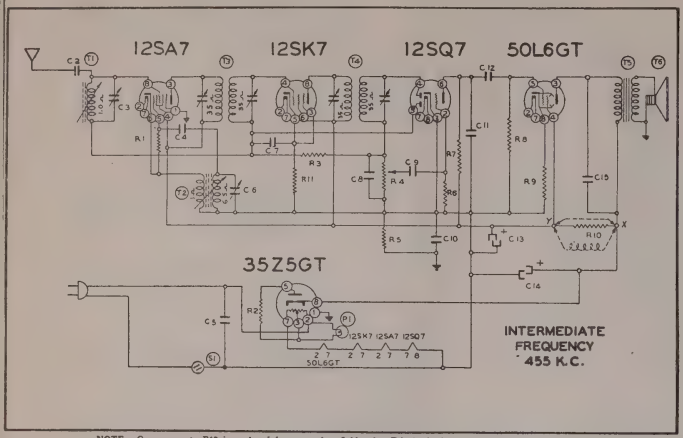
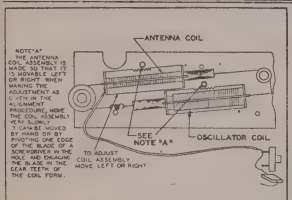
MODELS D1215, D2210

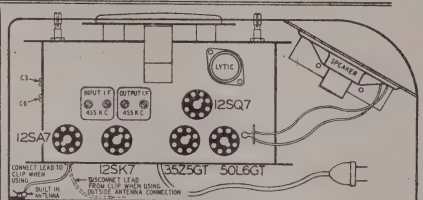
WESTERN AUTO SUPPLY CO.



NOTE: On some sets R10 is replaced by a speaker field; also B+ lead of output transformer is moved from point "X" to point "Y".

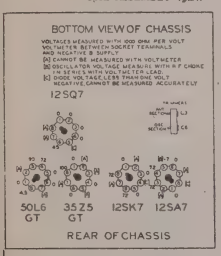

ANTENNA COIL
OSCILLATOR COIL
SEE NOTE "A"
TO ADJUST THE BLADE IN THE GEAR TEETH OF THIS COIL FORM.
MOVE COIL ASSEMBLY LEFT OR RIGHT

COIL ASSEMBLY VIEW



CHASSIS VIEW

Note: When using an outside aerial disconnect lead wire from clip and connect to outside aerial as shown above.



PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Replacement Parts List

Part No.	Schematic Diagram Reference	Description	No. Selling Used In Set	Price Each
		CONDENSERS		
1001	C5	.1 x 400 Volt Tubular Condenser	1	.25
1009	C7	.05 x 200 Volt Tubular Condenser	1	.25
10011	C15	.01 x 400 Volt Tubular Condenser	1	.25
10025	C9	.002 x 600 Volt Tubular Condenser	1	.25
10091	C10	.15 x 400 Volt Tubular Condenser	1	.25
10078	C12	.01 x .200 Volt Tubular Condenser	1	.25
11992	C13, C14	Electrolytic Filter Condenser 20 Mfd. x 150 Volts; 40 Mfd. x 150 Volts	1	1.50
134150	C3, C6	Antenna and Oscillator Dual Trimmer Condenser	1	.35
12912	C8	.00025 Mica Type Condenser—20%	1	.25
12938	C4	.00005 Mica Type Condenser—10%	1	.25
129160	C11	.0004 Mica Type Condenser—20%	1	.35
129187	C2	.000025 Mica Type Condenser—20%	1	.25
		RESISTORS		
1305	R6	300M Ohm—½ Watt Resistor—20%	1	.30
13080	R5, R7	150M Ohm—½ Watt Resistor—10%	2	.20
130166	R9	150 Ohm—½ Watt Resistor—10%	1	.20
130170	R8	3 Megohm—½ Watt Resistor—25%	1	.20
130199	R10	1500 Ohm—1 Watt Resistor—10%	1	.30
130233	R1	25M Ohm—½ Watt Resistor—10%	1	.20
130257	R4	5 Megohm—½ Watt Resistor—25%	1	.20
130304	R2	25 Ohm—½ Watt Resistor—20%	1	.20
130168	R11	100 Ohm—½ Watt Resistor—20%	1	.20
		SOCKETS		
121216		Eight Prong Molded Octal Socket	5	.13
121316		Bakelite Socket Base for Filter Cond.	1	.10
		SPEAKER		
114813	T6	Four Inch Permanent Magnet Dynamic Speaker (Less Output Transformer)	1	2.75
		or		
114266		Four Inch Electrodynamic Speaker. (Less Output Transformer)		2.75
105117	T5	Output Transformer for Speaker	1	1.00
		COILS		
108157J	T3	Input I. F. Coil Complete in Can	1	1.00
108157K	T4	Output I. F. Coil Complete in Can	1	1.00
112327	T1, T2	Complete Tuning Assembly (Consisting of Antenna and Osc. Coils)	1	3.50
		MISCELLANEOUS		
10798		Line Cord and Plug	1	.30
101230	R4, S1	Volume Control and Switch (500M Ohm)	1	1.00
107249	P1	6-8 Volt Pilot Lite Bulb—Type T-47	1	.10
107344		Socket Assembly for Pilot Lite	1	.10
107305		Insulating Shield for Pilot Lite Socket	1	.02
128523-4		Knob—Mahogany	2	.10
		DIAL PARTS		
112822		Dial Scale	1	1.00
112824		Crystal for Dial Scale	1	.30
131211		Snap-in Rivets	7	.01
112825		Pointer	1	.15
120184		Coiled Tension Spring for Dial String	1	.05
128214		Silk Line Dial String	.15	Yd.
117809		Shaft for Pointer	1	.10
115647		Bracket for Dial	1	.30
115648		Support for Dial Bracket	1	.10
117808		Drive Shaft	1	.15
115394		Drive Bracket	1	.15

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B— of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—: Mfd., and 200 Mmf.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Connect to Grid of 12SA7	Iron Cores All the way out	Two trimmers on top of output I. F. can	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Connect to Grid of 12SA7	Iron Cores All the way out	Two trimmers on top of input I. F. can	Input I. F.	Adjust to maximum output
BROADCAST BAND	1720 Kc.	.1 MFD.	Connect to Grid of 12SA7	Iron Cores All the way out	Trimmer (C8) (See chassis view)	Oscillator	Adjust to maximum output
	1720 Kc.	200 MMF.	Connect to Outside Antenna Lead	Iron Cores All the way out	Trimmer (C6) (See chassis view)	Antenna	Adjust to maximum output
	1400 Kc.	200 MMF.	Connect to Outside Antenna Lead	Turn Dial to 1400 Kc.	Adjust position of antenna coil (See coil assembly view)	Antenna Coil Adjustment	Adjust to maximum output (See Note "A")
	1720 Kc.	200 MMF.	Connect to Outside Antenna Lead	Turn Dial to 1720 Kc.	Adjust trimmer (C3) (See chassis view)	Antenna	Check for tracking (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment again at 1720 Kc. If no appreciable change in trimmer adjustment is made the coil is in track. If the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1720 Kc.

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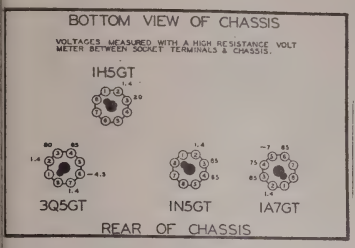
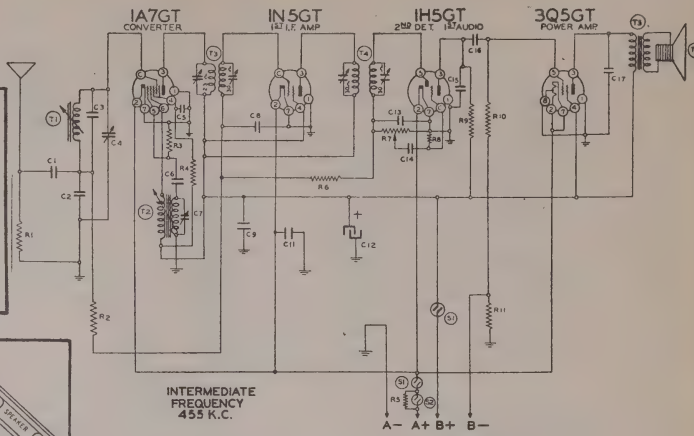
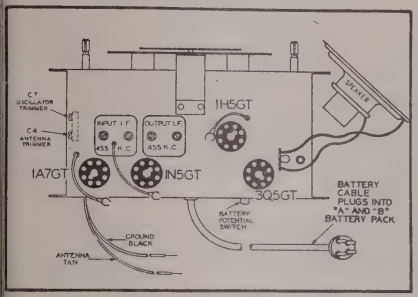
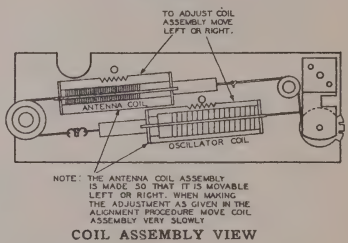
MODELS D1224, D2261







CHASSIS VIEW


TO ADJUST COIL ASSEMBLY MOVE LEFT OR RIGHT.
ANTENNA COIL
OSCILLATOR COIL
NOTE: THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT. WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE ALIGNMENT PROCEDURE MOVE COIL ASSEMBLY VERY SLOWLY

COIL ASSEMBLY VIEW

ALIGNMENT PROCEDURE

The following equipment is required for aligning.

- Dummy antenna .1 mfd. and 200 mmf.
- Volume control—Maximum all adjustments.
- Connect ground lead of radio chassis to ground post of signal generator.

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (in Order Shown)	Trimmer Function	Ajustment
455 Kc. I. F.	455 Kc.	.1 MFD.	Connect to Grid of 1A7	Iron Cores All the way out	Two trimmers on top of output I. F. can	Output I. F.	maximum output
	455 Kc.	.1 MFD.	Connect to Grid of 1A7	Iron Cores All the way out	Two trimmers on top of input I. F. can	Input I. F.	maximum output
BROADCAST BAND	1700 Kc.	.1 MFD.	Connect to Grid of 1A7	Iron Cores All the way out	Trimmer (C7) (See chassis view)	Oscillator	maximum output
	1700 Kc.	200 MMF.	Connect to Antenna	Iron Cores All the way out	Trimmer (C4) (See chassis view)	Antenna	maximum output
	1400 Kc.	200 MMF.	Connect to Antenna	Turn Dial to 1400 Kc.	Adjust position of antenna coil (See coil assembly view)	Antenna Coil Adjustment	maximum output (See Note "A")
	1700 Kc.	200 MMF.	Connect to Antenna	Turn Dial to 1700 Kc.	Adjust Trimmer (C4) (See chassis view)	Antenna	Check for tracking (See Note "B")

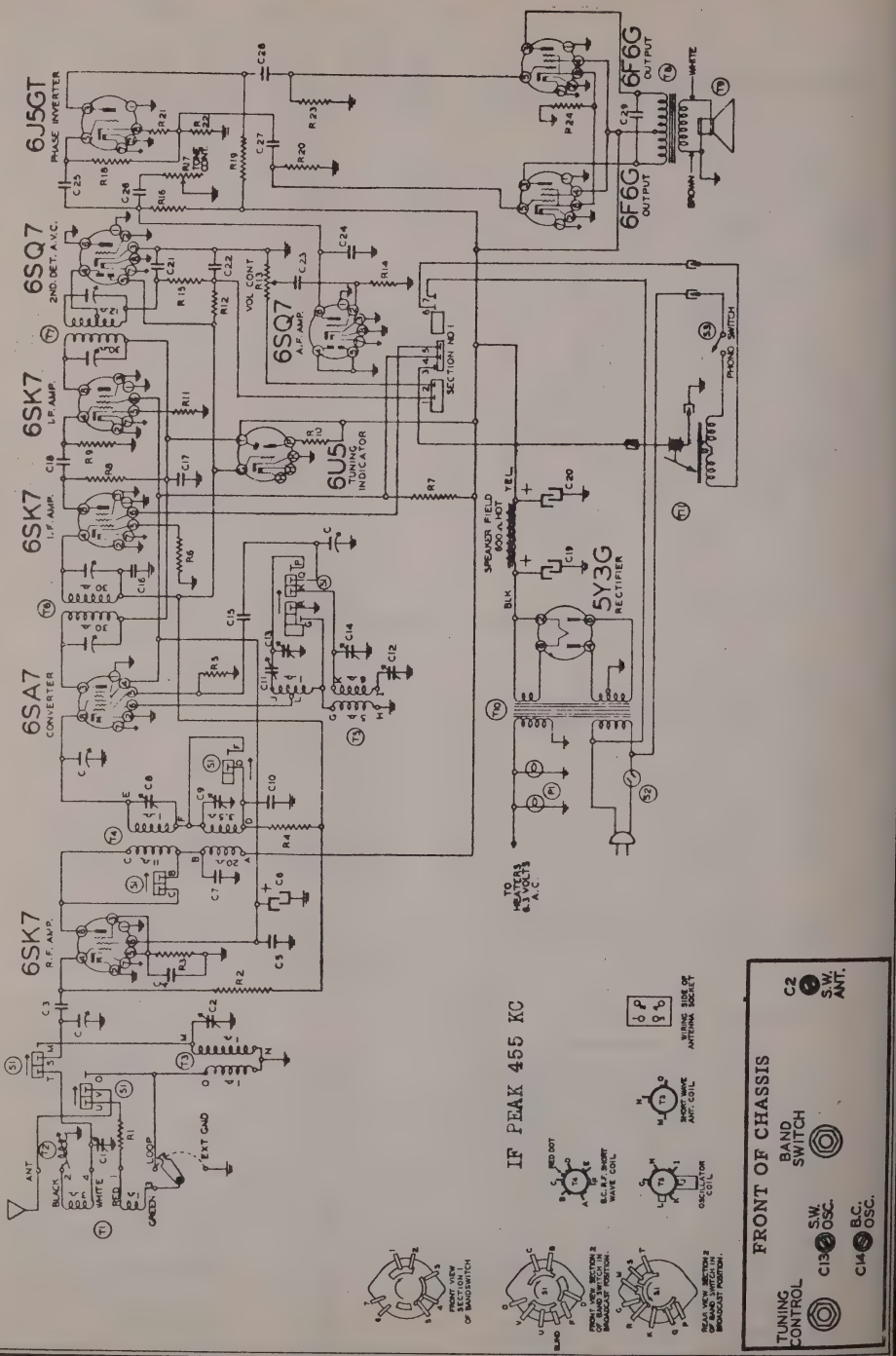
NOTE "A"—The antenna coil assembly is made so that it is movable. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C4) adjustment again at 1700 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1700 Kc.

Part No.	Schematic Reference	Description	No. Used	Price Each
		CONDENSERS		
1007	C17	.005 Mfd. x 600 Volt Tubular Condenser	1	.25
1006	C9	.25 Mfd. x 200 Volt Tubular Condenser	1	.25
10012	C14	.003 Mfd. x 600 Volt Tubular Condenser	1	.25
10017	C11	.5 Mfd. x 120 Volt Tubular Condenser	1	.35
10022	C5, C8	.05 Mfd. x 200 Volt Tubular Condenser	2	.25
10026	C16	.02 Mfd. x 400 Volt Tubular Condenser	1	.25
100112	C2	.001 Mfd. x 200 Volt Tubular Condenser	1	.25
119117	C12	Electrolytic Filter Condenser—10 Mfd. x 150 Volts	1	.40
124165	C4, C7	Dual Trimmer Condenser, Ant. and Oscillator	1	.25
12912	C6	.00025 Mica Type Condenser—20%	1	.25
12940	C13, C15	.0001 Mica Type Condenser—10%	2	.25
129114	C1	.0003 Mica Type Condenser—20%	1	.25
129177	C3	.000045 Ceramicon Condenser—5%	1	.35
		RESISTORS		
1304	R2, R6	3 Megohm—½ Watt Resistor—20%	2	.20
1309	R1	200M Ohm—½ Watt Resistor—20%	1	.20
13068	R9	1 Megohm—½ Watt Resistor—10%	1	.20
13079	R11	400 Ohm—½ Watt Resistor—10%	1	.20
13082	R1	10M Ohm—½ Watt Resistor—10%	1	.20
130194	R4	35M Ohm—½ Watt Resistor—10%	1	.20
130257	R8	5 Megohm—½ Watt Resistor—25%	1	.20
130346	R5	.56 Ohm—5 Watt Wire Wound Resistor—5%	1	.20
130146	R10	2 Megohm—½ Watt Resistor—10%	1	.30
		SOCKETS		
121210		Eight Prong Molded Octal Socket	4	.15
		COILS		
13613	T1, T2	Permeability Tuning Unit Complete with Antenna and Oscillator Coils	1	3.50
108202B	T3	Input I.F. Coil Complete in Can	1	1.25
108153C	T4	Output I.F. Coil Complete in Can	1	1.25
		SPEAKER		
114213	T6	Four Inch P.M. Dynamic Speaker—Less Output Transformer	1	2.00
10591C	T5	Output Transformer for Speaker	1	.75
		DIAL PARTS		
112924		Dial Scale	1	1.00
112824		Crystal for Dial	1	.30
131211		Snap-in Rivets for Dial	6	.01
112825		Pointer	1	.15
1209		String for Dial	1'	Yd. .15
120184		Coiled Tension Spring for Dial String	1	.05
115647		Bracket and Support for Dial	1	.30
		MISCELLANEOUS		
101210	R7, S1	Volume Control and Switch	1	1.00
107364	S2	Battery Cable Assembly	1	.50
12388B		Battery Potential Switch	1	.25
128775		Metal Cabinet (Walnut)	1	
128790B		Back for Cabinet	1	
128523-14		Knob—Without Dot	1	.10
128523C-14		Knob—With Dot	1	.10

MODELS D1250

WESTERN AUTO SUPPLY CO.



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MODELS D1250

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CONDENSERS

Part No.	Schematic Diagram Reference	Description	No. Used In Set	Price Each
102129B	C	Three Gang Variable Condenser	1	4.00
'0020	C4	.1 x 200 Volt Tubular Condenser	1	.25
10026	C10, C16, C25	.02 x 400 Volt Tubular Condenser	3	.25
10025	C23	.002 x 600 Volt Tubular Condenser	1	.25
1009	C27	.05 x 200 Volt Tubular Condenser	1	.25
10013	C28	.05 x 400 Volt Tubular Condenser	1	.25
10011	C26	.01 x 400 Volt Tubular Condenser	1	.25
10071	C29	.004 x 600 Volt Tubular Condenser	1	.25
100117	C5, C17	.25 x 400 Volt Tubular Condenser	2	.35
119124	C6, C19, C20	Electrolytic Filter Condenser—10 Mfd. x 350 V.; 25 Mfd. x 450 V.; 25 Mfd. x 450 V.	1	1.50
124117	C2	S.W. Antenna Trimmer	1	.20
124131	C8,C9	S.W. and B.C. R.F. Trimmer—Dual	1	.35
124130	C13, C14	S.W. and B.C. Osc. Trimmer—Dual	1	.35
124132	C1	B.C. Antenna Trimmer	1	.20
129157	C12	.000525 Compression Cond.—B.C. Pad	1	.35
1292	C3, C18	.0005 Mica Type Condenser—20%	2	.25
129160	C7	.0004 Mica Type Condenser—20%	1	.35
12939	C15	.00005 Mica Type Condenser—20%	1	.25
1295	C21, C22	.0001 Mica Type Condenser—2%	2	.25
129156	C11	.0024 Compression Mica Condenser	1	.50
12912	C24	.00025 Mica Type Condenser—20%	1	.25

TRANSFORMERS

10554B	T8	Output Transformer for Speaker	1	1.50
104202C	T10	Power Transformer, 50 to 60 Cycles 105-125 Volt Primary	1	4.50
104203C		Power Transformer 25 to 60 Cycles 105-125 Volt Primary		

RECORD CHANGER COMPARTMENT

104297	S2	Automatic Record Changer Complete (N-200) 115 Volts A.C. 60 Cycles L-26 Cartridge	1	
10794	P2	Indicator Light Bulb	1	.10
107388		Socket Assembly for Pilot Lite	1	.35

SPEAKER

Part No.	Schematic Diagram Reference	Description	No. Used In Set	Price Each
114275	T9	Ten Inch Electrodynamic Speaker (Less Output Transformer)	1	6.00

RESISTORS

101278	R13, S2	Volume Control and Switch (500M Ohms) Less Shaft	1	1.25
101279	R17	Tone Control (1 Megohm) Less Shaft	1	.90
115834		Shaft Only For Volume and Tone Controls	2	.05
13019	R2, R18	1 Megohm—½ Watt Resistor—20%	2	.20
1305	R4	300M Ohm—½ Watt Resistor—20%	1	.20
130208	R5	40M Ohm—½ Watt Resistor—20%	1	.20
13054	R6, R11	500 Ohm—½ Watt Resistor—20%	2	.20
130263	R8	12M Ohm—½ Watt Resistor—20%	1	.20
13020	R9, R19, R22	100M Ohm—½ Watt Resistor—20%	3	.20
130304	R7	12M Ohm—2 Watt Resistor—10%	1	.20
13012	R15	50M Ohm—½ Watt Resistor—20%	1	.20
130170	R12	3 Megohm—½ Watt Resistor—25%	1	.20
130257	R14	5 Megohm—½ Watt Resistor—30%	1	.20
13043	R21	2500 Ohm—½ Watt Resistor—20%	1	.20
1303	R20, R23	500M Ohm—½ Watt Resistor—20%	2	.20
13011	R16	250M Ohm—½ Watt Resistor—20%	1	.20
130311	R24	300 Ohm—1 Watt Resistor—20%	1	.20
13099	R3	300 Ohm—½ Watt Resistor—20%	1	.20
13024	R1	400 Ohm—½ Watt Resistor—20%	1	.20
	R10	1 Megohm—In Eye Socket	1	.20

COILS

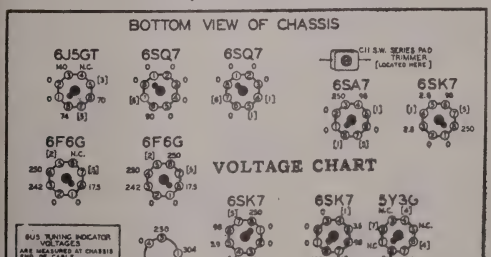
108169K	T6	Input I. F. Coil Complete in Can	1	1.00
108130G	T7	Output I.F. Coil Complete in Can	1	1.25
10957	T4	B.C.—S.W. R.F. Coil Complete in Can	1	1.25
110149	T5	B.C.—S.W. Oscillator Coil	1	.75
111176	T3	S.W. Antenna Coil	1	.50
111153	T2	Loop Adjusting Coil With Iron Slug	1	.50
111257B	T1	Loop Antenna Assembly	1	2.00

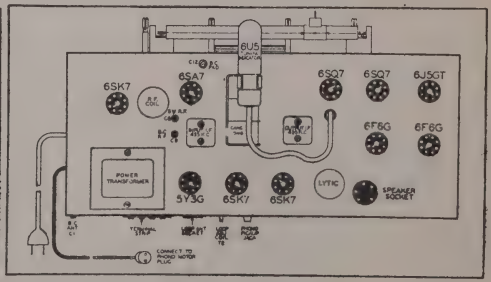
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

Alignment Procedure

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Position of Band Switch	Variable Condenser Setting	Trimmers Adjusted to Max mum (in Order Shown)
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 I. F.	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top Output I. F.
	455 Kc.	.1 MFD.	Grid of 6SA7 Mixer	Broadcast	Rotor full open (Plates out of mesh)	Two trimmers on top Input I. F.
SHORT WAVE BAND	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	C13, S.W. Osc.
	17 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 17 Mc.	C8, S.W. R.F., C2 S.W. Antenna
	6 Mc.	400 Ohms	External Antenna and Ground	Short Wave	Set Dial at 6 Mc.	C11 S.W. Osc. Series Pad See Note "A"
BROAD-CAST BAND	1580 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Rotor full open (Plates out of mesh)	C14 B.C. Osc.
	540 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Set Dial at 540 Kc. (Plates in Mesh)	C12 B.C. Osc. Series Pad
	1400 Kc.	200 mmf.	Grid of 6SK7 R. F. Tube	Broadcast	Set Dial at 1400 Kc.	C9 B.C. R.F.
LOOP ALIGN-MENT	1400 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 1400 Kc.	C1 B.C. Ant.
	600 Kc.	200 mmf.	External Antenna and Ground	Broadcast	Set Dial at 600 Kc.	T2 Iron Core Tracking Coil

NOTE "A"—Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.


BOTTOM VIEW OF CHASSIS
6J5GT
6SQ7
6SQ7
C11 S.W. SERIES PAD TRIMMER (LOCATED HERE)
6SA7
6SK7
6F6G
6F6G
VOLTAGE CHART
6SK7
6SK7
5Y3G
6US TUNING INDICATOR VOLTAGES ARE MEASURED AT CHASSIS END OF CABLE
COLOR WIRE VOLTAGES
RED 250 V.
GREEN 0
BROWN 6.3 V. A.C.
BLACK 0
SPEAKER SOCKET
ALL VOLTAGES MEASURED WITH A HIGH RESISTANCE VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
(1)-CANNOT BE MEASURED WITH VOLTMETER.
(2)-BIAS 17.5 VOLTS READ ACROSS RESISTOR NO. R 24
(3)-BIAS 2.5 VOLTS READ ACROSS RESISTOR NO. R 21
(4)- 640 VOLTS A.C. BETWEEN PINS 4 & 8.
(5)- 6.3 VOLTS A.C. BETWEEN PINS 2 & 7.
(6)- 6.3 VOLTS A.C. BETWEEN PINS 7 & 8.
(7)- 5.0 VOLTS A.C. BETWEEN PINS 2 & 8.
NOTE N.C.= NO CONNECTION.
REAR OF CHASSIS



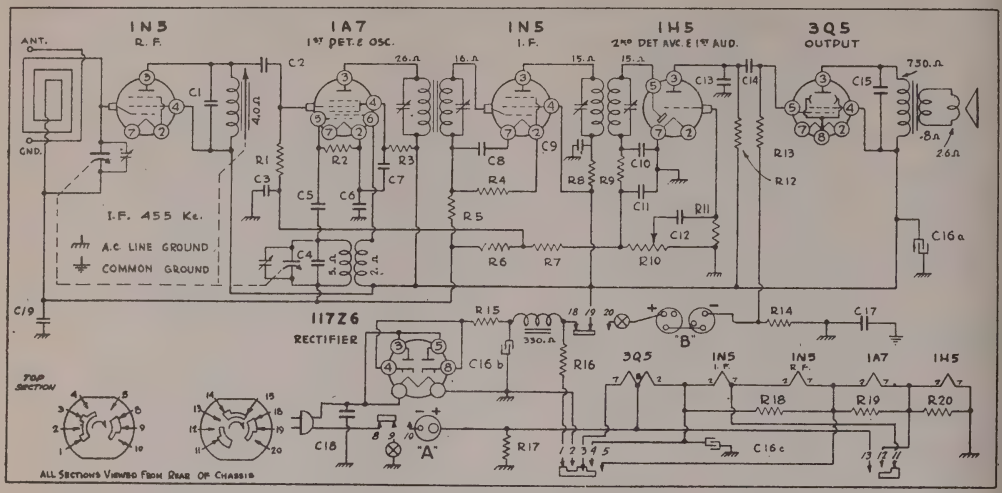
CHASSIS VIEW

This radio uses Detrola Model N100 record changer. Replacement parts should be ordered from the Detrola Corp.

FOR RECORD CHANGER DATA, SEE RIDER'S "AUTOMATIC RECORD CHANGERS AND RECORDERS".

MODELS D1281,
D3230

WESTERN AUTO SUPPLY CO.



RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	100,000	½	R11	15,000,000	½
R2	200,000	½	R12	1,000,000	½
R3	50,000	½	R13	2,000,000	½
R4	5,000,000	½	R14	400	½
R5	5,000,000	½	R15	22	½
R6	5,000,000	½	R16	2,150	5
R7	3,000,000	½	R17	3,000	½
R8	5,000	½	R18	500	½
R9	70,000	½	R19	200	½
R10	1,000,000	V.C.	R20	110	½

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.000367	Silver Mica	C11	.0001	Mica
C2	.00025	Mica	C12	.01	400
C3	.01	400	C13	.00025	Mica
C4	.000015	Mica	C14	.01	400
C5	.00005	Mica	C15	.002	600
C6	.25	200	C16a	40.	150
C7	.01	400	C16b	30.	150
C8	.01	400	C16c	100.	25
C9	.05	400	C17	.1	400
C10	.00005	In I.F. Can	C18	.05	400
			C19	.05	200

SERVICE DATA FOR PROFESSIONAL SERVICEMEN

SERVICE NOTES

Voltages taken from the different points of the circuit to chassis are measured with volume control in maximum position, all tubes in their sockets and with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the voltage chart.

All voltages should be measured with 117.5 volts AC input to receiver. Resistance and actual connections of coils and transformers and speaker data are given under Service Information.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good until the defective unit is located.

ALIGNING INSTRUCTIONS

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver, a signal generator as well as an output meter, must be used.

SEE INDEX FOR ALIGNMENT

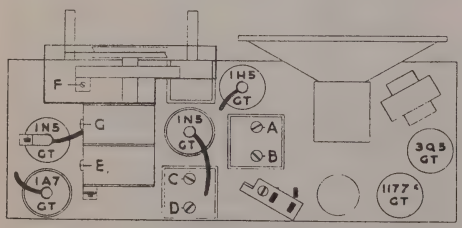


FIG. 1 TOP VIEW

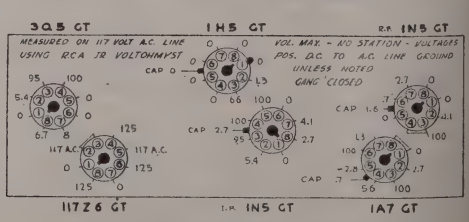


FIG. 2 VOLTAGE CHART

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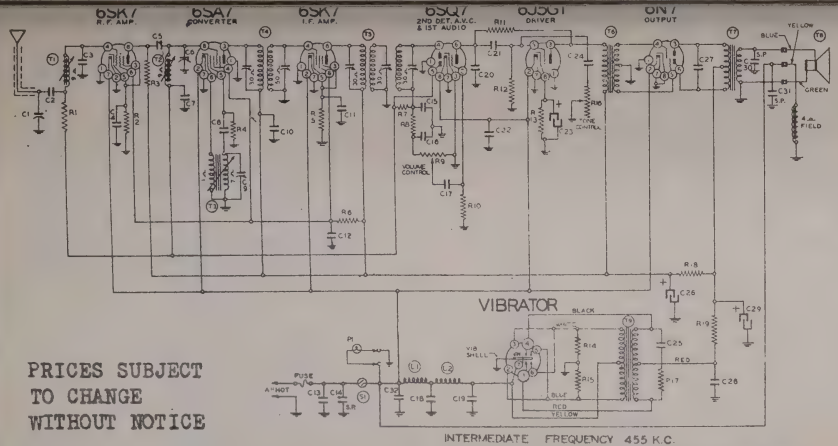

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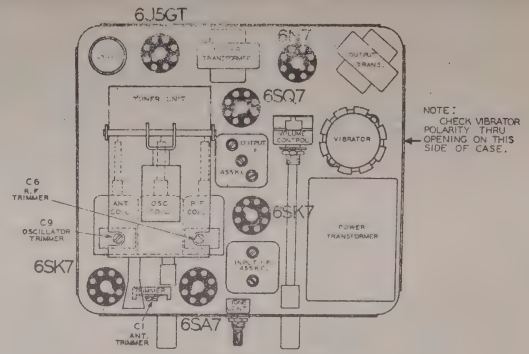


CHASSIS VIEW
SHOWING TRIMMER POSITIONS

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non metallic screwdriver.
- Dummy antennas .1 mfd., 35 mmf.

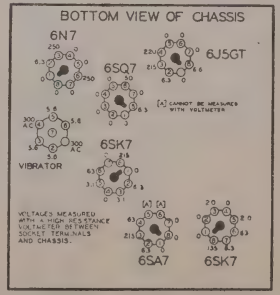
BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Remote Tuner Dial Setting	Trimmers Adjusted (in Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 I. F. Tube	Set dial at 1400 Kc.	See Chassis View	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Grid of 6SA7 I. F. Tube	Set dial at 1400 Kc.	See Chassis View	Input I. F.	Adjust to maximum output
BROAD-CAST BAND	1600 Kc.	35 mmf.	Antenna lead	Set dial at 1600 Kc.	Trimmer C9, C6, C1 Chassis View	Oscillator R. F. antenna	Adjust to maximum output
	1400 Kc.	35 mmf.	Antenna lead	Set dial at 1400 Kc.	Rotate cores of antenna and R. F. coils	Antenna and R. F.	Adjust to maximum output

CONDENSERS

Part No.	Schematic Diagram Reference	Description	No. Used In Set	Selling Price Each
1001	C10, C28	.1 x 400 Volt Tubular Condenser	2	.25
10011	C24	.01 x 400 Volt Tubular Condenser	1	.25
10053	C12	.25 x 400 Volt Tubular Condenser	1	.35
10031	C13, C18, C19	.5 x 120 Volt Oval Type Condenser	3	.60
100126	C27	.006 x 800 Volt Tubular Condenser	1	.25
100127	C2, C17	.01 x 120 Volt Tubular Condenser	2	.25
100128	C4, C11	.05 x 120 Volt Tubular Condenser	2	.25
100129	C7	.02 x 120 Volt Tubular Condenser	1	.25
10098	C25	.005 x 1600 Volt Tubular Condenser	1	.25
10026	C21	.02 x 400 Volt Condenser	1	.25
10081		.5 Mfd. Generator Condenser	1	.50
10082		.5 Mfd. Ammeter Condenser	1	.40
119118	C23, C26, C29	Electrolytic Filter Condenser 20 Mfd. x 25 V.; 20 Mfd. x 400 V.; 20 Mfd. x 400 V.	1	1.50
124157	C1	Antenna Trimmer Condenser	1	.30
124158	C9	Oscillator Trimmer Condenser	1	.25
124159	C6	R.F. Trimmer Condenser	1	.20
1292	C22	.0005 Mica Type Condenser—20%	1	.25
129145	C5	.00001 Ceramicon Zero Coefficient Condenser—1%	1	.25
129165B	C15, C16	.00005 Dual Mica Condenser	1	.25
129172	C3, C8	.0001 Ceramicon Negative Coefficient Condenser—5%	2	.25
12912	C20, C32	.00025 Mica Type Condenser	2	.25

RESISTORS

13016	R5	900 Ohm—½ Watt Resistor—10%	1	.20
13019	R7	1 Megohm—½ Watt Resistor—20%	1	.20
13092	R13, R17	1000 Ohm—½ Watt Resistor—10%	2	.20
130102	R11, R12	500M Ohm—½ Watt Resistor—10%	2	.20
130168	R14, R15	100 Ohm—½ Watt Resistor—10%	2	.20
130196	R6	30M Ohm—1 Watt Resistor—10%	1	.20
130199	R18	1500 Ohm—1 Watt Resistor—10%	1	.20
130257	R10	5 Megohm—½ Watt Resistor—25%	1	.20
130328	R19	75 Ohm—½ Watt Resistor—20%	1	.20
130329	R4, R8	47M Ohm—½ Watt Resistor—20%	2	.20
130330	R1	220M Ohm—½ Watt Resistor—20%	1	.20
130331	R3	15M Ohm—½ Watt Resistor—10%	1	.20
130332	R2	250 Ohm—½ Watt Resistor—10%	1	.20
130202		Distributor Suppressor	1	.30



WESTERN AUTO SUPPLY CO.
MODELS D1294, D4255
TRUETONE PAGE 14-29

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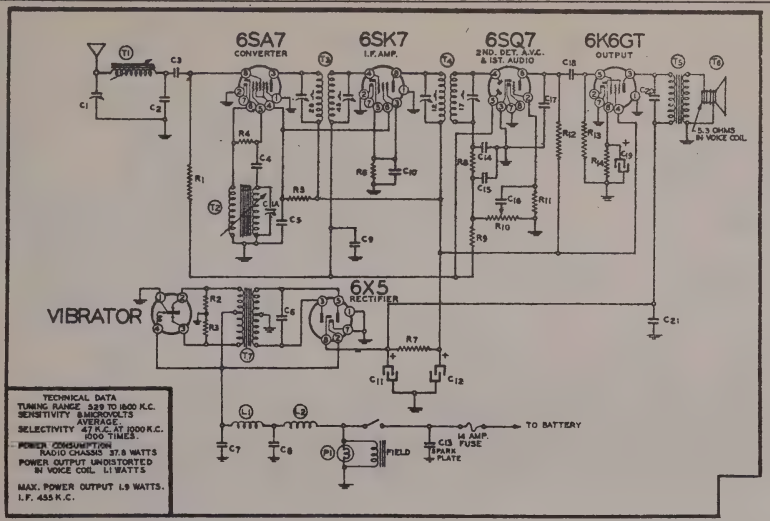
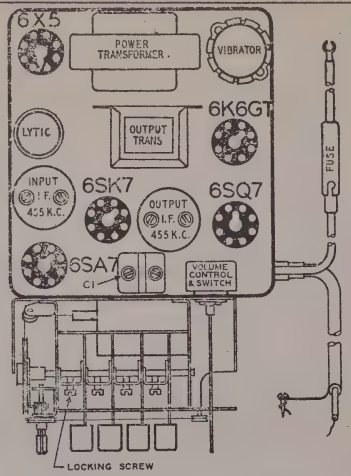
MODELS D1296, D4220

WESTERN AUTO SUPPLY CO.





CHASSIS VIEW—Showing tube location, trimmers, and the pushbutton locking-screws.

CONDENSERS

10026	C18	.02 x 400 Volt Tubular Condenser	1	.25
10067	C20	.01 x 600 Volt Tubular Condenser	1	.25
10013	C5	.05 x 400 Volt Tubular Condenser	1	.25
10020	C10	.1 x 200 Volt Tubular Condenser	1	.25
1009	C9	.05 x 200 Volt Tubular Condenser	1	.25
100125	C6	.0035 x 1600 Volt Tubular Condenser	1	.35
10025	C16	.002 x 600 Volt Tubular Condenser	1	.25
10031	C7, C8	.5 x 120 Volt Oval Condenser	2	.60
10081		.5 Mfd. Generator Condenser	1	.50
10082		.5 Mfd. Ammeter Condenser	1	.40
119105	C11, C12, C19	Electrolytic Filter Condenser—15 Mfd. x 350 V.; 15 Mfd. x 350 V.; 25 Mfd. x 25 V.;	1	1.50
124187	C1, C1A	Ant. and Oscillator Dual Trimmer	1	.35
1292	C3, C17	.0005 Mica Type Condenser—20%	2	.25
129188	C2	.00008 Mica Type Condenser—3%	1	.25
12921	C4	.0002 Mica Type Condenser—20%	1	.25
12912	C21	.00025 Mica Type Condenser—20%	1	.25
129161	C14, C15	.0001 Dual Mica Condenser—10%	1	.25
117149-B	C13	Spark Plate	1	.05

RESISTORS

101276	R10*	Volume Control and Switch (500M Ohms) (Less Shaft)	1	1.00
130257	R11	5 Megohm—½ Watt Resistor—25%	1	.20
13011	R12	250M Ohm—½ Watt Resistor—20%	1	.20
1303	R13	500M Ohm—½ Watt Resistor—20%	1	.20
130101	R14	600 Ohm—½ Watt Resistor—10%	1	.20
1304	R9	3 Megohm—½ Watt Resistor—20%	1	.20
13012	R8	50M Ohm—½ Watt Resistor—20%	1	.20
13083	R6	300 Ohm—½ Watt Resistor—10%	1	.20
13019	R1	1 Megohm—½ Watt Resistor—20%	1	.20
13076	R4	30M Ohm—½ Watt Resistor—20%	1	.20
130307	R5	15M* Ohm—1 Watt Resistor—10%	1	.20
130199	R7	1500 Ohm—1 Watt Resistor—10%	1	.20
130168	R2, R3	100 Ohm—½ Watt Resistor—10%	2	.20
130202		Distributor Suppressor	1	.30

COILS

108139-B	T3	Input I. F. Coil	1	1.25
108211	T4	Output I. F. Coil	1	1.25
13620	T1, T2	Permeability Tuning Unit Complete with Ant. and Osc. Coils	1	3.75
10566	L2	"A" Choke No. 16 Wire	1	.15
10568	L1	"A" Choke No. 18 Wire	1	.15

TRANSFORMERS

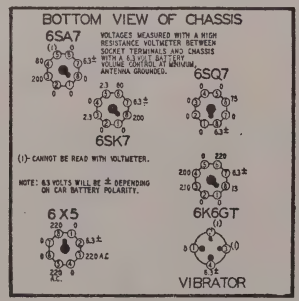
104295	T7	Power Transformer	1	3.00
105142	T5	Output Transformer for Speaker	1	1.25
114273	T6	Five Inch Electrodynamic Speaker. Less Output Transformer	1	3.50

VIBRATOR UNIT

12629		Plug-in Vibrator Unit	1	2.50

DIAL AND TUNER PARTS

1121028		Dial Scale	1	.35
1121025-45		Escutcheon	1	1.00
1121029		Set of Station Call Letters	1	.20
128773-45		Knob—For Tuning and Volume	2	.10
115860		Shaft for Volume Control	1	.05
128766-45		Pushbuttons	4	.10
1121027		Pointer	1	.10
120214		String for Pointer	.15	Yd.
120442		Tension Spring for Pointer String	1	.05
1121026		Diffuser for Dial	1	.10
131211		Snap-in Rivet to Fasten Diffuser	2	.01
107400		Socket Assembly for Pilot Lite	1	.10
10797	P1	6-8 Volt Pilot Lite, Type T-51	1	.10
115807		Pushrod—For Pushbuttons	4	.40
115799		"U" Cam—With Set Screw	4	.20
120445		Return Spring—For Pushrods	4	.05
117924		Tuning Shaft	1	.35
117311		Pinion Gear—Drives Crown Gear	1	.05
13623		Drum Assembly Complete with 115800 Crown Gear	1	.35
120441		Tension Spring for Slug Stringz	1	.05


BOTTOM VIEW OF CHASSIS
6SA7
VOLTAGES MEASURED WITH A HIGH RESISTANCE VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS WITH CONTROLS SET AT MINIMUM. ANTENNA GROUNDED.
6SQ7
6SK7
(1)-CANNOT BE READ WITH VOLTMETER.
NOTE: 6.3 VOLTS WILL BE ± DEPENDING ON CAR BATTERY POLARITY.
6X5
6K6GT
VIBRATOR

- VOLTAGE CHART

ALIGNMENT PROCEDURE

BAND	SIGNAL GENERATOR Frequency Setting	Dummy Antenna	Connection to Radio	Dial Setting	Trimmers Adjusted to Maximum
I. F.	455 Kc.	.1 MFD.	Grid of 6SK7 I. F. Tube	Set dial at 1400 Kc.	Output I. F.
	455 Kc.	.1 MFD.	Grid of 6SA7 I. F. Tube	Set dial at 1400 Kc.	Input I. F.
BROAD-CAST BAND	1600 Kc.	100 mmf.	Antenna lead	Set dial at 1600 Kc.	Trimmer C1A Oscillator C1 Antenna
	1400 Kc.	100 mmf.	Antenna lead	Set dial at 1400 Kc.	Rotate cores of Antenna coils

MODELS DW2090, DE3002

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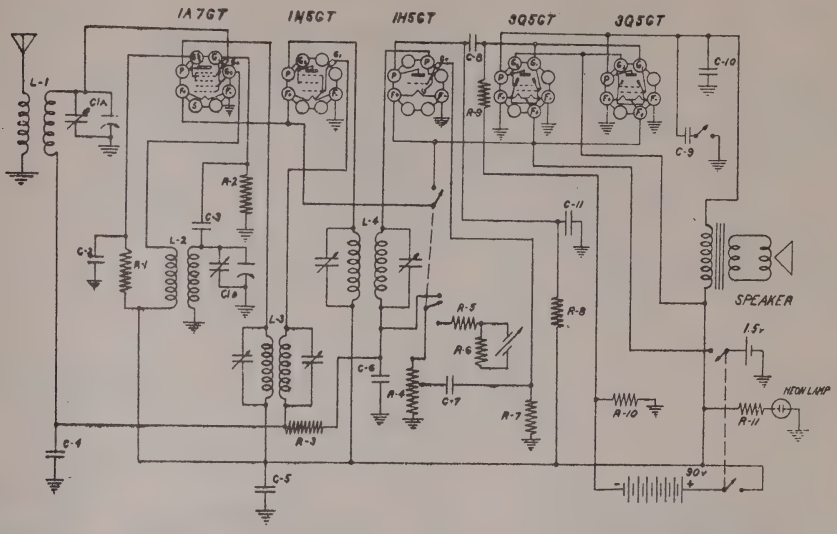

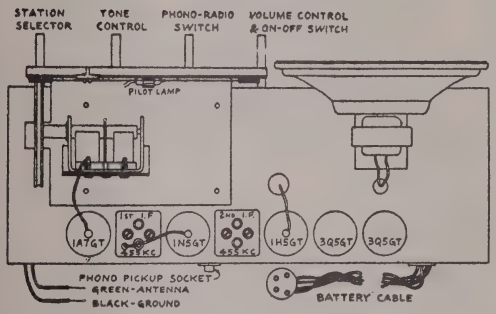

SEE INDEX FOR PARTS LIST

BOTTOM VIEW OF CHASSIS

VOLTAGES MARKED AT SOCKET TERMINALS ARE MEASURED WITH 1000 OHM PER VOLT METER, ON A 90 VOLT BATTERY WITH NO SIGNAL. (ANTENNA LEAD IS SHORTED TO THE CHASSIS) VOLTAGE FROM CHASSIS TO + OF BATTERY IS 4.4V

ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output Meter.
3. A non-metaillic screw driver.
4. Dummy antenna—.1 mfd., 200 mmf.

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TRIMMERS TO TUNE	REMARKS
IF 455 KC.	1A7 GRID	.1 mfd.	H. F. End	IF Transfomer	Tune to Max.
1620 KC.	Antenna	200 mmf.	H. F. End	4 Trimmers	Set Limit of Band
1400 KC.	Antenna	200 mmf.	1400	Oscillator Trimmer	Tune to Max.
				Antenna Trimmer	

Repeat above Alignment Procedure at least once more.

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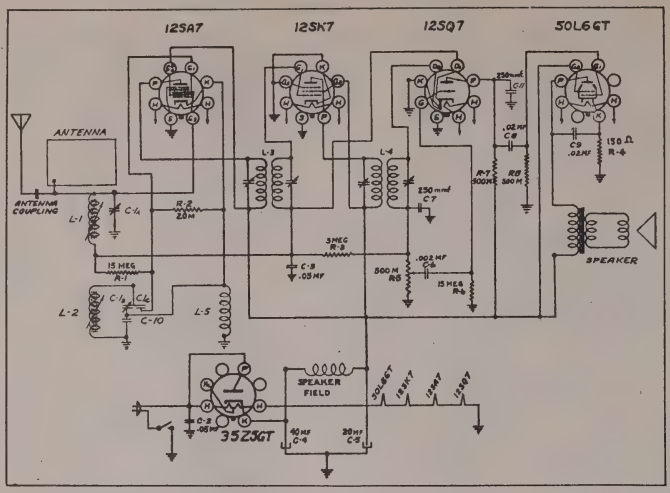
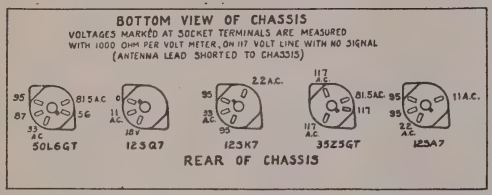
MODEL D2206

WESTERN AUTO SUPPLY CO.





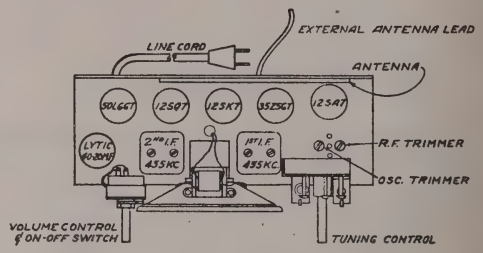


Figure 1

ALIGNMENT PROCEDURE

GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TRIMMERS TO TUNE	REMARKS
IF 455 KC	12SA7 GRID	.1 mfd.	H. F. End	IF Transformers	Tune to
				4 Trimmers	Max.
1720 KC	Antenna	200 mmf.	H. F. End (1720)	Oscillator	Set Limit
				Trimmer	Of Band
1400 KC	"	"	1400	Antenna	Tune to
				Trimmer	Max.

Repeat above Alignment Procedure at least once

Part No.	Circuit Diagram Reference	Description	List Price Each
9914		Book—Instruction	$0.20
9897		Cabinet	2.50
2163		Cable—Drive	.10
9458	L5	Coil—Cathode	.40
9513	L1, L2	Tuner-Permeability	2.00
9913		Antenna Capacity Plate Assembly	.55
9008	R5	Control—Volume and Switch	1.00
9510	C1a, b	Condenser—Trimmer	.40
1285	C1c	Condenser—Mica 100 mmf.	.20
8948	C4, C5	Condenser—Elect. 40 mfd.—20 mfd. 150V	1.00
824	C6	Condenser—Paper .002 mfd.—600V	.20
563	C2	Condenser—Paper .05 mfd.—400V	.20
576	C8, C9	Condenser—Paper .02 mfd.—400V	.20
580	C3	Condenser—Paper .05 mfd.—200V	.20
1286	C7, C11	Condenser—Mica 250 mmf.	.20
8036		Cord—AC Line	.25
9899		Crystal—Dial	.20
9511-1		Indicator	.25
9021		Knob	.15
9024		Pointer	.20
8039	R1, R6	Resistor ⅓ W—15 Meg.	.15
6997	R3	Resistor ⅓ W—2 Meg.	.15
8060	R7, R8	Resistor ⅓ W—500 M.	.15
8061	R2	Resistor ⅓ W—20 M.	.15
7326	R4	Resistor ½ W—150 ohm	.20
8648		Spring—Pointer Drive	.10
9015	L3	Transformer 1st I.F.	1.75
9016	L4	Transformer 2nd I.F.	1.75
9744		Speaker—4" Dynamic	3.50
9915		Carton	.60

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

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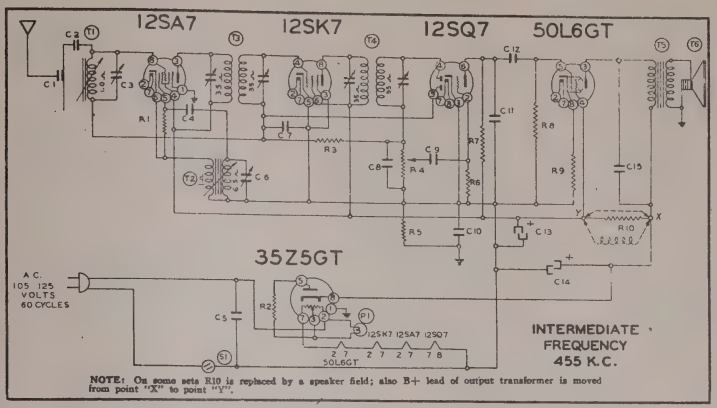
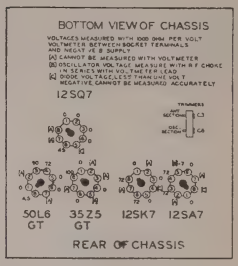
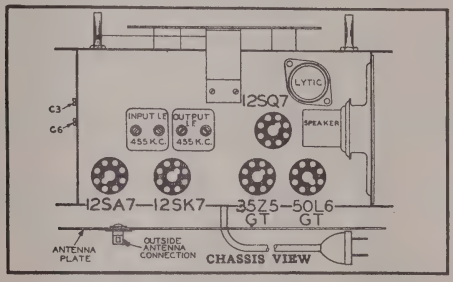
MODEL D2211

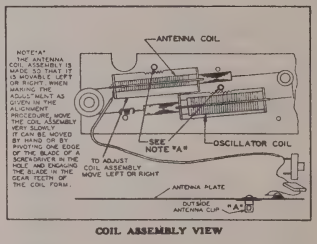
WESTERN AUTO SUPPLY CO.



NOTE: On some sets R10 is replaced by a speaker field; also B+ lead of output transformer is moved from point "X" to point "Y".


BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHMS PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND NEGATIVE B SUPPLY.
(A) CANNOT BE MEASURED WITH VOLTMETER
(B) OSCILLATOR VOLTAGE MEASURED WITH R F CHOKE AND 10,000 OHM RESISTOR IN PROBE
(C) DIODE VOLTAGE LESS THAN ONE VOLT
NEGATIVE CANNOT BE MEASURED ACCURATELY
12SQ7
50L6 GT
35Z5 GT
12SK7
12SA7
REAR OF CHASSIS




ANTENNA COIL
NOTE "A" THE ANTENNA COIL ASSEMBLY IS MADE SO THAT IT IS MOVABLE LEFT OR RIGHT WHEN MAKING THE ADJUSTMENT AS GIVEN IN THE PROCEDURE. MOVE THE COIL ASSEMBLY VERY SLOWLY. IT CAN BE MOVED BY HAND OR BY PIVOTING ONE EDGE OF THE BLADE OF A SCREWDRIVER IN THE HOLE AND ENGAGING THE BLADE IN THE GEAR TEETH OF THE COIL FORM.
SEE NOTE "A"
OSCILLATOR COIL
TO ADJUST COIL ASSEMBLY MOVE LEFT OR RIGHT
ANTENNA PLATE
OUTSIDE ANTENNA CLIP "A"

COIL ASSEMBLY VIEW

Part No.	Schematic Diagram Reference	Description	No. Selling Used Price In Set	Each
		RESISTORS		
1305	R8	300M Ohm—½ Watt Resistor—20%	1	.20
13080	R5	150M Ohm—½ Watt Resistor—10%	1	.20
130166	R9	150 Ohm—½ Watt Resistor—10%	1	.28
130170	R8	3 Megohm—½ Watt Resistor—25%	1	.20
130199	R10	1500 Ohm—1 Watt Resistor—10%	1	.20
130232	R1	25M Ohm—½ Watt Resistor—10%	1	.20
130257	R6	5 Megohm—½ Watt Resistor—25%	1	.20
130284	R2	25 Ohm—½ Watt Resistor—20%	1	.20
		CONDENSERS		
1001	C5	.1 x 400 Volt Tubular Condenser	1	.25
1009	C7	.05 x 200 Volt Tubular Condenser	1	.25
10011	C15	.01 x 400 Volt Tubular Condenser	1	.25
10025	C9	.002 x 600 Volt Tubular Condenser	1	.25
10091	C10	.15 x 400 Volt Tubular Conednser	1	.25
10078	C12	.01 x 200 Volt Tubular Condenser	1	.25
11992	C13, C14	Electrolytic Filter Condenser 20 Mfd. x 150 Volts; 40 Mfd. x 150 Volts	1	1.50
124150	C3, C6	Antenna and Oscillator Dual Trimmer Condenser	1	.35
12912	C2, C8	.00025 Mica Type Condenser—20%	2	.25
12938	C4	.00005 Mica Type Condenser—10%	1	.25
129160	C11	.0004 Mica Type Condenser—20%	1	.35

ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B— of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mfd., and 200 Mmf.

BAND	SIGNAL GENERATOR Frequency Setting	SIGNAL GENERATOR Dummy Antenna	Connection to Radio	Position of Iron Cores (Dial Setting)	Trimmers Adjusted (In Order Shown)	Trimmer Function	Adjustment
I. F.	455 Kc.	.1 MFD.	Connect to Grid of 12SA7	Iron Cores All the way out	Two trimmers on top of output I. F. can	Output I. F.	Adjust to maximum output
	455 Kc.	.1 MFD.	Connect to Grid of 12SA7	Iron Cores All the way out	Two trimmers on top of input I. F. can	Input I. F.	Adjust to maximum output
BROADCAST BAND	1720 Kc.	.1 MFD.	Connect to Grid of 12SA7	Iron Cores All the way out	Trimmer (C8) (See chassis view)	Oscillator	Adjust to maximum output
	1720 Kc.	200 MMF.	Connect to Outside Antenna Clip	Iron Cores All the way out	Trimmer (C3) (See chassis view)	Antenna	Adjust to maximum output
	1400 Kc.	200 MMF.	Connect to Outside Antenna Clip	Turn Dial to 1400 Kc.	Adjust position of antenna coil (See coil assembly view)	Antenna Coil Adjustment	Adjust to maximum output (See Note "A")
	1720 Kc.	200 MMF.	Connect to Outside Antenna Clip	Turn Dial to 1720 Kc.	Adjust trimmer (C3) (See chassis view)	Antenna	Check for tracking (See Note "B")

NOTE "A"—The antenna coil assembly is made so that it is movable. When making the adjustment as given in the alignment procedure move the coil assembly very slowly. It can be moved by hand or by pivoting one edge of the blade of a screwdriver in the hole and engaging the blade in the gear teeth of the coil form.

NOTE "B"—After the antenna coil has been tracked at 1400 Kc. it is necessary to check the antenna trimmer (C3) adjustment again at 1720 Kc. If no appreciable change in trimmer adjustment is made the coil is in track, if the trimmer requires considerable change it will be necessary to again adjust the position of the antenna coil at 1400 Kc. These two adjustments should be tried several times until no change of trimmer adjustment is required at 1720 Kc.

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MODEL D2269

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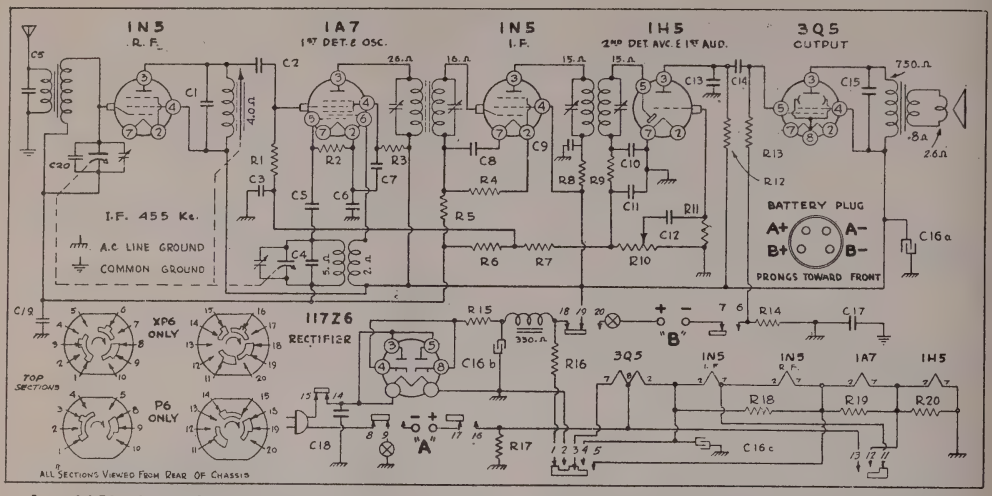

In model P6 only, switch points 6, 7, 16, and 17 are not used. Power switch in line position. Common ground is chassis ground.

RESISTORS

No.	Ohms	Watts	No.	Ohms	Watts
R1	100,000	½	R11	15,000,000	½
R2	200,000	½	R12	1,000,000	½
R3	50,000	½	R13	2,000,000	½
R4	5,000,000	½	R14	400	½
R5	5,000,000	½	R15	22	½
R6	5,000,000	½	R16	2,150	5
R7	3,000,000	½	R17	3,000	½
R8	5,000	½	R18	500	½
R9	70,000	½	R19	200	½
R10	1,000,000	V.C.	R20	110	½

CONDENSERS

No.	Capacity (Mfd.)	Volts	No.	Capacity (Mfd.)	Volts
C1	.000367	Silver Mica	C12	.01	400
C2	.00025	Mica	C13	.00025	Mica
C3	.01	400	C14	.01	400
C4	.000015	Mica	C15	.002	600
C5	.00005	Mica	C16a	40.	150
C6	.25	200	C16b	30.	150
C7	.01	400	C16c	100.	25
C8	.01	400	C17	.1	400
C9	.05	400	C18	.05	400
C10	.00005	In I.F. Can	C19	.05	200
C11	.0001	Mica	C20	.00002	Mica

IF PEAK 455 KC

SERVICE NOTES

Voltages taken from the different points of the circuit to chassis are measured with volume control in maximum position, all tubes in their sockets and with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the voltage chart.

All voltages should be measured with 117.5 volts AC input to receiver. Resistance and actual connections of coils and transformers and speaker data are given under Service Information.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good until the defective unit is located.

ALIGNING INSTRUCTIONS

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver, a signal generator as well as an output meter, must be used.

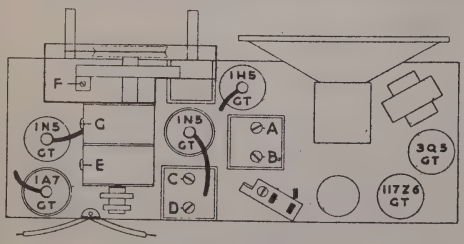

FIG. 1 TOP VIEW

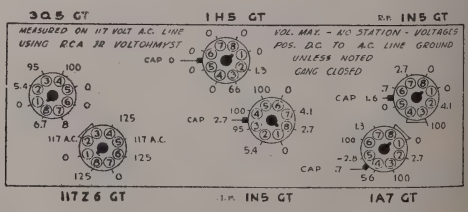

FIG. 2 VOLTAGE CHART

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MODEL WR-12X4

WESTINGHOUSE ELECTRIC SUPPLY CO.

Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

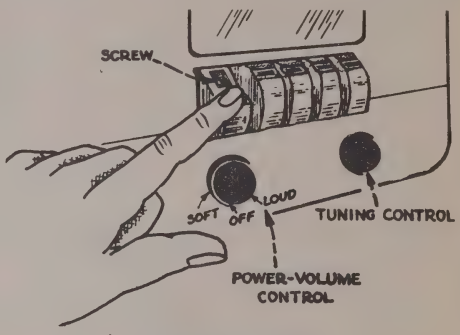
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	I-F grid in series with .01 mfd.	455 kc	Quiet point 1,700 kc end of dial	C8 and C9 2nd I-F Transformer
2	1st Det. grid in series with .01 mfd.			C6 and C7 1st I-F Transformer
3	Ant. terminal in series with 200 mmfd.	1,720 kc	Gang at minimum	C3 (osc.)
4	Radiation loop consisting of two turns of wire 18 inches in diameter located 4 to 6 feet from receiver	1,300 kc	Signal Frequency	C1 (ant.)
5	Repeat steps 3 and 4.			

Adjustments for Push Button Tuning

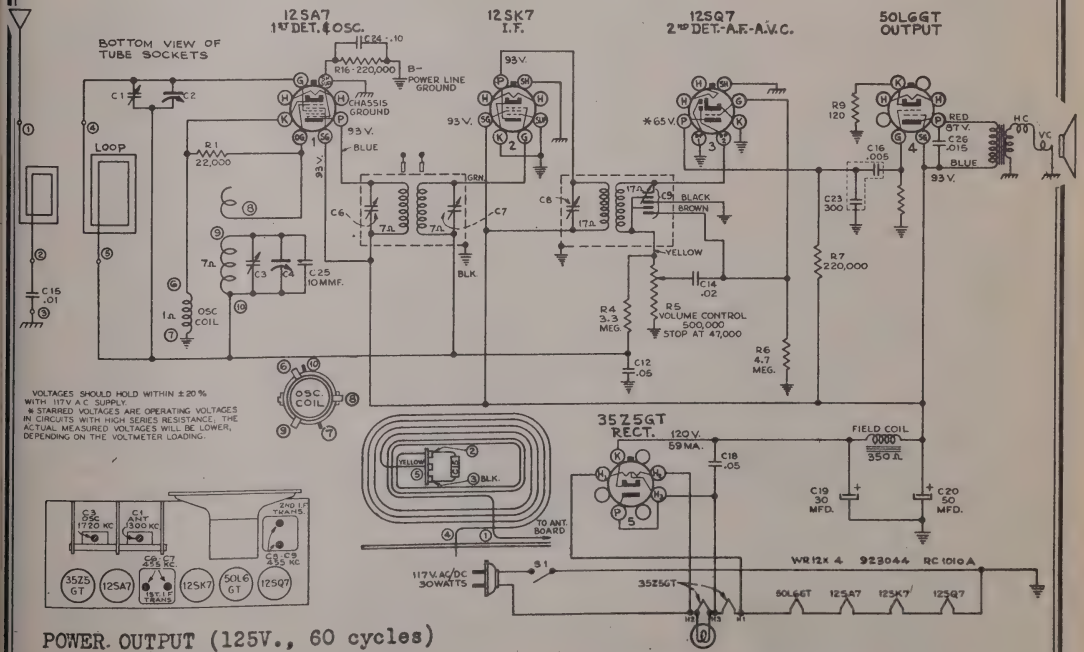
The push buttons should be adjusted for five favorite stations after the receiver has been operating for a brief warm-up period. Each button may be set up to any standard broadcast station. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Cut out the tabs for your five favorite stations and arrange them in order of frequency in the recesses on the push buttons.
2. Press down on the first push button and hold it down. The screw in back of the push button is now accessible and should be loosened one or two turns with a screwdriver.
3. While still holding down the push button, tune in the first station represented by the station tab with the tuning knob, by Dial Tuning. When the station is heard at its best, tighten up the screw in back of the push button. Now let go of the push button, turn the tuning knob in order to detune and again press down the button and let go. The station should be heard again. If not, repeat the above adjustment process until reception is satisfactory.
4. Proceed to set up the other four push buttons in a similar manner.

A station may be changed at any time by following the above information.



Push Button Adjustments



POWER OUTPUT (125V., 60 cycles)

Undistorted	.09 watts
Maximum	1.4 watts

INTERMEDIATE FREQUENCY PEAK 455 KC

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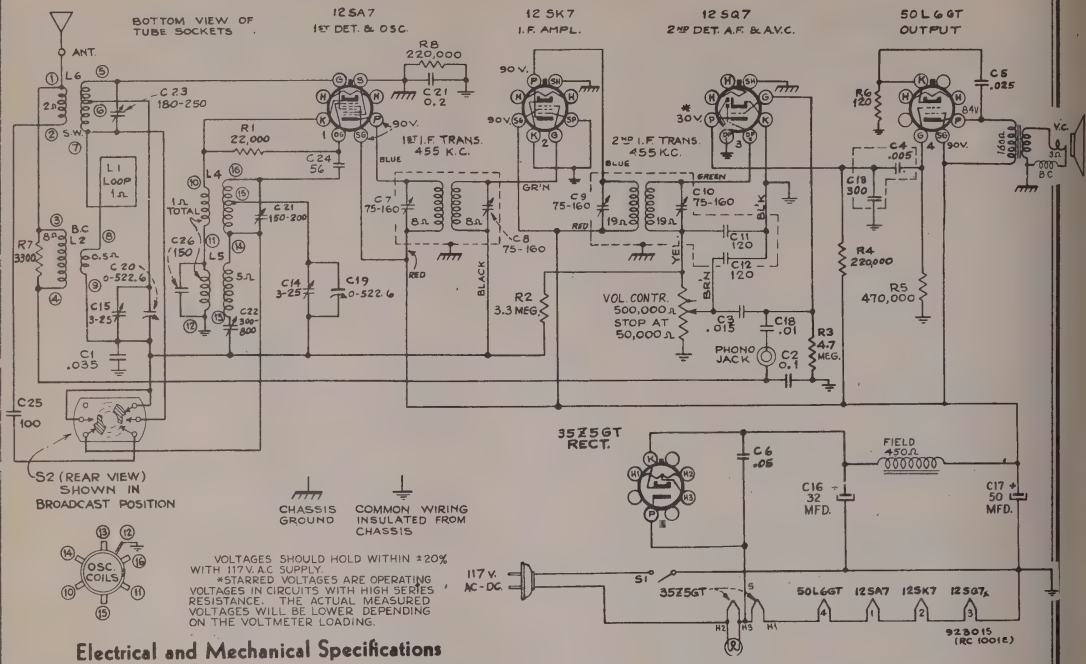
MODEL WR-13X8

WESTINGHOUSE ELECTRIC SUPPLY CO.



Electrical and Mechanical Specifications

Frequency Range
Broadcast Band ..... 540-1,720 kc
Short Wave Band ..... 9 mc to 12 mc.

Intermediate Frequency ..... 455 kc

Pilot Lamp ..... Mazda No. 51, 6-8 volts, 0.2 amp.

Power Output
Undistorted ..... .9 watts
Maximum ..... 1.3 watts

Loudspeaker
Type ..... 5-inch Electrodynamic
V.C. Impedance ..... 3.3 ohms at 400 cycles

Power Supply Rating
105-125 volts, AC 50 or 60 cycles, or DC ..... 30 watts

Precautionary Lead Dress.—

1. Dress the power cable to switch on the volume control close to the chassis and away from all grid and diode leads and condensers.
2. Dress capacitors in the 12SQ7 grid circuit away from all wiring.
3. Green and black phono wires should be twisted and dressed away from other parts and leads.
4. 50L6-GT filament wires should be dressed to rear of chassis and away from the second I-F transformer leads.
5. Dress brown lead from second I-F transformer to 12SQ7 away from power cable.
6. Dress wire to No. 1 grid of the 12SA7 away from pilot lamp leads.
7. Dress wire from loop to variable condenser away from chassis.
8. Dress all capacitors, leads, etc. which come close to oscillator coil rigidly and as far as possible from it.

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Alignment Procedure

Output Meter Alignment.—If this method is used connect the meter across the voice coil and turn the receiver volume control to maximum.

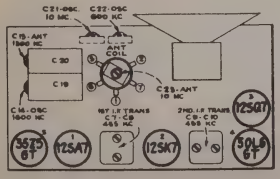
Test Oscillator.—Connect the low side of the test oscillator to the receiver chassis through a .01 mfd. capacitor. With the output meter alignment method the test oscillator output should be kept as low as possible.

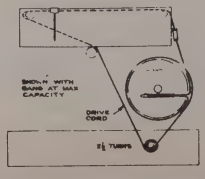
Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the dial backing plate for quick reference during alignment.

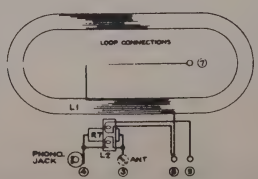
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	12SK7 grid in series with 0.1 mfd.	455 kc	Quiet Point at 1,600 kc end of dial	C10, C9 2nd I-F Transformer
2	12SA7 grid in series with 0.1 mfd.			C8, C7 1st I-F Transformer
3	Antenna term. in series with 47 mmf.	10 mc*	10 mc	C21 (osc.)** C23 (ant.)
4	Antenna term. in series with 200 mmfd.	1,600 kc	1,600 kc	C14 (osc.)
5	Radiation Loop	1,300 kc	Resonance on Signal	C15 (ant.)
6	Radiation Loop	600 kc	600 kc	C22 Osc. Rock in

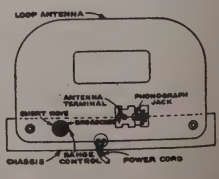
* It is recommended that this step be repeated using a received station of known frequency.

** Use minimum capacity if two peaks can be obtained.









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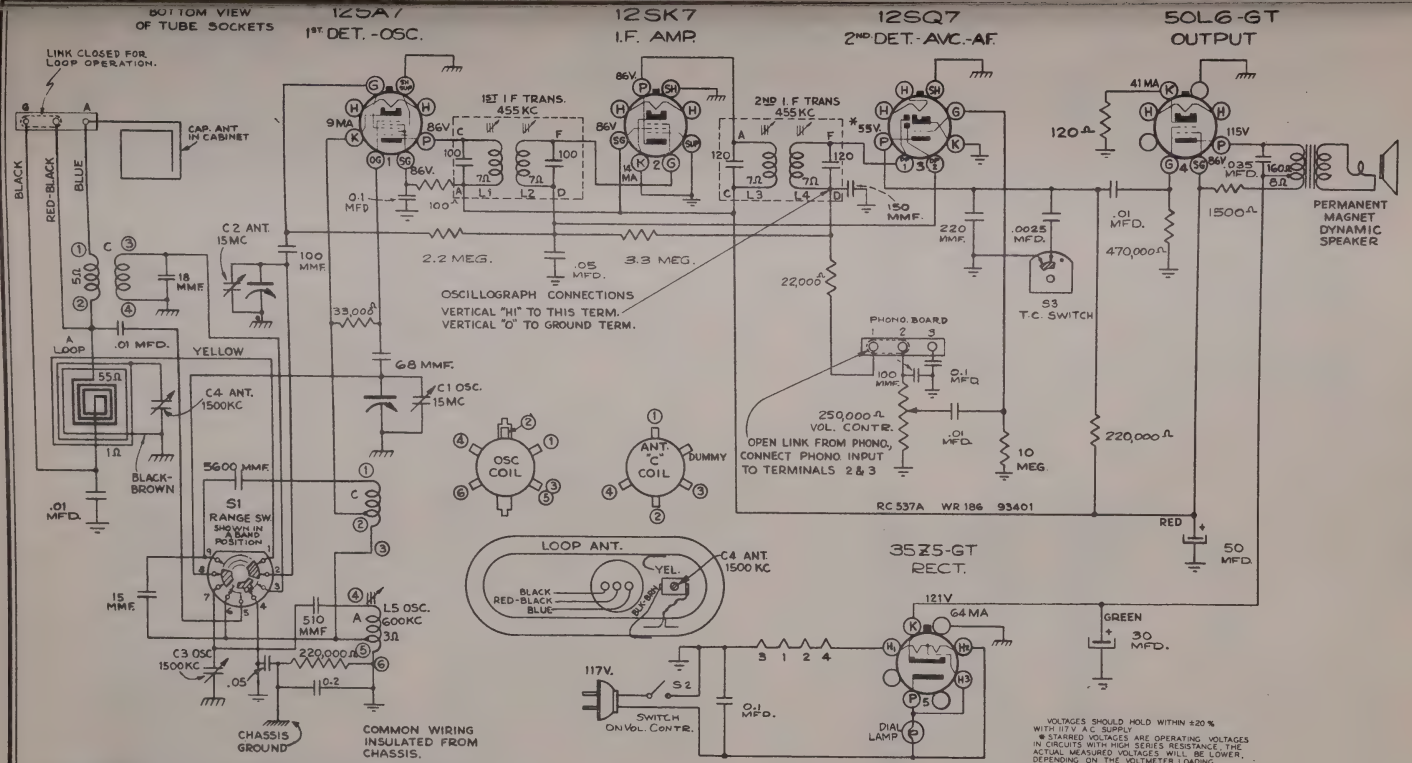

BOTTOM VIEW OF TUBE SOCKETS
LINK CLOSED FOR LOOP OPERATION.
12SA7 1ST DET.-OSC.
12SK7 I.F. AMP.
12SQ7 2ND DET.-AVC.-AF.
50L6-GT OUTPUT
1ST I.F. TRANS. 455 KC
2ND I.F. TRANS 455 KC
CAP. ANT. IN CABINET
C2 ANT. 15 MC
C4 ANT. 1500 KC
C1 OSC. 15 MC
C3 OSC 1500 KC
L5 OSC. 600 KC
S1 RANGE SW. SHOWN IN A BAND POSITION
S2 SWITCH ON VOL. CONTR.
S3 T.C. SWITCH
OSCILLOGRAPH CONNECTIONS
VERTICAL "HI" TO THIS TERM.
VERTICAL "O" TO GROUND TERM.
PHONO. BOARD
OPEN LINK FROM PHONO, CONNECT PHONO INPUT TO TERMINALS 2 & 3
250,000Ω VOL. CONTR.
OSC COIL
ANT. "C" COIL
DUMMY
LOOP ANT.
BLACK
RED-BLACK
BLUE
YELLOW
BLACK-BROWN
RED
GREEN
CHASSIS GROUND
COMMON WIRING INSULATED FROM CHASSIS.
RC 537A WR 186 93401
35Z5-GT RECT.
117V.
DIAL LAMP
PERMANENT MAGNET DYNAMIC SPEAKER
VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V A.C. SUPPLY
* STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE. THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING

ADJUSTMENTS FOR PUSH BUTTON TUNING.

1. Cut out tabs for six stations, arrange them in order of freq.
2. Press down on first P.B. and hold it down. The screw in back of P.B. is now accessible and should be loosened 1 or 2 turns.
3. While still holding down P.B., tune in first station represented by station tab with tuning knob, by Dial Tuning. When station is heard at its best, tighten screw in back of push button. Let go of P.B., turn tuning knob in order to detune and again press down button and let go. Station should be heard again. If not, repeat above adjustment until reception is satisfactory.
4. Proceed to set up other five push buttons in similar manner.

POWER SUPPLY RATINGS

A-C Rating.....105-125 V. 50-60 ~, 30 W.
D-C Rating .....105-125 V. d.c., 30 W.

POWER OUTPUT

Undistorted ..... 1.1 watts
Maximum ..... 1.4 watts

LOUDSPEAKER (permanent-magnet dynamic) 5"
V.C. Impedance at 400 cycles 3.4 ohms
INTERMEDIATE FREQUENCY 455 kc
RANGE: (A) 540-1,600kc; (C) 5.8 - 18 mc

WESTINGHOUSE ELECTRIC SUPPLY CO.

MODELS WR-12X7,WR-186

WESTINGHOUSE ELECTRIC SUPPLY CO.

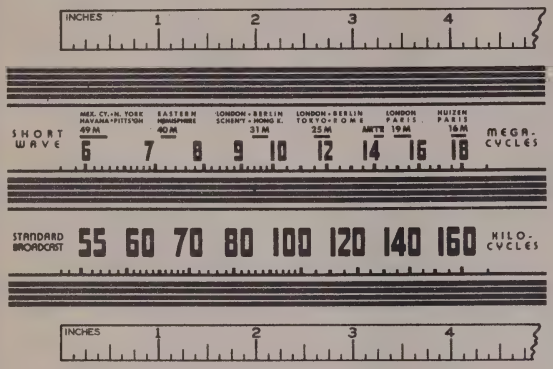
Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

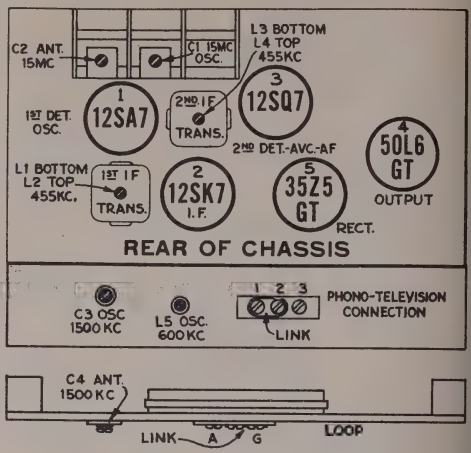
Test-Oscillator.—Connect the low side of the test-oscillator to the receiver ground, and keep the output as low as possible.

Precautionary Lead Dress

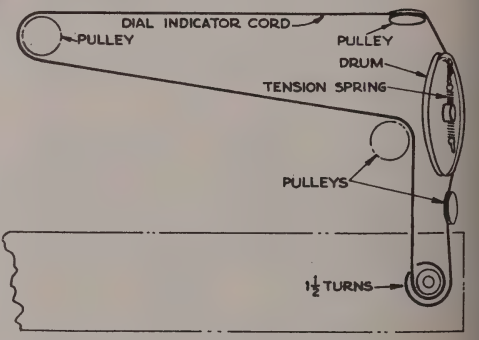
1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 12SK7 close to chassis.
2. Dress leads from terminal board on loop support away from loop.



Calibration Scale



Tube and Trimmer Location



Dial-Indicator and Drive Mechanism

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. Or, if necessary, the calibration scale printed in this service note can be used in conjunction with an ordinary 12-inch ruler as an accurate and convenient substitute for the regular dial.

Using Calibration Scale.—

1. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

2. Place a flat 6-inch ruler on the dial backing plate so the left-end of ruler is at the reference mark at left-end of backing plate. Temporarily fasten the ruler with scotch tape to the backing plate.

3. Refer to calibration scale printed in this service note. This is a reduced reproduction of the dial with an inch-scale drawn at the bottom. To find the correct pointer position in inches for any desired frequency, draw a vertical line through this frequency on the calibration scale. For example 1,500 kc is approximately 3¾ inches from the reference mark.

Dial-Pointer Adjustment.—After the chassis is replaced in cabinet, move the dial pointer (if necessary) so that it is at the left-hand graduation on the dial with the gang in full mesh.

Antenna.—The set is equipped with a built-in loop antenna. If an outdoor antenna is used, it may be connected to the "ANT." terminal on rear of cabinet. It should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Loudspeaker.—To center the loudspeaker voice coil, first remove the front dust cover, then loosen the screws, holding the spider assembly. Insert three narrow feelers into the air gap, and tighten the spider screws. Remove the feelers and fasten a dust cover in place with loudspeaker cement.

Steps	Connect test-osc. output to—	Tune test-osc. to—	Turn radio dial to—	Adjust the lowing for peak outpu
1	I-F grid through 0.1 mfd. capacitor and ground	455 kc	Quiet point between 550-750 kc	L-3 and L (2nd I-F tra
2	1st det. grid through 0.1 mfd. capacitor and ground	455 kc		L-1 and L (1st I-F tra
3	Antenna terminal (open link between "A" and "G") in series with 47 mmfd.	15 mc	15 mc "C" band	C-1 oscilla
4		15 mc	Rock at 15 mc	C-2 antenn while rock
5	Antenna terminal (open link between "A" and "G") in series with 200 mmfd.	1,500 kc	1,500 kc "A" band	C-3 oscilla C-4 antenn
6		600 kc	Rock at 600 kc "A" band	L-5 oscilla while rock
7		1,500 kc	1,500 kc "A" band	C-3 oscilla C-4 antenn

* Oscillator should track on high frequency side of signal. If peaks are obtained use high frequency (minimum capacity) peak.

† If two peaks can be obtained use low frequency (maximum capa peak.

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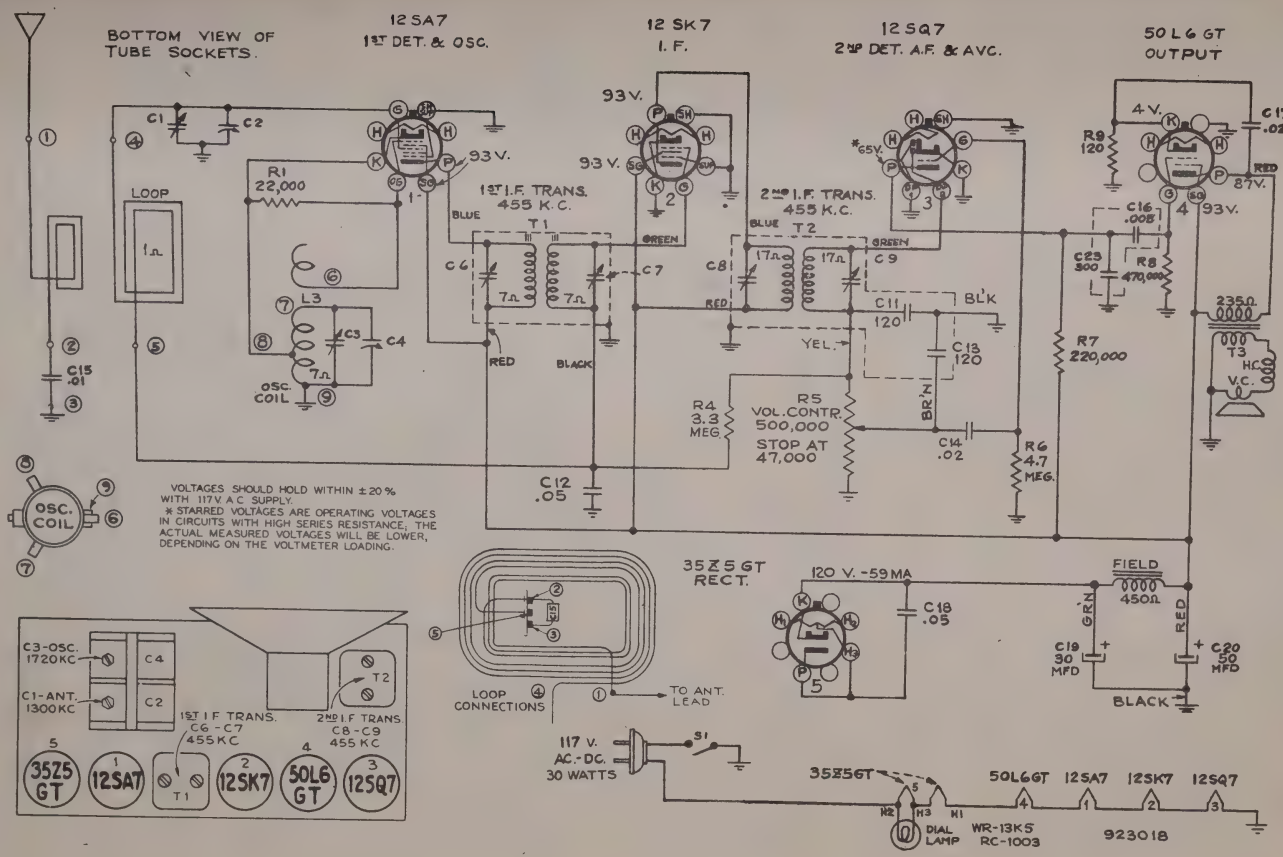


Schematic Circuit Diagram

MODEL WR-13K5
MODELS WR-177, WR-179 WESTINGHOUSE ELECTRIC SUPPLY CO.
MODELS WR-178, WR-180

Model WR-13K5

Electrical and Mechanical Specifications

FREQUENCY RANGE ..... 540-1,720 kc

INTERMEDIATE FREQUENCY ..... 455 kc

TUBE COMPLEMENT

(1) RCA-12SA7 ..... 1st-Detector—Oscillator
(2) RCA-12SK7 ..... I-F Amplifier
(3) RCA-12SQ7 ..... 2nd-Detector, 1st A-F, and A.V.C.
(4) RCA-50L6GT ..... Power Output
(5) RCA-35Z5GT ..... Half-Wave Rectifier

DIAL LAMP ..... Mazda 51, 7.5 volts, 0.2 amp.

POWER SUPPLY RATINGS

A-C Rating ..... 105-125 volts, 50-60 cycles, 30 watts
D-C Rating ..... 105-125 volts, direct current, 30 watts

POWER OUTPUT (125 volts, 60 cycle supply)

Undistorted ..... 0.8 watts
Maximum ..... 1.2 watts

LOUDSPEAKER

Type ..... 5-inch Electrodynamic

	Height	Width	Depth
Over-all Dimensions	7⅛ inches	11⅛ inches	6 3/16 inches

Weight ..... 10 pounds (shipping)

Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a 0.1 mfd. capacitor, and keep the output as low as possible.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	I-F grid, in series with .01 mfd.	455 kc	Quiet point 1,700 kc end of dial	C8 and C9 2nd I-F Transformer
2	1st Det. grid in series with .01 mfd.			C6 and C7 1st I-F Transformer
3	Ant. terminal in series with 200 mmfd.	1,720 kc	Gang at minimum	C3 (osc.)
4	Radiation loop consisting of two turns of wire 18 inches in diameter located 4 to 6 feet from receiver	1,300 kc	Signal Frequency	C1 (ant.)
5	Repeat steps 3 and 4			

Antenna.—The set is equipped with a built-in loop antenna. If an out-door antenna is used, it may be connected to the "ANT." (blue) lead on rear of cabinet. It should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Precautionary Lead Dress:

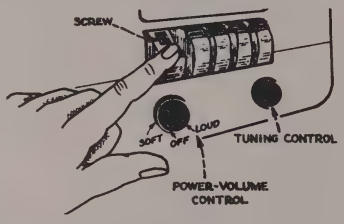
1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 12SK7 close to chassis.
2. Dress leads from terminal board on loop support away from loop.

WR-177, WR-178, WR-179, WR-180 Adjustments for Push Button Tuning

The push buttons should be adjusted for five favorite stations after the receiver has been operating for a brief warm-up period. Each button may be set up to any standard broadcast station. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Cut out the tabs for your five favorite stations and arrange them in order of frequency in the recesses on the push buttons.
2. Press down on the first push button and hold it down. The screw in back of the push button is now accessible and should be loosened one or two turns with a screwdriver.
3. While still holding down the push button, tune in the first station represented by the station tab with the tuning knob, by Dial Tuning. When the station is heard at its best, tighten up the screw in back of the push button. Now let go of the push button, turn the tuning knob in order to detune and again press down the button and let go. The station should be heard again. If not, repeat the above adjustment process until reception is satisfactory.
4. Proceed to set up the other four push buttons in a similar manner.

A station may be changed at any time by following the above information.



Push Button Adjustments

Antenna.—The set is equipped with a built-in loop antenna. If an outdoor antenna is used, it may be connected to the "ANT." terminal on rear of cabinet. It should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Alignment Procedure WR-177, WR-178, WR-179, WR-180

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd capacitor, and keep the output as low as possible.

Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 12SK7 close to chassis.
2. Dress leads from terminal board on loop support away from loop.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Tuning condenser stator (osc.) in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers)
2	Antenna term. of ant. loop in series with 100 mmfd.	1,600 kc	Full clockwise (out of mesh)	C5 (oscillator)
3		1,500 kc	Resonance on 1,500 kc signal	C6 (antenna)

Electrical and Mechanical Specifications

Frequency Range ..... 540-1,600 kc

Intermediate Frequency ..... 455 kc

Loudspeaker

Type ..... 5-inch Electrodynamic

Power Supply Ratings

A-C Rating ..... 105-125 volts, 50-60 cycles, 30 watts
D-C Rating ..... 105-125 volts, direct current, 30 watts

Power Output (125 volts, 60 cycle supply)

Undistorted ..... 0.8 watts
Maximum ..... 1.2 watts

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WESTINGHOUSE ELECTRIC SUPPLY CO.

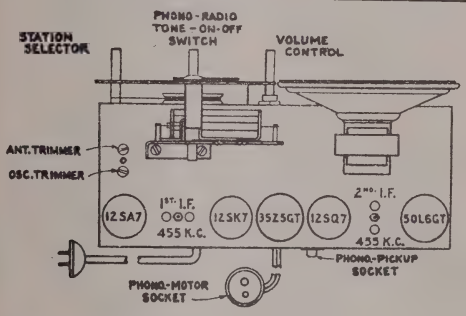
WR 42K11

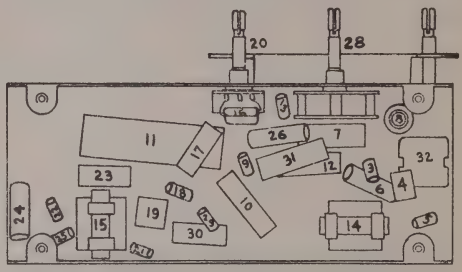
ALIGNMENT PROCEDURE

The following equipment is necessary to properly align this chassis:

1. A signal generator which will provide an accurately calibrated signal at the frequencies listed.
2. An output meter.
3. A non-metallic screw driver
4. Dummy antennae—.1 mfd., 200 mmf.

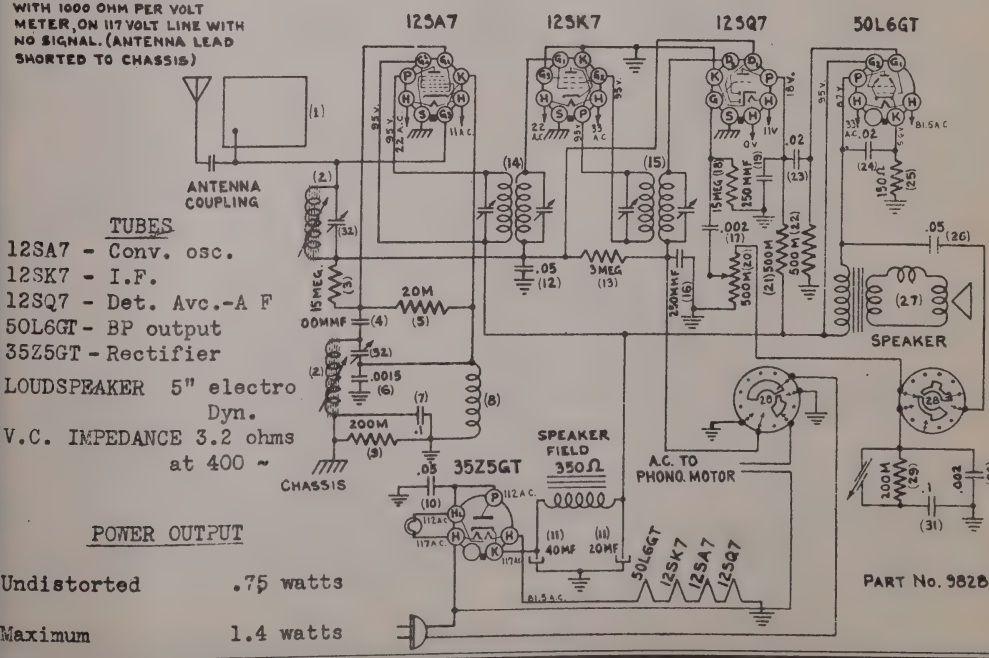
GENERATOR	CONNECTION AT RADIO	DUMMY ANTENNA	DIAL	TRIMMER TO TUNE	REMARKS
I.F. 455 kc	12SA7 Grid	.1 mfd.	H.F. End	I.F. Transformers	Tune to Max.
1720 kc	Ext. Ant. Wire	200 mmf.	H.F. End	Oscillator Trimmer	Set limit of band
1400 kc	Ext. Ant. Wire	200 mmf.	1400	Antenna Trimmer	Tune to Max.





PART No. 9839

VOLTAGES ARE MEASURED WITH 1000 OHM PER VOLT METER, ON 117 VOLT LINE WITH NO SIGNAL. (ANTENNA LEAD SHORTED TO CHASSIS)



TUBES

12SA7 - Conv. osc.
12SK7 - I.F.
12SQ7 - Det. Avc.-A F
50L6GT - BP output
35Z5GT - Rectifier

LOUDSPEAKER 5" electro Dyn.

V.C. IMPEDANCE 3.2 ohms at 400 ~

POWER OUTPUT

Undistorted	.75 watts
Maximum	1.4 watts

PART No. 9828

©John F. Rider

MODEL WR-42X2

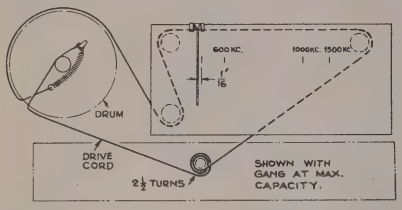
WESTINGHOUSE ELECTRIC SUPPLY CO.

Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator. — For all alignment operations, connect the low side of the test-oscillator to the common negative, and keep the output as low as possible to avoid a-v-c action.

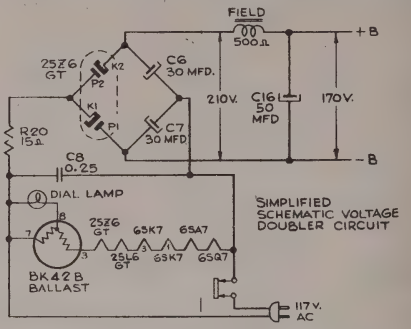
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	I-F grid, in series with .01 mfd.	455 kc	Quiet point 1,600 kc end of dial	L9 and L10 2nd I-F transformer
2	1st Det. grid in series with .01 mfd.			L8 and L7 1st I-F transformer
3	Ant. terminal in series with 200 mmfd.	1,720 kc	Gang at minimum	C10 (osc.)
4	Radiated signal 1,500 kc		Signal Frequency	C1 (ant.)
5	Radiated signal near 600 kc		Signal Frequency	L5 (osc.) (Rock gang)
6	Repeat steps 3, 4 and 5.			

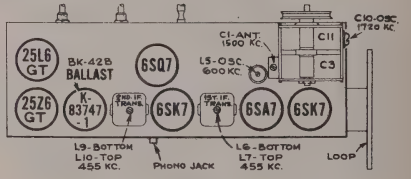


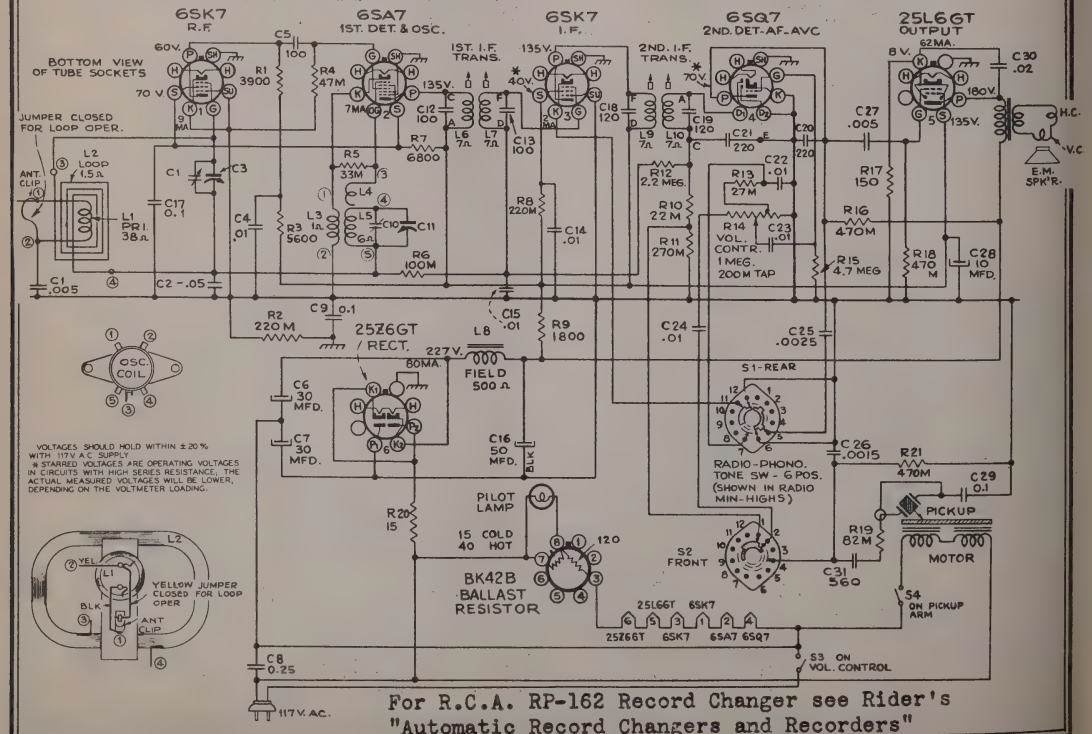
Critical Lead Dress:

1. Lead from 6SK7 i-f plate to last i-f transformer to be dressed close to chassis and under all other leads. Prevents i-f beats.
2. First audio grid coupling capacitor C23 and C24 to be dressed close to chassis and away from heater wiring. Prevents hum.

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. In the event that only the chassis is returned for service, and the cabinet with its tuning dial is left in the customer's home, the scale printed in this service note can be used as an accurate and convenient substitute for the regular dial. With gang in full mesh, move the dial pointer to a point 1/16 inch to left of reference mark at left hand end of the dial backing plate. Place the dial under the pointer so that the extreme left scale graduation coincides with the pointer. Use scotch tape to hold the dial in place.







For R.C.A. RP-162 Record Changer see Rider's "Automatic Record Changers and Recorders"

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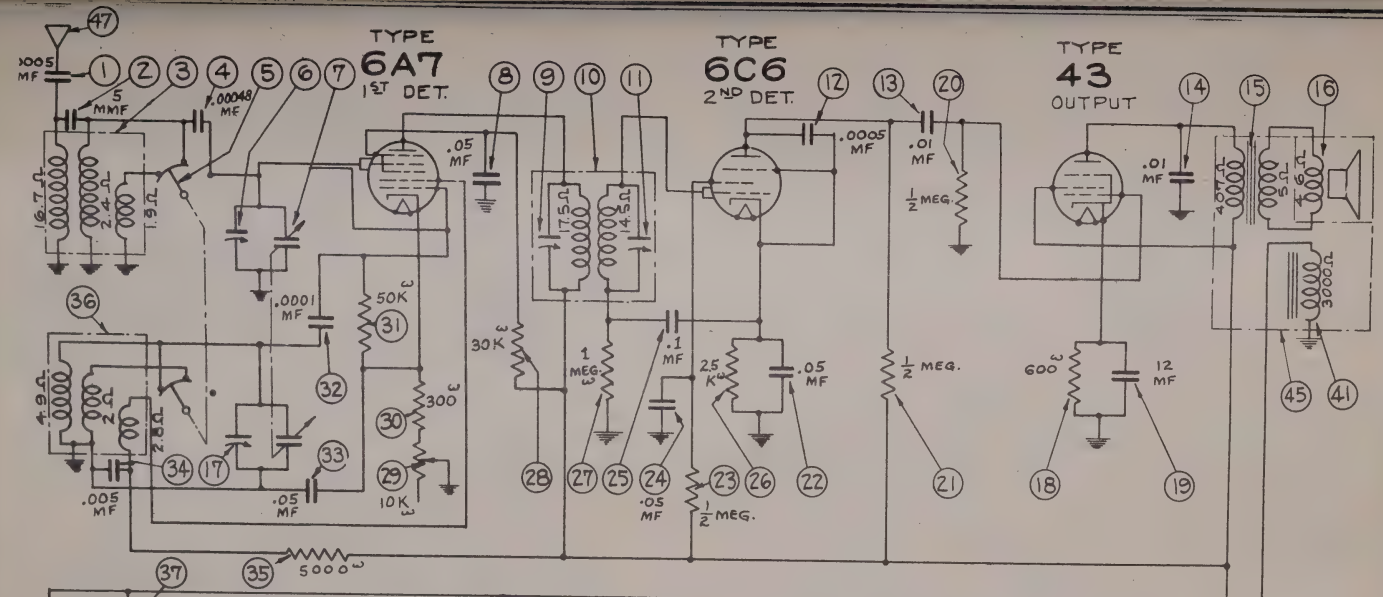


ALIGNMENT PROCEDURE

ALIGNMENT OF I.F. (465 K.C.)

1. Set vol. cont. to max.pos., wave change sw. to std. B.C.
2. Connect output meter across voice coil terms. of the spkr.
3. Set test osc. to 465 K.C. and adj. output for a measureable reading on output meter when test signal is applied to the grid of 6A7 det. osc thru .5 mfd. blocking cond.
4. Adjust trimmers No. 9 and No. 11 to maximum output.

ALIGNMENT OF OSCILLATOR AND R.F.

1. Check pointer setting, exactly horizontal when tuning cond. is completely closed.
2. Set test osc. and dial ind. to 1400 K.C. and osc. trim. cond. NO. 17 to maximum output.
3. Apply test to ant. of receiver thru .0001 mfd. blocking cond. and adj. trimmer condenser No. 6 to maximum output.
4. Check sensitivity over the band.
5. Turn wave change sw. to S.W. band and check sensitivity over scale.

SOCKET VOLTAGE

TUBE	STAGE	FIL.	PLATE	CATH	SCREEN	ANODE GRID
6A7	1ST DET.	6.0	108	1.75	58*	96
6C6	2ND DET.	6.0	21*	3.6	50*	
43	POWER PENTODE	24.5	98	14.5	109	
25Z5	RECTIFIER	24.5		120		
K55C	BALLAST	54				

* 600 VOLT SCALE
115 VOLTS 60 CYCLE LINE
NOTE-ALL VOLTAGE READINGS WITH A VOLTMETER HAVING A RESISTANCE OF 1000 Ω PER VOLT

WESTINGHOUSE RADIO MODEL WR-102

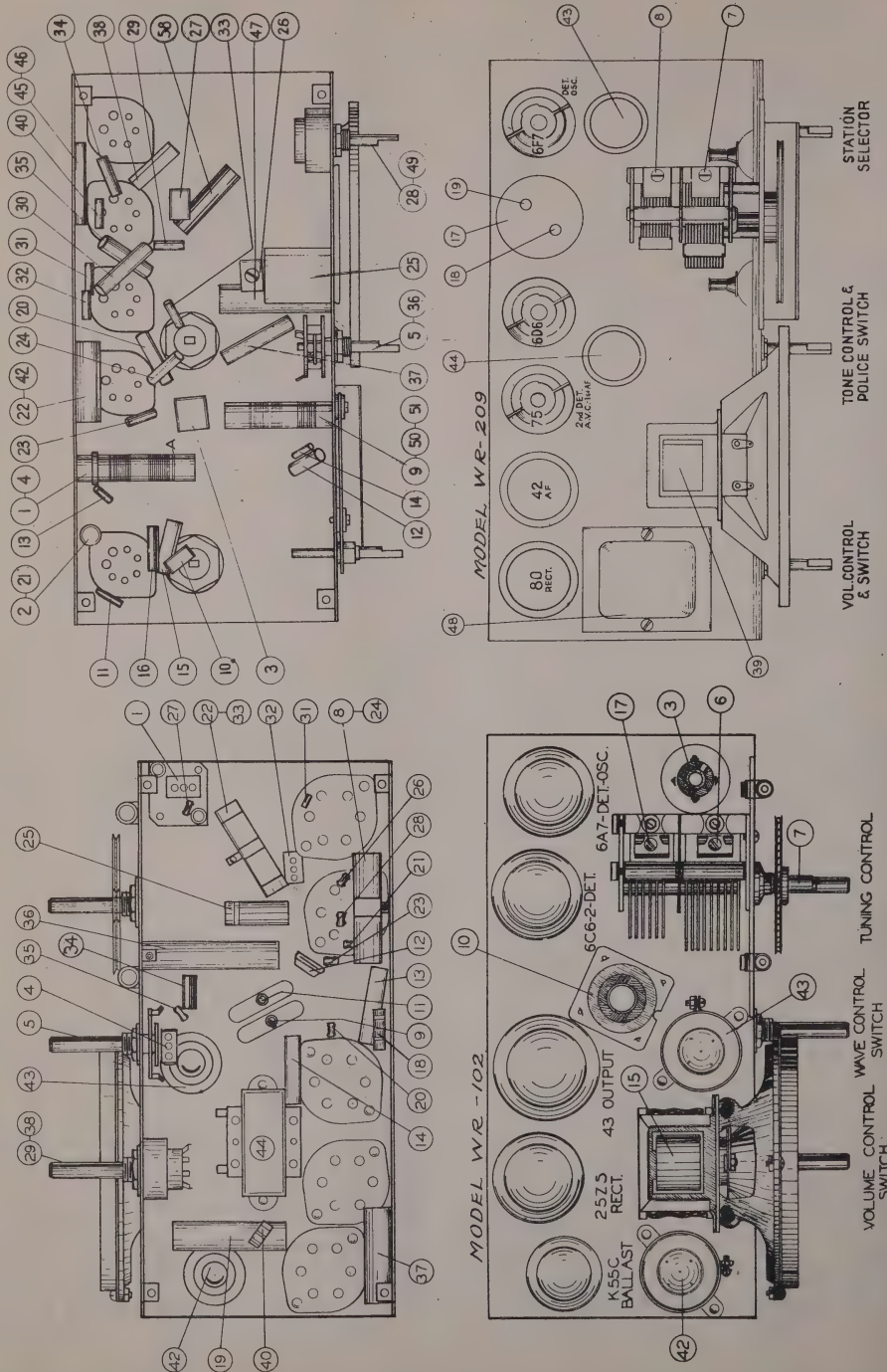
WESTINGHOUSE ELECTRIC SUPPLY CO.

WESTINGHOUSE PAGE 14-9

MODEL WR-102

MODEL WR-102
MODEL WR-209

WESTINGHOUSE ELECTRIC SUPPLY CO.



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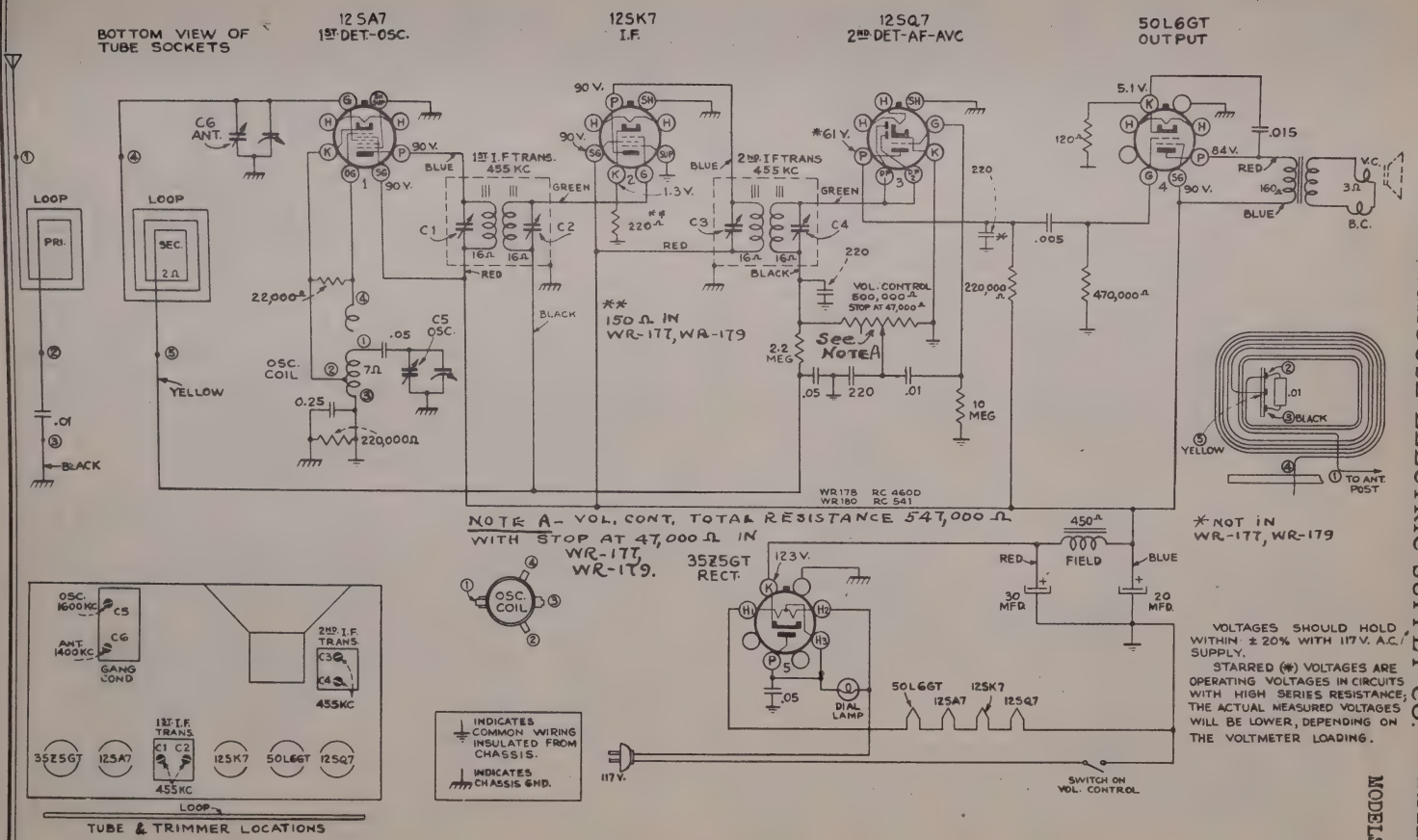


Schematic Circuit Diagram Models WR-178 and WR-180

MODEL WR-182
MODEL WR-182A

WESTINGHOUSE ELECTRIC SUPPLY CO.

Alignment Procedure

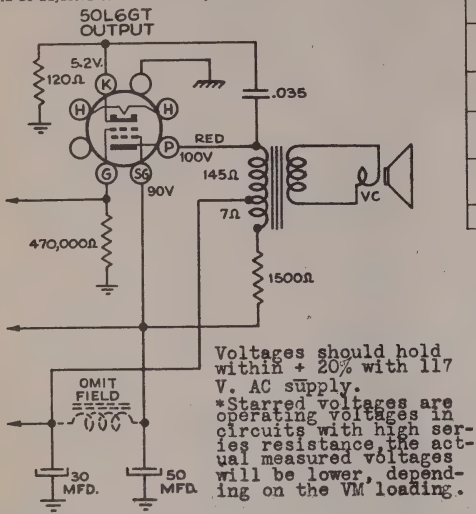
Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—Connect the low side of test-oscillator to the receiver chassis through a .01 mfd. capacitor, and keep the output as low as possible.

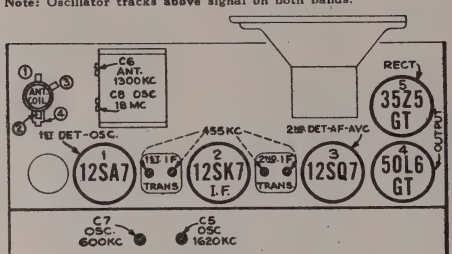
Pre-Setting Pointer.—With gang condenser in full mesh, the pointer should be adjusted to a horizontal position.

Step	Connect high side of test oscillator to—	Tune test oscillator to—	Turn radio dial to—	Adjust following for max. output—
1	Grid 12SK7 in series with 0.01 mfd.	455 kc	"A" Band Quiet Point at 1,550 kc end of dial	C3 and C4 (2nd I-F Trans.)
2	Grid 12SA7 in series with 0.01 mfd.			C1 and C2 (1st I-F Trans.)
3	Antenna in series with 300 ohms	18 mc	"C" Band 18 mc	C8 (osc.)*
4	Antenna in series with 200 mmfd.	600 kc	"A" Band 600 kc	C7 (osc.)
5		1,620 kc	"A" Band Full Clockwise	C5 (osc.)
6		1,300 kc	Resonance on 1,300 kc "A" Band	C6 (ant.)
7	Repeat steps 4 (rock in), 5 and 6.			

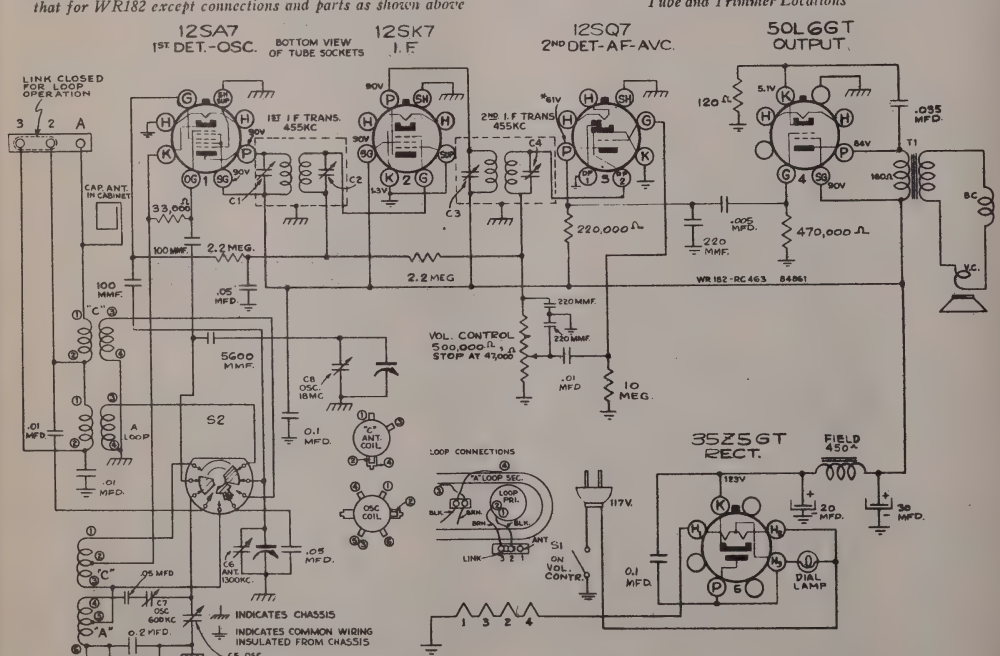
* Use minimum capacity peak if two can be obtained.
Note: Oscillator tracks above signal on both bands.



Schematic Circuit Diagram for the Model WR182A is the same as that for WR182 except connections and parts as shown above



Tube and Trimmer Locations



INTERMEDIATE FREQUENCY	455 kc
POWER OUTPUT(125 V., 60 ~ Supply)	
Undistorted	0.65 watts
Maximum	1.23 watts

LOUDSPEAKER	WR182	WR182A
Type	5" Electro-dyn.	5"PM Dyn.
POWER SUPPLY RATINGS		
A-C Rating	105-125V. 50-60~, 30 W.	
D-C Rating	105-125 V. d.c.30 W.	

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MODEL WR-184

WESTINGHOUSE ELECTRIC SUPPLY CO.

Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

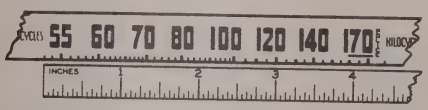
Test-Oscillator.—Connect the low side of the test-oscillator to the receiver ground, and keep the output as low as possible.

Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 12SK7 close to chassis.
2. Dress leads from terminal board on loop support away from loop.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Tuning condenser stator (osc.) in series with .01 mfd.	455 kc	Quiet point at 1,600 kc end of dial	L1, L2, L3, L4 (1st and 2nd I-F transformers)
2	Antenna term. of ant. loop in series with 100 mmfd.	1,500 kc	1,500 kc	C1 (oscillator) C2 (antenna)
3		600 kc	600 kc	L5 (oscillator)
4	Repeat steps 2 and 3.			

Calibration Scale.—The glass tuning dial may be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. Or, if necessary, the calibration scale printed in this service note can be used in conjunction with an ordinary 12-inch ruler as an accurate and convenient substitute for the regular dial.



Receiver Dial Scale and Corresponding Calibration Scale

Using Calibration Scale.—

1. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

2. Place a flat 12-inch ruler on the dial backing plate so the left-end of ruler is at the reference mark at left-end of backing plate. Temporarily fasten the ruler with scotch tape to the backing plate.

3. Refer to calibration scale printed in this service note. This is a reduced reproduction of the dial with an inch-scale drawn at the bottom. To find the correct pointer position in inches for any desired frequency, draw a vertical line through this frequency on the calibration scale. For example 1,500 kc is approximately 3¼ inches from the reference mark.

Adjustments for Push Button Tuning

The push buttons should be adjusted for six favorite stations after the receiver has been operating for a brief warm-up period. Each button may be set up to any standard broadcast station. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Cut out the tabs for your six favorite stations and arrange them in order of frequency in the recesses on the push buttons.
2. Press down on the first push button and hold it down. The screw in back of the push button is now accessible and should be loosened one or two turns with a screwdriver.
3. While still holding down the push button, tune in the first station represented by the station tab with the tuning knob, by Dial Tuning. When the station is heard at its best, tighten up the screw in back of the push button. Now let go of the push button, turn the tuning knob in order to detune and again press down the button and let go. The station should be heard again. If not, repeat the above adjustment process until reception is satisfactory.
4. Proceed to set up the other five push buttons in a similar manner.

A station may be changed at any time by following the above information.

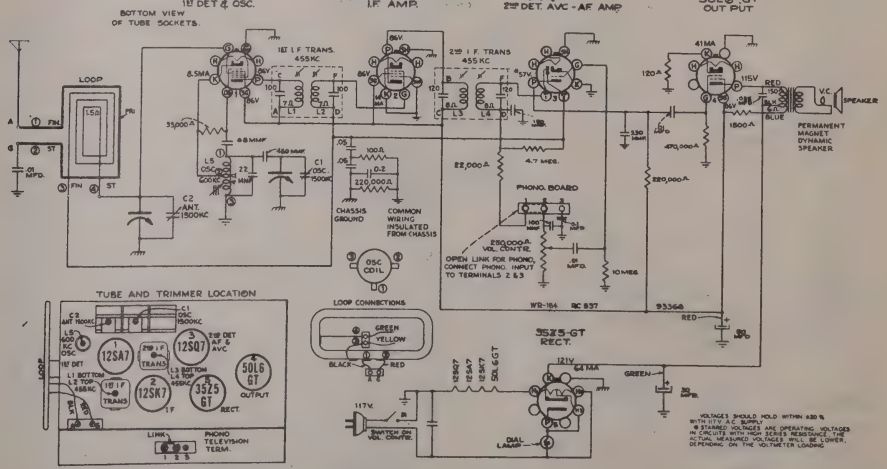
Dial-Pointer Adjustment.—After the chassis is replaced in cabinet, move the dial pointer (if necessary) so that it is at the left-hand graduation on the dial with the gang in full mesh.

INTERMEDIATE FREQUENCY 455 kc

POWER SUPPLY RATINGS
A-C Rating .... 105-125 V. 50-60 ~, 30 W.
D-C Rating ..... 105-125 V., d.c. 30 W.

POWER OUTPUT (125 Volts, 60 cycle supply)
Undistorted 1.1 watts
Maximum 1.4 watts

LOUDSPEAKER
Type 5-inch Permanent Magnet


12SA7
1st DET & OSC.
BOTTOM VIEW OF TUBE SOCKETS
12SK7
I.F. AMP.
12SQ7
2nd DET. AVC - AF AMP
50L6-GT
OUT PUT
1st I.F. TRANS. 455KC
2nd I.F. TRANS 455 KC
LOOP
SPEAKER
PERMANENT MAGNET DYNAMIC SPEAKER
PHONO. BOARD
CHASSIS GROUND
COMMON WIRING INSULATED FROM CHASSIS
OPEN LINK FOR PHONO, CONNECT PHONO. INPUT TO TERMINALS 2 & 3
WR-184 RC 837
93360
3525-GT RECT.
LOOP CONNECTIONS
TUBE AND TRIMMER LOCATION
LINK
PHONO TELEVISION TERM.
SWITCH ON VOL. CONTR.
DIAL LAMP
VOLTAGES SHOULD HOLD WITHIN ±20 % WITH 117 V. A.C. SUPPLY.
STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE. THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING

Schematic Circuit Diagram

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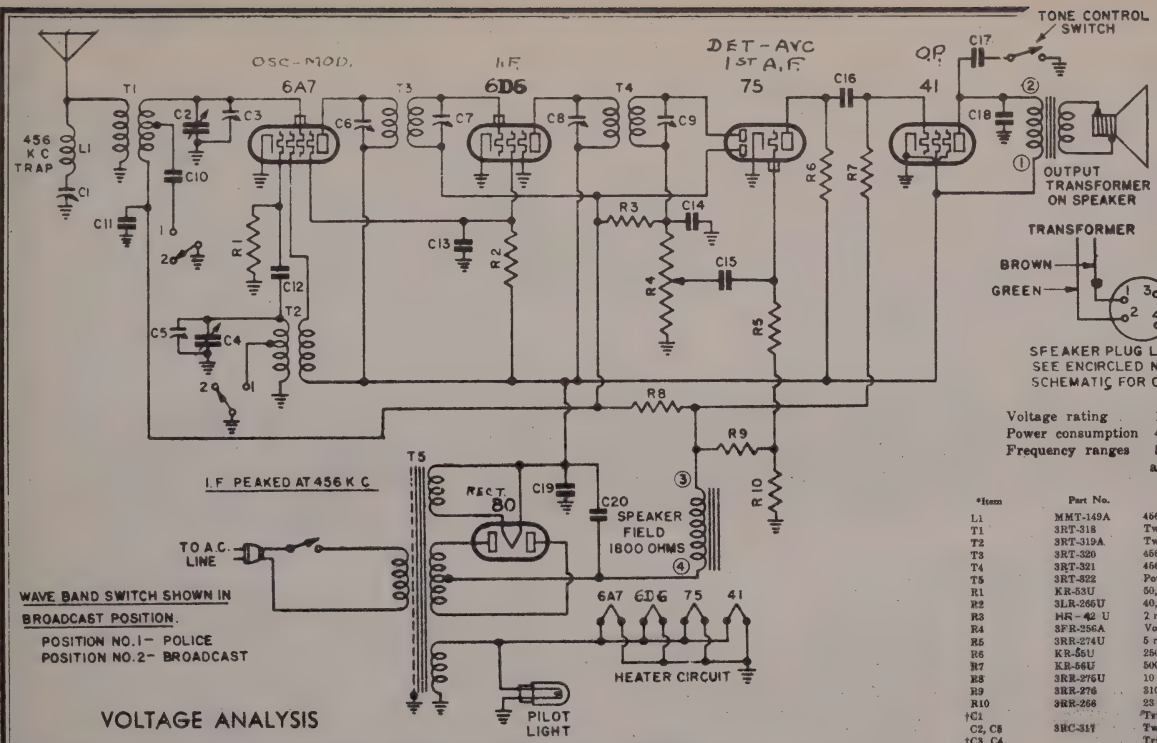
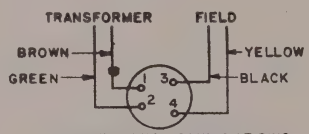




SPEAKER PLUG LOOKING AT PINS. SEE ENCIRCLED NUMBERS ON SCHEMATIC FOR CONNECTIONS

Voltage rating	105-125 volts a.c.
Power consumption	45 watts
Frequency ranges	540 to 1580 kc. and 1580 to 4200 kc.

*Item	Part No.	DESCRIPTION
L1	MMT-149A	456 kc wave-trap
T1	3RT-318	Two-band antenna coil
T2	3RT-319A	Two-band oscillator coil
T3	3RT-320	456 kc first i-f transformer
T4	3RT-321	456 kc second i-f transformer
T5	3RT-322	Power transformer
R1	KR-53U	50,000 ohm ¼ watt carbon resistor
R2	3LR-266U	40,000 ohm ½ watt carbon resistor
R3	HR-42 U	2 megohm ¼ watt carbon resistor
R4	3FR-256A	Volume control with switch—500,000 ohms
R5	3RR-274U	5 megohm ½ watt carbon resistor
R6	KR-55U	250,000 ohm ¼ watt carbon resistor
R7	KR-56U	500,000 ohm ¼ watt carbon resistor
R8	3RR-275U	10 megohm ¼ watt carbon resistor
R9	3RR-276	310 ohm ½ watt wire-wound resister
R10	3RR-266	23 ohm ½ watt wire-wound resistor
†C1		Trimmer, part of 456 kc wave-trap assembly.
C2, C8	3RC-317	Two-gang variable condenser
‡C3, C4		Trimmers, part of variable condenser.
†C6, C7		Trimmers, part of first i-f transformer assembly.
†C8, C9		Trimmers, part of second i-f transformer assembly.
C10	AAC-114	0.001 mf mica condenser
C11, C13	BC-12	0.05 mf, 200 volt tubular condenser
C12	AAC-106A	0.00005 mf mica condenser
C14	IC-47A	0.0005 mf mica condenser
C15, C18	HC-84	0.006 mf, 600 volt tubular condenser
C16	KC-56	0.01 mf, 400 volt tubular condenser
C17	QQC-172	0.015 mf, 600 volt tubular condenser
C19, C20	3RC-318	Dual 5 mf, 300 volt dry electrolytic condenser

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	182	70	0	182	6.3
6D6	182	70	0	—	6.3
75	87	—	0	—	6.3
41	165	182	0	—	6.3

Voltage across speaker field—70.
Voltage from B minus to chassis—80. B plus at 80 filament—262.

Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The first i-f transformer is the one directly behind the 6A7 tube. The trimmers for the two i-f transformers are available through holes in the tops of the cans.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 456 kc wave-trap is mounted on the rear chassis wall directly beneath the wave-band switch. The trimmers for the 456 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.

I-f and Wave-Trap Alignment

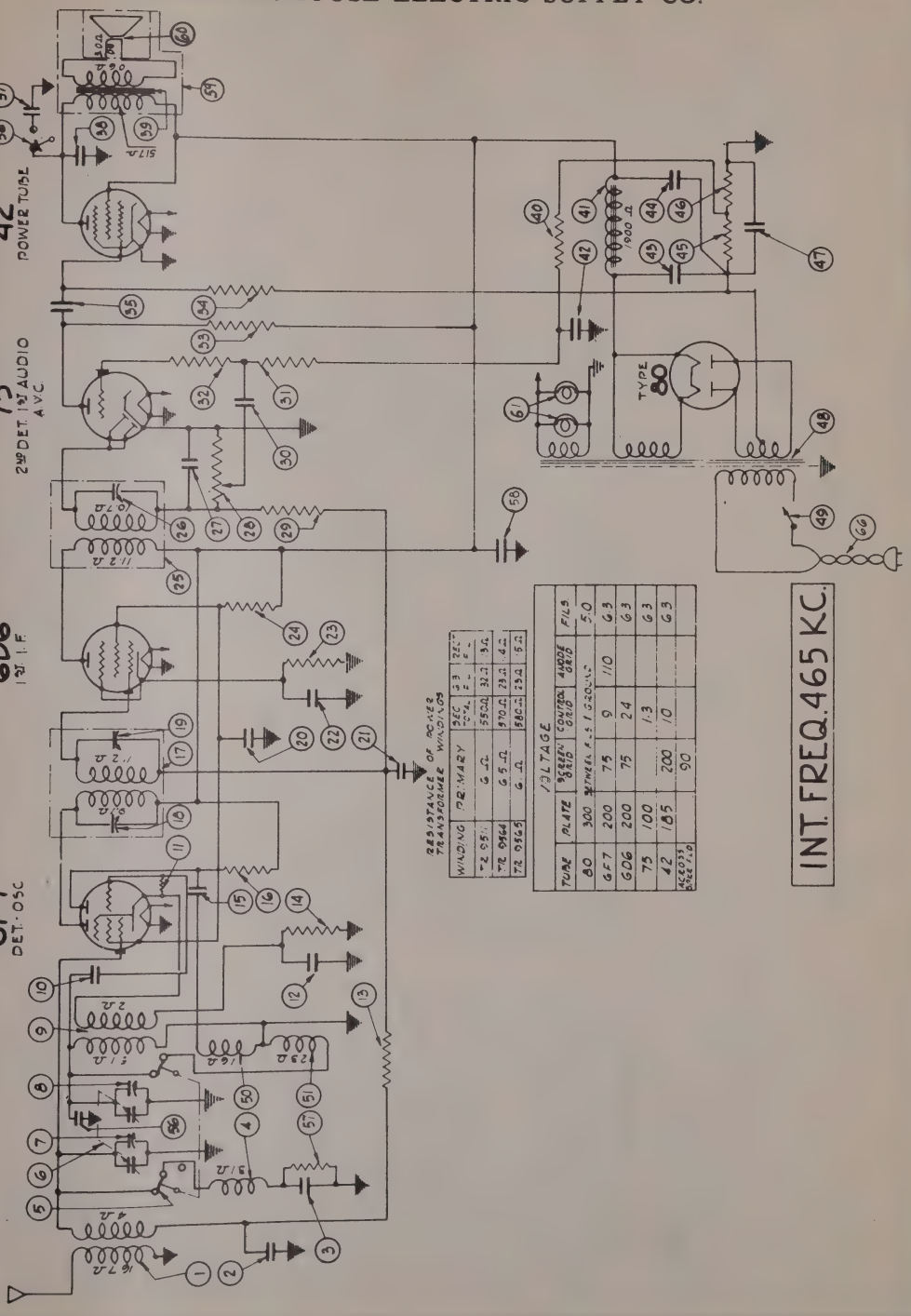
Rotate the wave-band switch (located on the rear wall of the chassis) to the broadcast position, clockwise, and swing the variable condenser to the maximum capacity position. Feed 456 kc to the grid-cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 456 kc through a dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust the wave-trap trimmer for maximum response. (See General Notes, paragraph No. 1.)

Broadcast Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc. through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response. The police band is self-tracking and does not require any adjustment.

MODEL WR-209

WESTINGHOUSE ELECTRIC SUPPLY CO.



RESISTANCE OF POWER TRANSFORMER WINDINGS

WINDING	RESISTANCE
2.5 V.	0 Ω
2.5 V.	0.4 Ω
5 V.	0.5 Ω
5 V.	0.6 Ω

VOLTAGE

TUBE	PLATE	SCREEN GRID	CONTROL GRID	CATHODE	FILS
80	300	BETWEEN FILAMENTS			5.0
6F7	200	75	3	1.0	6.3
6D6	200	75	2.4		6.3
75	100		1.3		6.3
42	185	200	10		6.3
ACROSS SECTION		90			

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WESTINGHOUSE RADIO MODEL WR-209

ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ---------- 1 #6F7, 1 #6D6, 1 #75, 1 #42, 1 #80 - Total 5
Power Supply ---------- 105 to 125 volts, 50 to 60 cycles A.C.
Power Consumption ---------- 46 Watts
Tuning Ranges ---------- 540 to 1500 K.C. and 1500 to 3200 K.C.
Maximum Undistorted Output ---------- 1.5 Watts
Maximum Output ---------- 2.8 Watts
Line-Up Frequencies ---------- I.F. 465 K.C., 1400 K.C.

GENERAL DESCRIPTION

This model is a five-tube, A.C., two-band superheterodyne receiver whose circuit comprises a combined first detector-oscillator an intermediate frequency amplifier, a combined second detector, A.V.C. and first audio amplifier, a power pentode output stage and a rectifier with its associated filter circuit and power transformer.

This model is designed to work over two bands, the broadcast band extending from 540 to 1500 K.C. and a police band which extends from 1400 to 3200 K.C.

LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment.

A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Fig. #1 and #2 and should be carefully studied before the actual work is started.

ADJUSTMENT OF I.F. (465 K.C.)

1. Set volume control on full, turn tone control knob to the right hand position. Set wave-change switch on the broadcast position and the dial indicator at approximately 600 K.C.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 K.C. and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of the 6D6 I.F. tube thru a .5 mfd. blocking condenser.
4. Adjust #26 (see Fig. #2) to maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6F7 first detector-oscillator tube and adjust #18 and #19 (Fig. #1) to maximum output.
6. With test signal still on the grid of 6F7 tube, repeat the above adjustments for greatest sensitivity.

ADJUSTMENT OF BROADCAST BAND

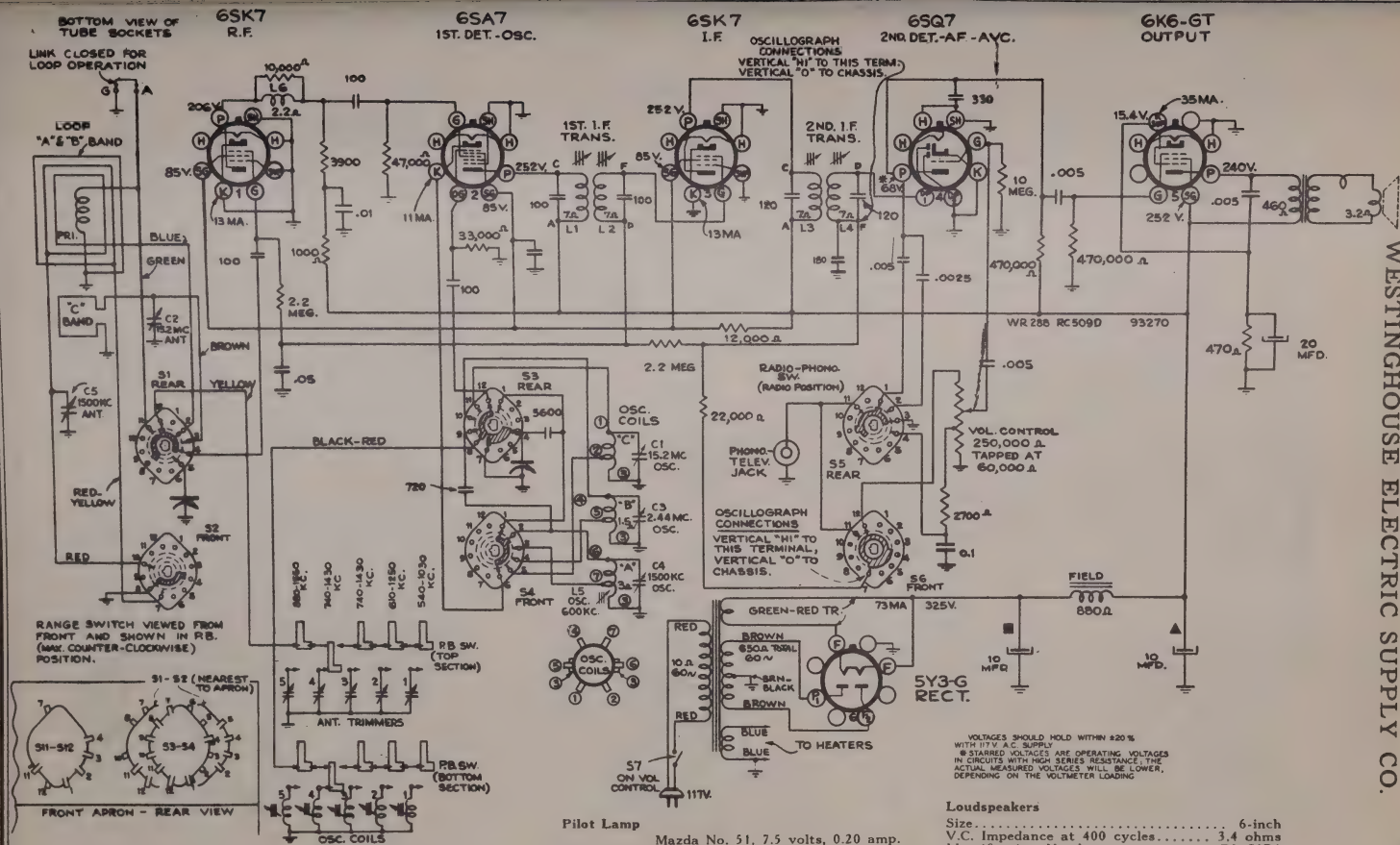
1. Leave test signal on grid of 6F7 tube and set the test oscillator to 1400 K.C.
2. Turn the gang condenser to its maximum position. Adjust dial indicator until either end is directly over the long horizontal lines on the dial scale. Then set dial indicator to 1400 K.C.
3. Adjust trimmer #8 to maximum output.
4. Apply test signal to antenna of set thru a .0002 mfd. condenser and adjust trimmer #7 to maximum output.

ADJUSTMENT OF POLICE BAND

When adjustments as outlined under the broadcast band are completed, the police band requires no adjustment unless the coil had been changed. In this event, set test oscillator and station indicator to 1700 K.C. and apply test signal to antenna lead. The police band winding is indicated by "A" in Fig. #2. Adjust the position of this winding by sliding it back and forth on the core until maximum output is indicated on the output meter. This winding should then be secured in place by applying a thin coat of coil cement.

SERVICE PARTS LIST

Dim. #	Part #	Description of Parts	List Price
1	RC 9588	Antenna coil assembly	$ 1.10
2		.05 mfd., 200 V. condenser - part of SA 105327 (dual).	.30
3	CM 958	400 mmfd. mica condenser	.20
4		Police pre-selctor coil - part of RC 9588	
5	SW 9519	Switch assembly	.85
6	CG 9522	Variable gang condenser	2.45
7		Trimmer condenser - part of CG 9522	
8		Trimmer condenser - part of CG 9522	
9	RC 9589	Oscillator coil assembly	.95
10	SA 106417	100 mmfd. mica condenser	.20
11	SA 105276	50,000 ohm, 1/4 W. resistor	.15
12	CW 2-05	.05 mfd., 200 V. condenser	.15
13	SA 105279	250,000 ohm, 1/4 W. resistor	.15
14	SA 105269	1800 ohm, 1/4 W. resistor	.15
15	CW 4-01	.01 mfd., 400 V. condenser	.15
16	SA 100197	25,000 ohm, 1/2 W. resistor	.15
17	IC 9532	1st I.F. transformer (465 KC.)	1.75
18		I.F. trimmer condenser - part of IC 9532	
19		I.F. trimmer condenser - part of IC 9532	
20	CW 4-10	.1 mfd., 400 V. condenser	.15
21		.05 mfd., 200 V. condenser - part of SA 105327 (dual).	.30
22		.05 mfd., 200 V. condenser - part of SA 105327 (dual).	.30
23	SA 105264	500 ohm, 1/4 W. resistor	.15
24	SA 101163	75,000 ohm, 1/2 W. resistor	.15
25	IC 9533	2nd I.F. transformer (465 KC.)	1.10
26		I.F. trimmer condenser - part of IC 9533	
27	SA 106417	100 mmfd. mica condenser	.20
28	VR 957	Volume control and line switch - (500,000 ohm)	1.25
29	SA 105281	1 meg., 1/4 W. resistor	.15
30	CW 4-02	.02 mfd. 400 V. condenser	.15
31	SA 105281	1 meg., 1/4 W. resistor	.15
32	SA 105278	100,000 ohm, 1/4 W. resistor	.15
33	SA 105279	250,000 ohm, 1/4 W. resistor	.15
34	SA 100195	250,000 ohm, 1/2 W. resistor	.15
35	CW 4-02	.02 mfd. 400 V. condenser	.15
36	SW 9519	Tone control switch	.85
37	CW 4-02	.02 mfd. 400 V. condenser	.15
38	CW 4-005	.005 mfd. 400 V. condenser	.15
39	SA 107357	Speaker output transformer	1.25
40	SA 105276	50,000 ohm, 1/4 W. resistor	.15
41	SA 107358	Speaker field coil - (1900 ohm)	1.75
42		.05 mfd. 200 V. condenser - part of 105327 (dual)	.30
43	CE 9512	12 mfd. electrolytic condenser (450 V.)	1.25
44	CE 9511	8 mfd. electrolytic condenser (300 V.)	.95
45	RE 9513	320 ohm resistor	.25
46		30 ohm resistor - part of RE 9513	
47	CE 958	10 mfd. electrolytic condenser	.65
48	TR 9511	Power transformer 105-125 V., 50-60 cycles	3.50
49		Line switch - part of VR 957	
50		Oscillator feed back coil - part of RC 9589	
51		Police oscillator coil - part of RC 9589	
56	SA 108043	.00001 mfd. mica condenser	.20
57	SA 105272	10,000 ohm, 1/4 W. resistor	.15
58	CW 4-05	.05 mfd., 400 V. condenser	.15
59	SK 9536	Speaker	6.00
60	SA 106617	Diaphragm and voice coil	1.15
61	LP 961	Dial lamp	.20
66	CB 9512	Line cable and plug	.50


BOTTOM VIEW OF TUBE SOCKETS
6SK7 R.F.
6SA7 1ST. DET.-OSC.
6SK7 I.F.
6SQ7 2ND. DET.-AF.-AVC.
6K6-GT OUTPUT
LINK CLOSED FOR LOOP OPERATION
LOOP "A" & "B" BAND
"C" BAND
1ST. I.F. TRANS.
2ND. I.F. TRANS.
OSCILLOGRAPH CONNECTIONS VERTICAL "HI" TO THIS TERM. VERTICAL "O" TO CHASSIS.
RADIO-PHONO. SW. (RADIO POSITION)
PHONO-TELEV. JACK
VOL. CONTROL 250,000Ω TAPPED AT 60,000Ω
OSC. COILS
RANGE SWITCH VIEWED FROM FRONT AND SHOWN IN R.B. (MAX. COUNTER-CLOCKWISE) POSITION.
S1 - S2 (NEAREST TO APRON)
FRONT APRON - REAR VIEW
R.B. SW. (TOP SECTION)
ANT. TRIMMERS
R.B. SW. (BOTTOM SECTION)
OSC. COILS
S7 ON VOL. CONTROL
117V.
5Y3-G RECT.
TO HEATERS
FIELD
880Ω
10 MFD.
20 MFD.
470Ω
WR 288 RC509D 93270
VOLTAGES SHOULD HOLD WITHIN ±20% WITH 117 V. A.C. SUPPLY
@ STARRED VOLTAGES ARE OPERATING VOLTAGES IN CIRCUITS WITH HIGH SERIES RESISTANCE, THE ACTUAL MEASURED VOLTAGES WILL BE LOWER, DEPENDING ON THE VOLTMETER LOADING

Pilot Lamp

Mazda No. 51, 7.5 volts, 0.20 amp.

Power Output Rating

Undistorted	2.5 watts
Maximum	4.5 watts

Push Button Frequency Ranges

One station between approximately 540-1,030 kc
One station between approximately 610-1,250 kc
Two stations between approximately 740-1,430 kc
One station between approximately 880-1,560 kc

Frequency Ranges

Broadcast	540-1,560 kc
"B" Band	1.4-4.5 mc
"C" Band	5.8-18 mc
Intermediate Frequency	455 kc

Loudspeakers

Size	6-inch
V.C. Impedance at 400 cycles	3.4 ohms
Identification Number	RL-79B1

Power Supply Ratings

105-125 volts, 50-60 cycles	70 watts
105-125 volts, 25-60 cycles	70 watts

Tuning Drive Ratio	12 to 1
Height (inches)	10¼
Width (inches)	19½
Depth (inches)	8½
Weight, lbs. net	19½

MODEL WR-288

WESTINGHOUSE ELECTRIC SUPPLY CO.

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown in the schematic diagrams.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

Calibration Scale.—The glass tuning dial my be easily removed from the cabinet and temporarily attached to the chassis for quick reference during alignment. Or, if necessary, the calibration scale printed in this service note can be used in conjunction with an ordinary 12-inch ruler as an accurate and convenient substitute for the regular dial.

Each method is described below.

Using Tuning Dial.—

1. Slide out the flat spring clamp at each end of the dial, and remove the glass dial from the cabinet.

2. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

3. Place the glass dial under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the glass dial in this position.

4. After completion of the alignment, replace the glass dial in cabinet, taking care that the fibre light shields are in correct position at ends of dial.

Using Calibration Scale.—

1. With gang in full mesh, move the dial pointer to the reference mark at the left-hand end of the dial backing plate.

2. Place a flat 12-inch ruler on the dial backing plate so the left-end of ruler is at the reference mark at left-end of backing plate. Temporarily fasten the ruler with scotch tape to the backing plate.

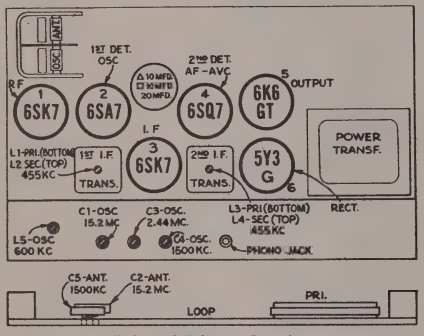
To find the correct pointer position in inches for any desired frequency, draw a vertical line through this frequency on the calibration scale. For example, 1,500 kc is approximately 4 inches from the reference mark.

Dial-Pointer Adjustment.—After the chassis is replaced in cabinet, move the dial pointer (if necessary) so that it is at the left-hand graduation on the dial with the gang in full mesh.

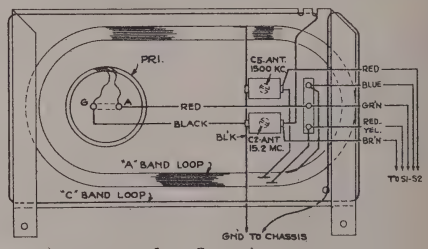
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for maximum peak output—
1	I.F grid, in series with .01	455 kc	"A" band, Quiet point at 1,500 kc end of dial	L3 and L4 (2nd I.F. Trans.)
2	1st-Det. grid, in series with .01			L1 and L2 (1st I.F. Trans.)
3	Antenna terminal, in series with 300 ohms (link open)	15.2 mc	15.2 mc "C" band	C1 (osc.) * C2 (ant.)
4		2.44 mc	2.44 mc "B" band	C3 (osc.) Rock in
5	Antenna terminal, in series with 200 mmfd. (link open)	1,500 kc	1,500 kc "A" band	C4 (osc.) C5 (ant.)
6		600 kc	600 kc "A" band	L5 Rock in
7	Repeat steps 5 and 6.			

* Use **minimum** capacity peak if two peaks can be obtained. Check to determine that the correct peak has been used, by tuning receiver to 14.29 mc, where a weaker signal should be received.

Note: Oscillator tracks **above** signal on all bands.



Tube and Trimmer Locations



Loop Connections

Push Button Adjustment

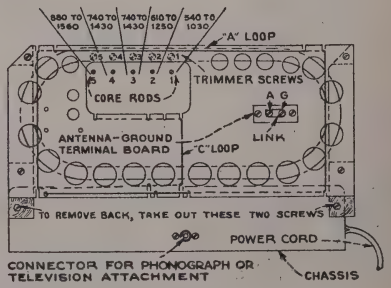
The push buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool. Allow at least five minutes warm-up period before making adjustments.

In the event that the receiver is to be used with an external antenna use one or two feet of wire (as an antenna) to ensure sharp peaking during the final adjustment procedure. For loop operation, the link should be strapped across "A" and "G" terminals on back of set. In either case the procedure is as follows:

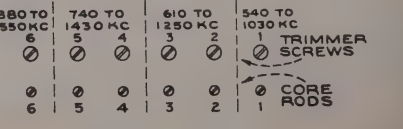
1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range selector to "A" band, and manually tune in the first station on the list.
3. Turn Range Control knob to "PB" and press push button No. 1 and adjust No. 1 oscillator core to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer for maximum output on this station.

   Owing to the relatively high R-F gain, it may be found that there are several settings of each push-button magnetite core that will bring in any particular station. In such cases it is advisable to unscrew the push button antenna trimmers to minimum capacity before adjusting the oscillator cores.

   Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.
5. Adjust for each of the remaining stations in the same manner.
6. After all stations are tuned-in on the buttons, make a fina careful adjustment of all core rods until best reception is obtained for each. Outdoor antenna should now be reconnected if used.



Back of Chassis



Push Button Adjustments

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MODELS WR-678, WR-679

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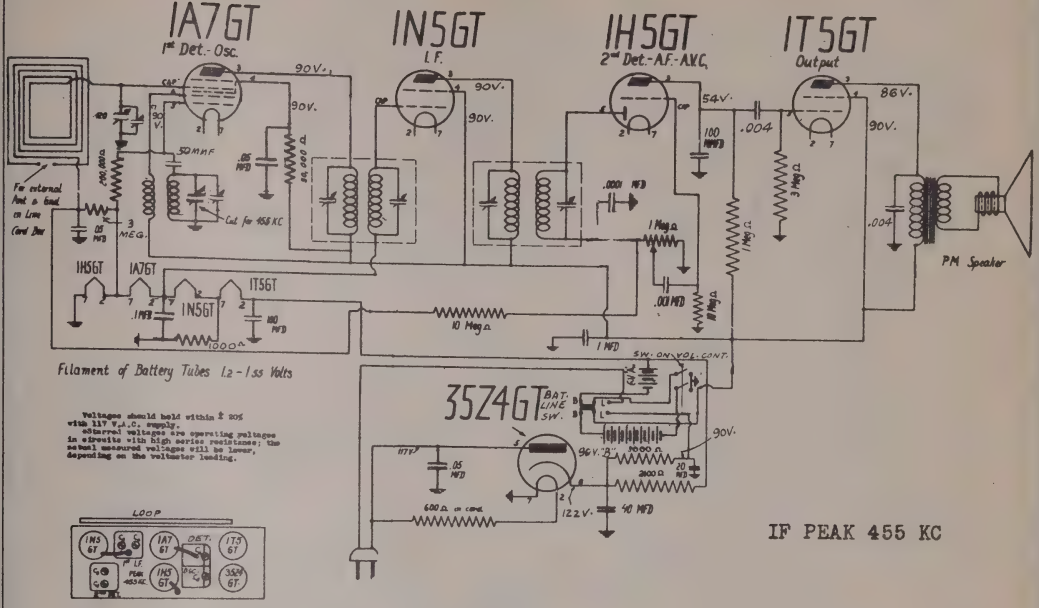


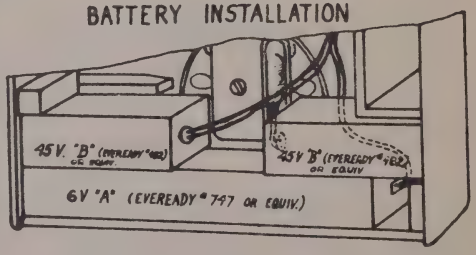
Alignment Procedure

Output Meter Alignment—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator—For all alignment operations, keep the output as low as possible to avoid a-v-c action. Connect the high side of the test-oscillator to one of the antenna loop primary leads. Connect the low side of the test-oscillator to the other antenna loop primary lead.

Steps	Tune test-osc. to—	Turn Radio dial to—	Adjust the following for max. peak output—
1	455 kc	Quiet point at 1700 kc end of dial	C1, C2, C3, C4 (1st and 2nd I-F transformers)
2	1700 kc	1700 kc	C5 osc.
3	1500 kc	1500 kc	C6

BATTERY INSTALLATION



MODEL WR-678
WR-679

Frequency Range	540-1700 kc
Intermediate Frequency	455 kc

RCA TUBE COMPLEMENT

(1)	RCA-1A7-GT	1st.-Det—Osc.
(2)	RCA-1N5-GT	I-F Amplifier
(3)	RCA-1H5-GT	2nd-Det., A-F, and A.V.C.
(4)	RCA-1T5-GT	output
(5)	RCA-35Z4-GT	Rectifier

LINE CURRENT SUPPLY
110 to 125 volts, AC 40 to 60 cycles, or DC ..... 20 watts

BATTERIES REQUIRED
"A" one 6 volt dry plug-in type (Eveready No. 747 or equivalent)
"B" two 45 volt dry plug-in type (Eveready No. 482 or equivalent)

CURRENT CONSUMPTION
"A," 0.05 ampere—"B," 10.5 milliamperes full power,

POWER OUTPUT

Undistorted	0.10 watt
Maximum	0.19 watt

LOUDSPEAKER

Type	5-inch permanent-magnet dynamic
Voice-coil Impedance	3.5 ohms at 400 cycles

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MODELS WR-680, WR-681

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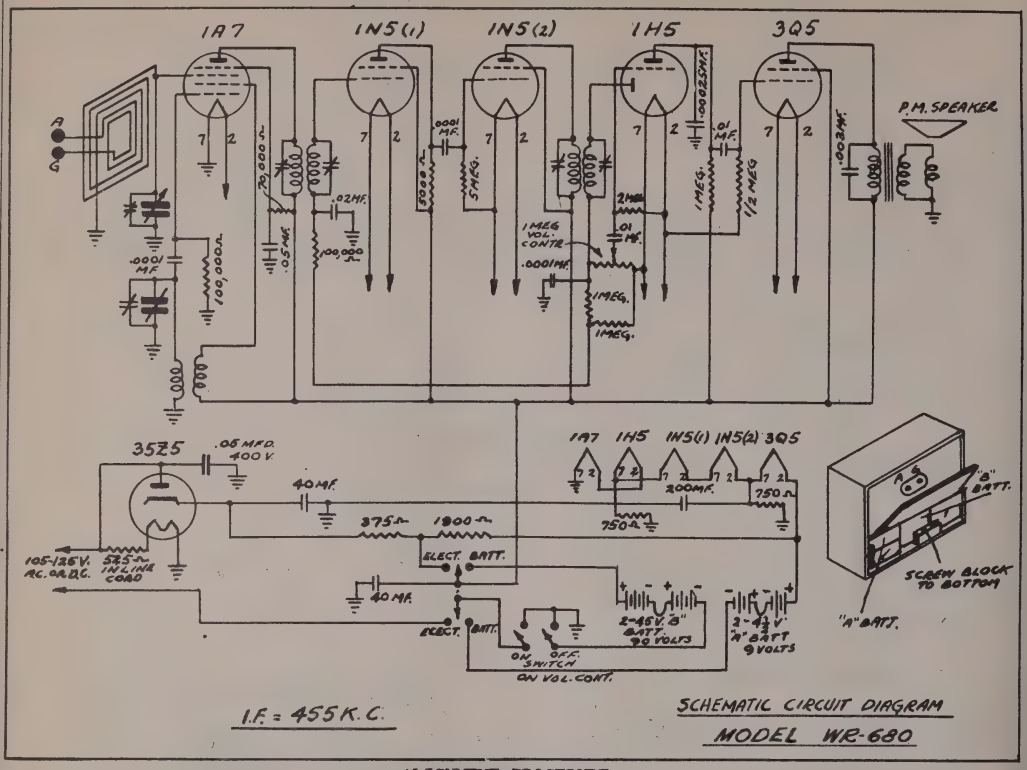

ALIGNMENT PROCEDURE

A Signal Generator and Output Meter are necessary for proper alignment of this receiver.

Before proceeding with any re-alignment, see that the pointer is in a horizontal position when the plates are fully meshed. Be sure that the grid leads to the 1N5 tubes are not too close together, and move the lead from the loop antenna away from the 1F grid.

THE INTERMEDIATE FREQUENCY is 455 KC. Connect the high side of the Signal Generator to the 1A7 grid with the grid cap removed and the low side to chassis. Set the Generator to this frequency. Adjust for maximum output as indicated on the output meter, which is connected across the Speaker Voice Coil. The I.F. trimmers are in the tops of the shield cans.

Replace the 1A7 grid cap. Couple the signal generator to the receiver by connecting to the A and G terminals on the back of the case. Turn the Signal Generator to 1400 KC, rotate the tuning knob to indicate this frequency and tune in the signal by means of the oscillator trimmer which is located on the right side (rear) of the variable condenser. Now adjust the antenna trimmer (front section of the variable condenser) for maximum output.

No further adjustments are required.

TUBES: 1A7GT - Det.-Osc.
1N5GT - 1st I.F.
1N5GT - 2nd I.F.
1H5GT - Det. avc. and A.F.
3Q5GT - Output
35Z5GT - Rectifier

POWER OUTPUT:

Undistorted	.17 watt
Maximum	.250 watt

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MODEL M-102

WESTINGHOUSE ELEC. INTERNATIONAL CO.

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MODEL M-102

WESTINGHOUSE ELEC. INTERNATIONAL CO.

SPECIFICATIONS

Power Consumption 45 Watts (At 120 volts 60 cycles)
Power Output .....1.5 Watts Undistorted
3.0 Watts Maximum
Selectivity.....37 KC Broad at 1000 times Signal
Intermediate Frequency .....456 KC
Speaker Voice Coil Impedance at
400 cycles .....3½ Ohms

Tuning Frequency Range
Broadcast Range ..... 540 to 1600 KC
Shortwave Range .....4700 to 18000 KC

Sensitivity—(For 0.5 Watt output)
Broadcast Range.....20 Microvolts Average
Shortwave Range.....60 Microvolts Average

120 OR 240 VOLT POWER TRANSFORMER CONNECTIONS

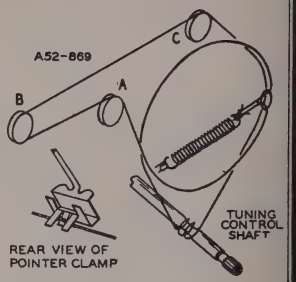
All radios except those for use on 25 cycles are equipped with a dual voltage power transformer which may be connected for 120 volts or 240 volts operation on 50-60 cycles. See diagram on page 3.

DRIVE CORD REPLACEMENT

Turn gang condenser to completely closed position. Using a new drive cord 45" in length, tie one end to tension spring. Pass other end through hole in rim of drive pulley. Pull spring flush against inside of pulley rim. Wind cord around drive pulley and pass over idler pulleys "A," "B," and "C"—See illustration.

Continue cord around drive pulley to tuning control shaft. Cord should be on right side of pulley groove (from gang condenser end of chassis). Wind drive cord 2 turns around section of tuning control shaft directly below drive pulley—See illustration.

Continue cord around drive pulley. Pass cord through hole in pulley rim. Tie cord to tension spring. Stretch tension spring and secure free end to hook on pulley.



ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Small Screwdriver.
Dummy Antennas—.1 mf., 200 mmf., and 400 ohm carbon resistor.

SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	RANGE SWITCH SETTING	CONDENSER SETTING	ADJUST TRIMMERS TO MAXIMUM
It is not necessary to remove chassis from cabinet if a short screwdriver is used for the I.F. adjustments. CAUTION—Align S.W. (Range D) **before** aligning Broadcast (Range B).					
I.F.					
456 KC	Antenna Lead	.1 mf.	Broadcast (to left)	Turn Rotor to Full Open	1st I.F. (C11) & (C12) 2nd I.F. (C15) & (C16)
S.W. (RANGE D)					
18,000 KC	Antenna Lead	400 Ohm	Shortwave (to right)	Turn Rotor to Full Open	Oscillator Shortwave (C6)
17,000 KC	Antenna Lead	400 Ohm	Shortwave (to right)	Turn Rotor to Max. Output	Ant. Shortwave (C3) Rock Rotor—See Note B
BROADCAST (RANGE B)					
1600 KC	Antenna Lead	200 mmf.	Broadcast (to left)	Turn Rotor to Full Open	Oscillator Broadcast (C7)
1400 KC	Antenna Lead	200 mmf.	Broadcast (to left)	Turn Rotor to Max. Output Set Pointer to 1400 KC—See Note A	Ant. Broadcast (C4)
600 KC	Antenna Lead	200 mmf.	Broadcast (to left)	Turn Rotor to Max. Output	600 KC (C8) Rock Rotor—See Note B

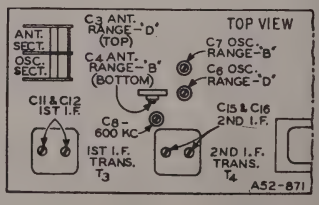
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1400 KC on the dial when maximum output is obtained, move the pointer to the 1400 KC mark on the dial scale.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal should be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.



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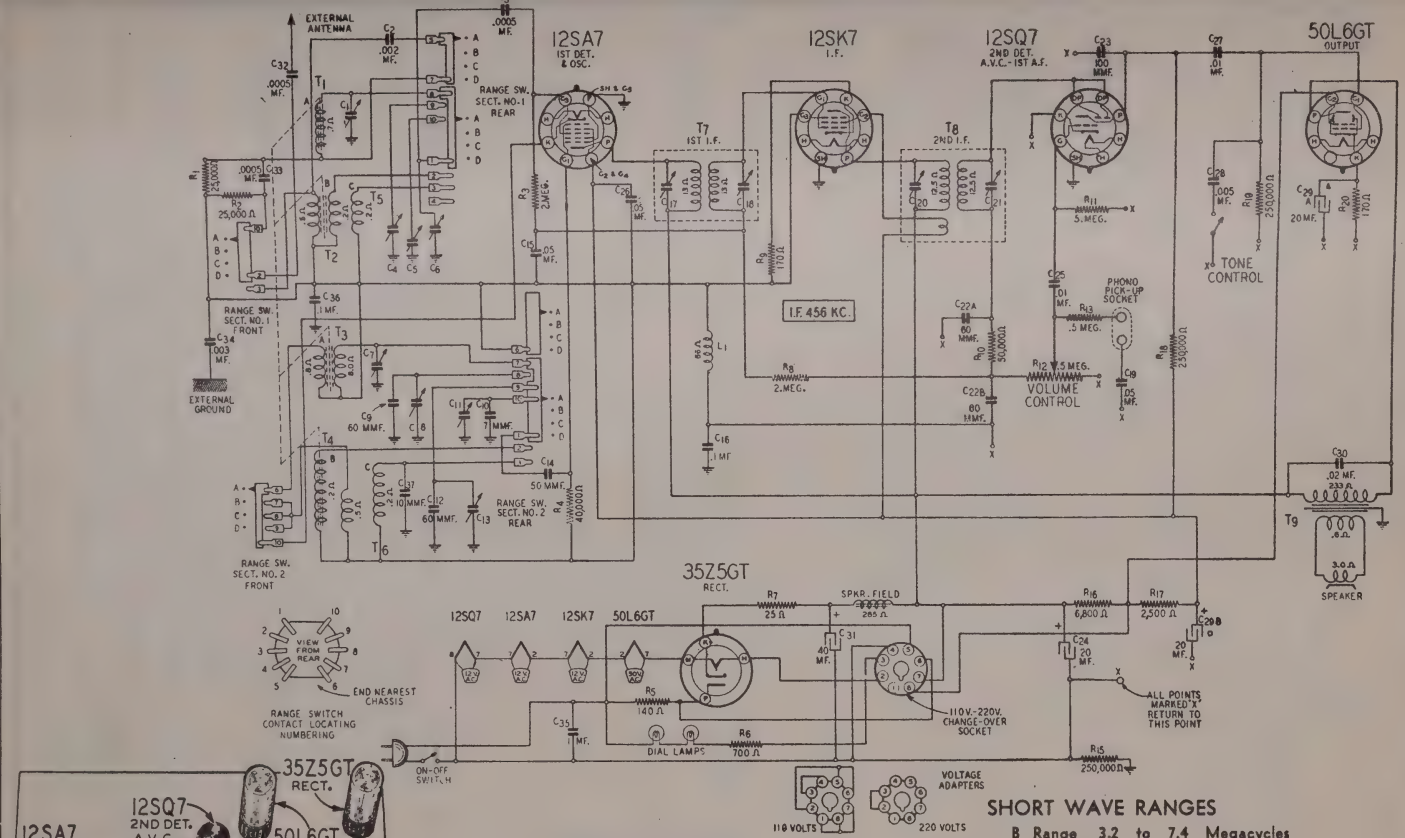


WAVE RANGES
BROADCAST RANGE

A Range 535 to 1610 Kilocycles

This range is calibrated in kilocycles and meters. Standard Broadcast stations are tuned in on this range.

SHORT WAVE RANGES

B Range	3.2	to	7.4 Megacycles
C Range	8.3	to	12.0 Megacycles
D Range	15.0	to	22.0 Megacycles

The Short Wave ranges are calibrated in megacycles and meters. Short Wave broadcasts will be heard best on the D range during the day and on the B and C ranges at night.

MODELS M-104, N-204

WESTINGHOUSE ELEC. INTERNATIONAL CO.

100-120 Volts DC or 40-60 Cycle AC Operation

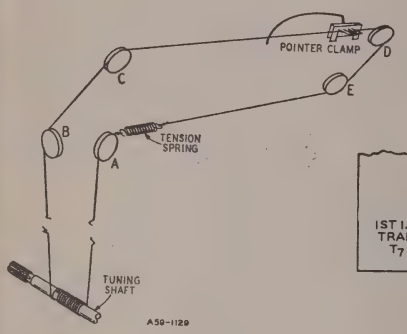
To adjust this receiver for operation on a 100-120 volt DC or 40-60 cycle power supply, the 220 volt Voltage Adapter tube (Part No. 6A250) must be replaced with a 110 volt Voltage Adapter tube (Part No. 6A251).

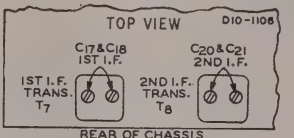
SPECIFICATIONS

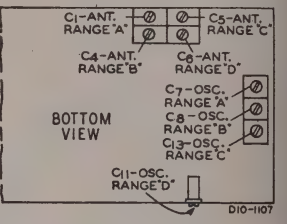
	120 Volt Operation AC or DC	240 Volt Operation AC or DC
Power Consumption	45 Watts	60 Watts
Power Output	2 Watts Undistorted 3 Watts Maximum	4.5 Watts Undistorted 6 Watts Maximum
Sensitivity	(For .05 Watt Output) 20 Microvolts Av. All Ranges	(For 0.5 Watt Output) 20 Microvolts Av. All Ranges
Selectivity	37 KC Broad at 1000 Times Signal	
Intermediate Frequency	456 KC	
Speaker	6" Electro-Dynamic	

Tuning Frequency Range

A Range	535 to 1610 KC
B Range	3.2 to 7.4 MC
C Range	8.3 to 12.0 MC
D Range	15.0 to 22.0 MC







Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

CAUTION—When aligning the short wave ranges, be sure NOT to adjust at the image frequency. This can be checked as follows: let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It will be necessary to increase the input signal to hear the image. The image frequency must always be 912 KC LESS than the frequency at which the set is aligned. This is true of all the short wave ranges.

It is very important that the bandspread ranges (B, C and D) be aligned at the precise frequencies given. If the accuracy of the signal generator is not known, it is always best to first calibrate the signal generator by using a receiver that is in good condition. First tune in a station of known frequency close to 12.0 MC. Then tune the signal generator until it "beats" with the station, carefully marking the setting of the generator. Proceed in the same manner for all the other alignment frequencies.

NOTE A—Turn tuner back and forth and adjust trimmer until peak of greatest intensity is reached.

ALIGNMENT PROCEDURE

Before aligning make certain that dial pointer is adjusted properly as instructed under "Drive Cord Replacement" on page 5.
Volume Control—Maximum All Adjustments.
Connect Radio Ground Lead to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 200 mmf., and 400 ohms. (Connect in series with Antenna lead.)

	SIGNAL GENERATOR FREQUENCY SETTING	CONNECTION AT RADIO	DUMMY ANTENNA	BAND SWITCH SETTING	POINTER SETTING	ADJUST TRIMMERS TO MAXIMUM
I.F.	456 KC	Antenna Lead	.1 mf.	A Range	Turn Tuning Knob until Extreme High Frequency Position is Reached	2nd I.F. (C20) & (C21) 1st I.F. (C17) & (C18)
RANGE D	21.8 MC	Antenna Lead	400 Ohm	D Range	Same as Above	Oscillator Range D (C11)
	Reset to 20.0 MC	Antenna Lead	400 Ohm	D Range	Turn Tuner to Max. Output	Antenna Range D (C6) Rock Tuner—See Note A
RANGE C	12.0 MC	Antenna Lead	400 Ohm	C Range	Extreme High Frequency Position	Oscillator Range C (C13)
	Reset to 11.5 MC	Antenna Lead	400 Ohm	C Range	Turn Tuner to Max. Output	Antenna Range C (C5) Rock Tuner—See Note A
RANGE B	7.4 MC	Antenna Lead	400 Ohm	B Range	Extreme High Frequency Position	Oscillator Range B (C8)
	Reset to 7.0 MC	Antenna Lead	400 Ohm	B Range	Turn Tuner to Max. Output	Antenna Range B (C4) Rock Tuner—See Note A
RANGE A	1610 KC	Antenna Lead	200 mmf.	A Range	Extreme High Frequency Position	Oscillator Range A (C7) Antenna Range A (C1)

PHONOGRAPH CONNECTIONS

Phonograph records may be reproduced through this radio by using a record-player.

On the back of the chassis base is a double pin tip socket to which a phono pickup of the high-impedance type may be connected. Always try reversing the position of the pickup pin tips in the socket if excessive hum is noticed.

POWER SUPPLY

Radio shipped from factory for operation on a power supply of 200 to 240 volts D.C. or 40 to 60 cycles A.C. An adjustment can be made for operation on a line voltage of 100 to 120 volts D.C. or 40 to 60 cycles A.C.

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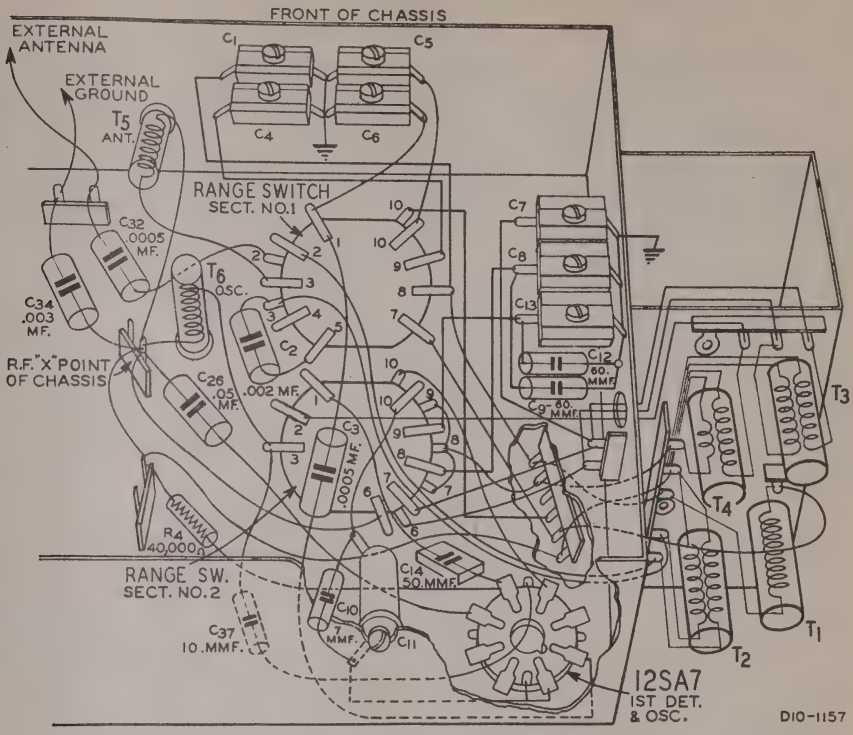
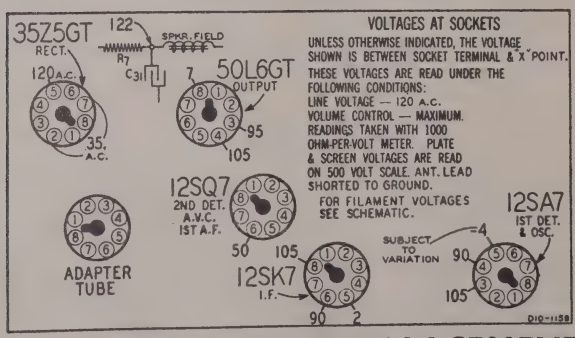
MODELS M-104, N-204



Wiring Diagram for Coil System



DRIVE CORD REPLACEMENT

Turn drive shaft until cores are entirely within coil form. Pass cord through hole in tuning shaft and bring two ends together evenly. CAUTION—Cord must remain centered on shaft. Wind one part of cord two turns on tuning shaft in a counterclockwise direction (from front of chassis). These turns should progress away from chassis. Hold both parts of cord and withdraw cores from within coils slowly by turning the tuning shaft. One part of cord should progress towards chassis and the other away from the chassis. Unwind the inside cord from shaft. Then wind this cord two turns in a clockwise direction (from front of chassis). These turns should progress towards rear of chassis.

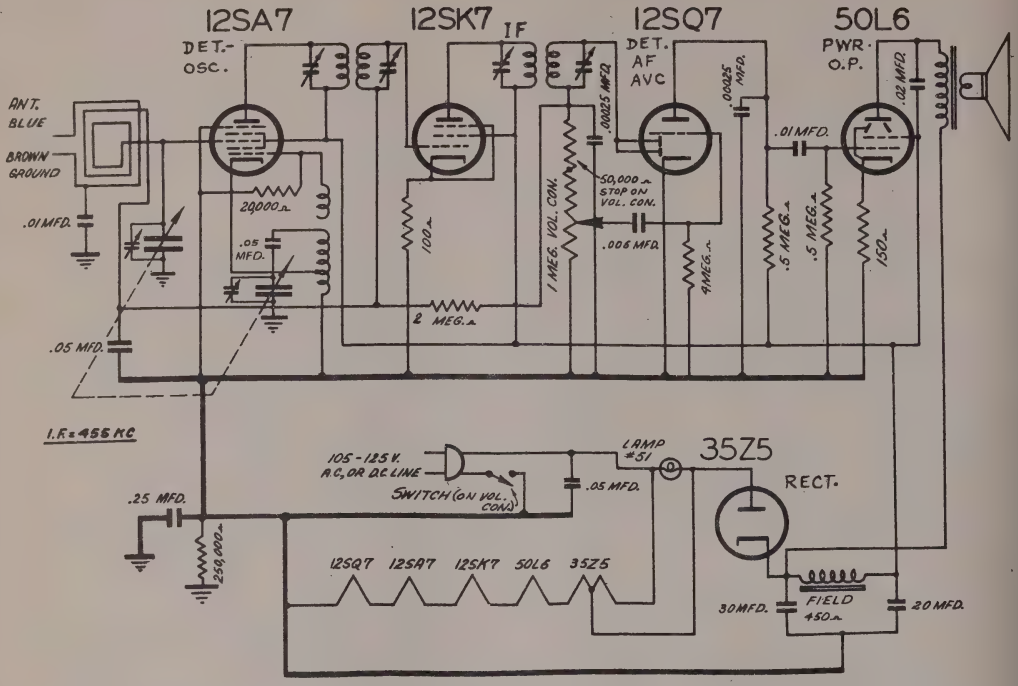
Pass this cord over idler pulley A—see illustration. Pass outer cord on tuning shaft over idler pulleys B, C, D and E, attaching it to tension spring. Secure other end of cord to opposite end of tension spring. This spring should be slightly stretched for tension.

ATTACHING DIAL POINTER

Turn tuning knob clockwise until extreme high frequency position is reached. (Cores completely out of coils.) Slip the pointer on the dial cord and move to high frequency end of dial scale. Carefully align pointer with end of printed scales and clamp securely into position.

MODEL M-115

WESTINGHOUSE ELEC. INTERNATIONAL CO.



Frequency Range----------545 to 1630 K.C.
Intermediate Frequency----------455 K.C.

Power Supply Ratings
Alternating Current----------105-125 volts, 50-60 cycles, 30 watts
Direct Current----------105-125 volts----------30 watts

Alignment Procedure

A test oscillator or signal generator is required together with an output meter. Connect the output meter across the voice coil. For I.F. alignment connect the low side of the signal generator or test oscillator to the Negative bus. (This connection maybe made at the line switch) The high side is then connected to the stator of the antenna section (rear) thru a .01 mfd condenser. Then align the I.F. trimmers for maximum as indicated on the output meter. Should any station interfere while this adjustment is being made, turn the variable condenser to a quiet point on the dial.

Connect the test oscillator to antenna and ground leads of the receiver. Now open the variable condenser with the plates entirely out of mesh. Set the test oscillator to 1630 K.C. and adjust the oscillator trimmer (front section of the variable condenser) to this frequency. Now change to a clear spot on the dial at about 1400 K.C., set the test oscillator to this frequency and align the antenna trimmer (rear section) for maximum. No other adjustments are required.

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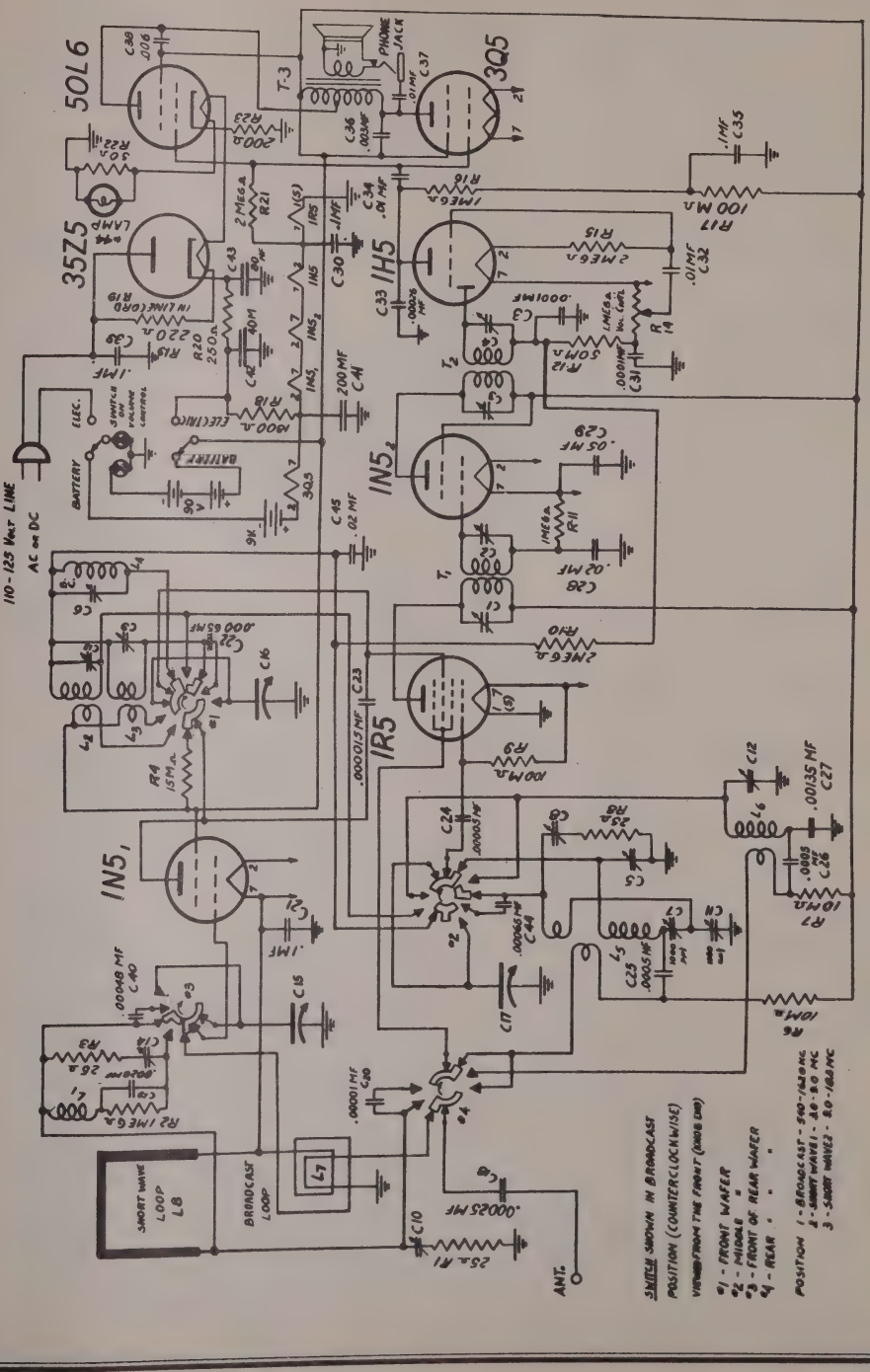
MODEL M-106



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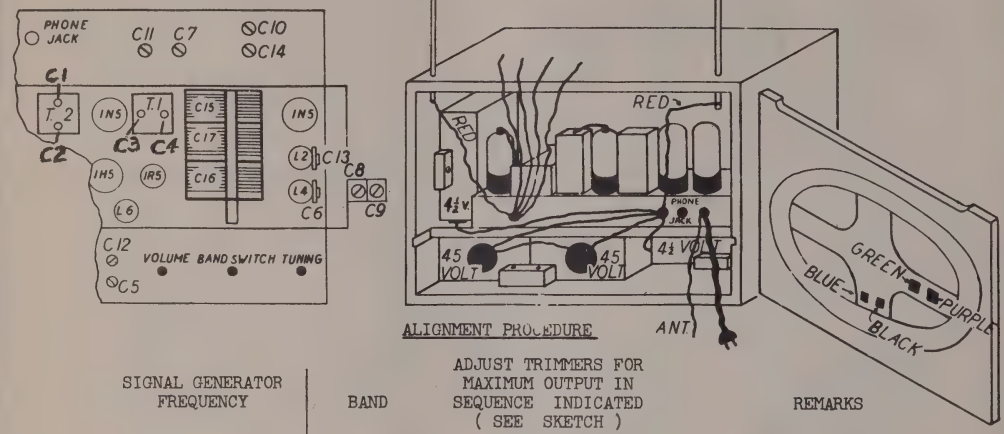
MODEL M-106

WESTINGHOUSE ELEC. INTERNATIONAL CO.

During the alignment procedure all adjustments should be made under the following conditions:

(1) Line Voltage as indicated elsewhere in these instructions (or a fresh set of batteries)
(2) Volume control at maximum.
(3) Minimum input from the Signal Generator to give a good readable signal on the output meter.

If this procedure is not adhered to, all adjustments will appear very broad due to the action of the automatic volume control.



ALIGNMENT PROCEDURE

	SIGNAL GENERATOR FREQUENCY	BAND	ADJUST TRIMMERS FOR MAXIMUM OUTPUT IN SEQUENCE INDICATED (SEE SKETCH)	REMARKS
A	455 MC	I.F.	1--2--3--4	I. F. Trimmers
B	1500 KC	B.C.	5--6	Set dial to 1500 KC
C	600 KC	B.C.	7	Recheck adjustment "B"
D	17 MC	S.W.2	8--9--10	Set dial to 17 MC (rock condenser slightly)
E	9.5 MC	S.W.2	11	Recheck adjustment "D"
F	8.5 MC	S.W.1	12--13--14	

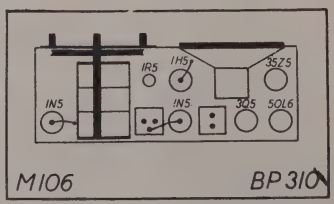
POWER CONSUMPTION (On 117 Volts AC) 20 Watts

BATTERIES 2--45 Volt "B" and 2--4½ Volt "A"

BATTERY DRAIN "A"--300 Milliamperes
"B"--12 Milliamperes

POWER OUTPUT BATTERY OPERATION - 100 Milliwatts undistorted
200 Milliwatts maximum

A.C. OPERATION - 500 Milliwatts undistorted
1.5 Watts maximum



INTERMEDIATE FREQUENCY 455 KC

SPEAKER 5 inch P.M. dynamic

FREQUENCY RANGE BROADCAST 540--1630 KC
SHORT WAVE #1 3--9 MC
SHORT WAVE #2 9--18 MC

TUBE COMPLEMENT

1N5GT Tuned R.F. Amplifier
1R5 1st. detector and oscillator
1N5GT I.F. amplifier
1H5GT 2nd detector, A.V.C. and 1st Audio
3Q5GT Output (for Battery Operation)
50L6G7 Output (for Electric Operation)
35Z5GT Rectifier (for Electric Operation)

SENSITIVITY BROADCAST-LOOP OPERATION-75 MICROVOLTS PER METER (AVERAGE) FOR 50 MW OUTPUT
ANTENNA - 5 MICROVOLTS (AVERAGE)
SHORT WAVE-LOOP OPERATION 100 MICROVOLTS PER METER (AVERAGE)

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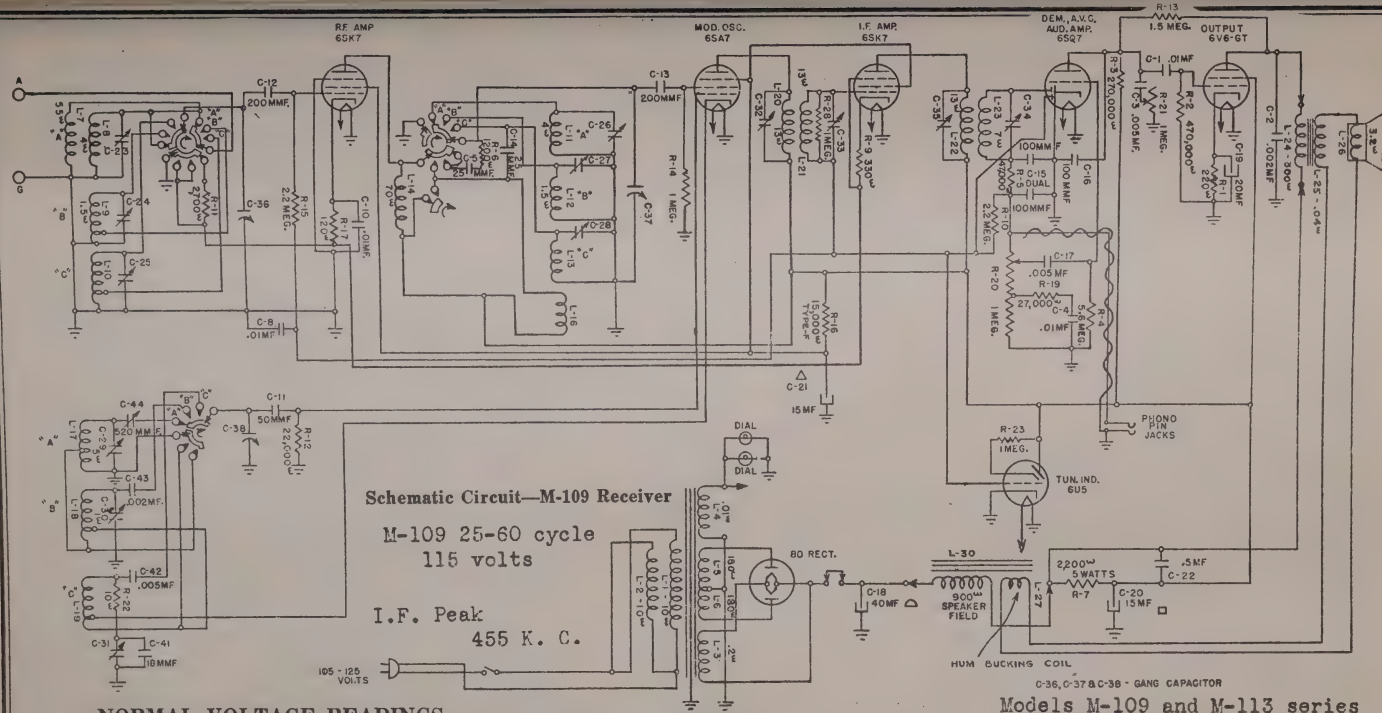

Schematic Circuit—M-109 Receiver

M-109 25-60 cycle
115 volts

I.F. Peak
455 K. C.

NORMAL VOLTAGE READINGS

Tube	*Circuit*	TERMINALS OF SOCKETS 1	2	3	4	5	6	7	8
6SK7	R. F. Amp.	0	0	0	0	+9*	+110	*6.0*	+265
6SA7	Mod. and Osc.	0	*6.0*	+265	+110	−6*	0	0	0
6SK7	I. F. Amp.	0	*6.0*	+9*	0	+9*	+110	0	+265
6SQ7	Demod., A. V. C. Audio Ampl.	0	0	0	0	0	+100	*6.0*	0
6V6G	Output	0	0	+310	+265	0	+100	*6.0*	+12*
80†	Rectifier	+410	*330*	*330*	+410	—	—	—	—
6U5	Tuning Indicator	0	+25	0	+265	0	*6.0*	—	—
	Speaker Socket	+320	+310	+320	+410	+410	0	+410	—

*Read on lowest possible scale of voltmeter.
†Between terminals 1 and 4 of rectifier socket: 4.5 volts A. C.

Models M-109 and M-113 series
VOLTAGE NOTES:

1. Take all readings with receiver operating and tuned to approx. 1000 Kc.-no Sig.
2. Use a line voltage of 120V. (240 V. for "C" models), or make or allow for any slight variation.
3. Use a good high res. voltmeter having a res. of at least 1000 ohms per volt.
4. Take all D.C. readings on the 500 V. scale except when an asterisk appears.
5. Read from indicated terminals to chassis base.
6. A.C. voltages are indicated by italics.

MODELS M-109, M-109B, M-109C

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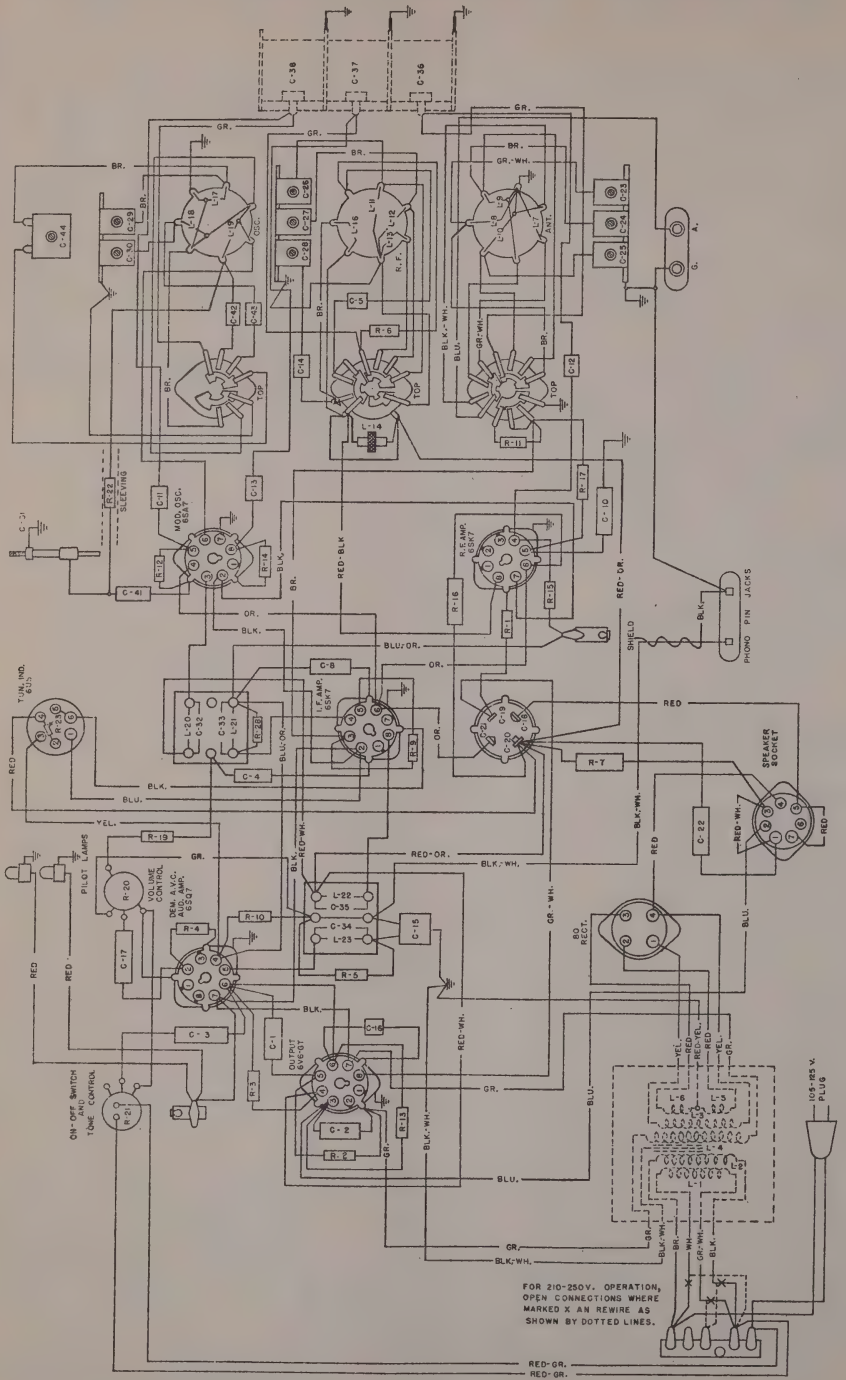

Wiring Diagram—M-109 Receiver

Tuning Range: A - .54 to 1.6 MC.; B - 2.3 to 7.6 MC.; C - 7.6 to 23 MC.
Input Power Rating..... 80 watts I. F. Peak ..... 455 KC.
Speaker Voice Coil Impedance at 400 cycles ..... Approximately 3.2 ohms
Speaker Field Coil Resistance ..... Approximately 900 ohms

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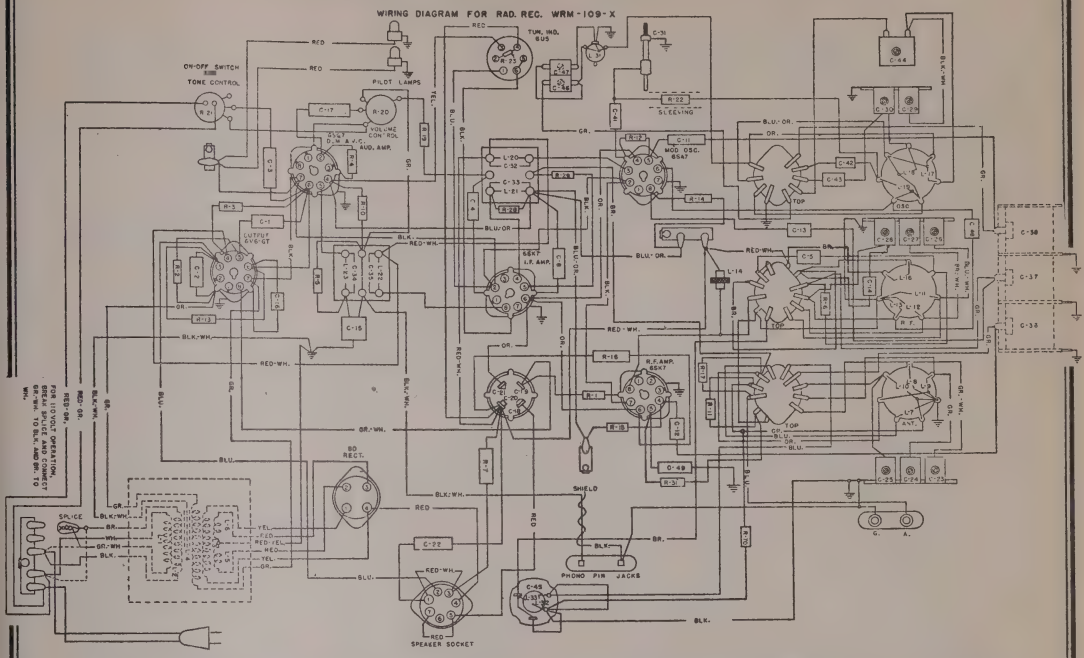
WESTINGHOUSE ELEC. INTERNATIONAL CO. MODEL M-109X

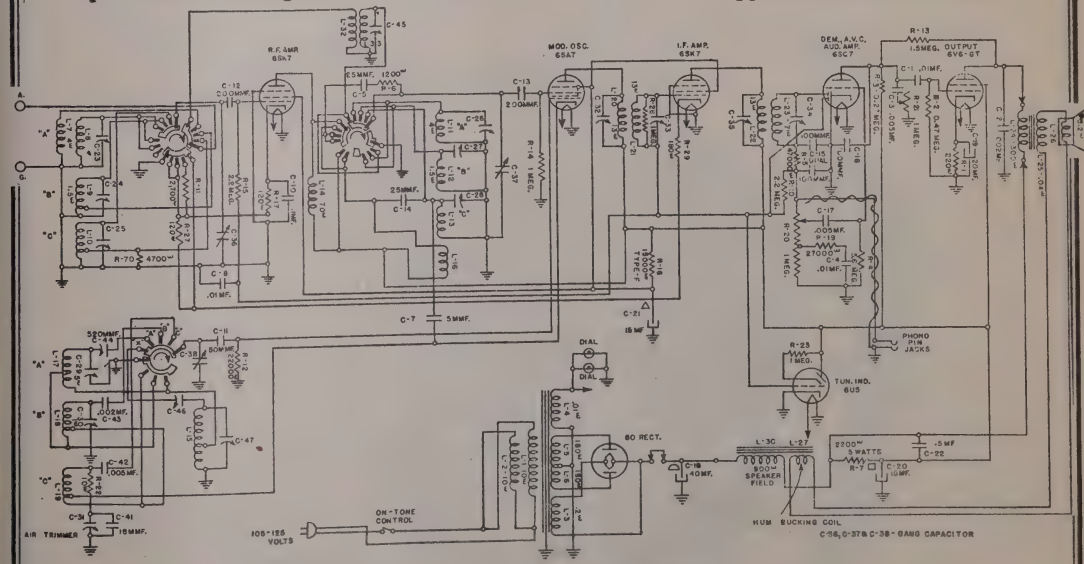
Wiring Diagram—M-109-X Receiver



Tuning Ranges, Model M-109-X
X-150 to 400 Kc.;A-0.54 to 1.6 Mc.
B-2.3 to 7.6 Mc.;C-7.6 to 23 Mc.

Input Power Rating (M-109) 80 watts

Intermediate Frequency ..... 455 Kc.
Spkr. V.C. Impedance at 400 cycles
Approximately 3.2 ohms
Spkr. Field Coil Resistance
Approximately 900 ohms



Schematic Circuit—M-109-X Receiver

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MODELS M-109, M-109B, M-109C, M-109X WESTINGHOUSE ELEC. INTERNATIONAL CO. MODELS M-113, M-113C

ALIGNING INFORMATION

Never Align Unless Absolutely Necessary

Use a good modulated signal generator (test oscillator) with variable output voltage and connect a sensitive output meter across the voice coil of the speaker.

Always align using the smallest possible signal from the signal generator. A strong signal makes adjustments inaccurate.

Always have receiver volume control full on.

See location chart for location of all the aligning adjustment screws.

Aligning procedure (follow this order exactly)

I. Dial pointer adjustment.

Make sure that the dial drive cord is in position on all pulleys, otherwise it will not be possible to correctly set the dial pointer. To correct the position of the dial pointer, first free the pointer ends from the drive cord, then with the gang capacitor fully engaged, set the pointer directly behind the horizontal line at the top of the dial. Carefully retighten the pointer ends to the drive cord.

II. Intermediate frequency adjustments.

1. Set the range switch to the medium wave position ("A").
2. Tune set to extreme low frequency end of the dial.
3. Connect the ground terminal of the signal generator to the ground terminal of the chassis.
4. Introduce a modulated signal of 455 Kilocycles to the stator terminal (top) of the center section of the gang capacitor, using a 0.1 microfarad capacitor in series with the output lead of the signal generator.
5. Adjust the I. F. Aligners for maximum signal in the following order:
   - A. Secondary of second I. F. transformer.
   - B. Primary of second I. F. transformer.
   - C. Secondary of first I. F. transformer.
   - D. Primary of first I. F. transformer.

III. Radio frequency adjustments.

Short Wave Range, Scale "C".

1. Replace the 0.1 microfarad capacitor in series with the output lead of the signal generator with a 400 ohm carbon type resistor, and connect it to the antenna terminal of the chassis.
2. Set the range switch to the "C" short-wave position.
3. Set the signal generator frequency and the receiver tuning dial to 20 megacycles.
4. Adjust the "OSC. 20 MC." (air trimmer) aligner by loosening the lock nut and moving the plunger in or out until maximum signal is obtained. If two positions are found at which maximum signal occurs, always use the minimum capacitance position (most outward position of plunger). Always be sure to tighten the lock nut after the aligning adjustment has been completed. An S. D. 76 aligning tool is recommended for alignment of air trimmer capacitors of the plunger type.
5. Adjust the "20 MC." R. F. and ANTenna aligning capacitors for maximum signal.

Short Wave Range, Scale "B".

(Leave the receiver connected to the signal generator in the same manner as above.)

1. Set the range switch to the "B" short-wave position.
2. Set the signal generator frequency and the receiver tuning dial to 7 Mc.
3. Adjust the "7 MC." OSCillator aligning capacitor for maximum signal. If two positions are found at which maximum signal occurs, always use the minimum capacitance position (most counter-clockwise position).
4. Adjust the "7 MC." R. F. and ANTenna aligning capacitors for maximum signal.

Medium Wave Range, Scale "A".

1. Replace the 400 ohm carbon type resistor in series with the output lead from the signal generator with a 200 micro-microfarad capacitor.
2. Set the range switch to the medium wave position, "A".
3. Set the signal generator frequency and the receiver tuning dial to 1.5 Mc.
4. Adjust the "1.5 MC." OSCillator R. F. and ANTenna aligners (iron cores) for maximum signal.
5. Set the signal generator frequency and the receiver tuning dial to 0.6 Mc.
6. Adjust the "0.6 MC." OSCillator aligning capacitor for maximum signal.
7. Repeat operations 3 and 4.

Alignment Procedure, WRM-109-X only

Long Wave Range, Scale "X".

1. Connect signal generator to antenna connection of receiver with a 200 MMF Capacitor in series with the high side of the signal generator lead. Connect the ground side to the ground connection of the receiver.
2. Set signal generator and receiver dial to 800 meters (375 Kc.).
3. Turn range switch to "X" range position (extreme left).
4. With a screwdriver, adjust the long wave shunt aligner until the 800 meter signal is brought to exact resonance. (The series and shunt oscillator aligners are located on the front of the chassis directly under the dial. The aligners are accessible through two holes side by side in which the left hand adjustment is the series aligner and the right, the shunt aligner.)
5. Adjust the antenna aligner for maximum output. (This aligner is located on the rear of the chassis, to the right of the antenna-ground terminal block, and is accessible through a hole provided.)
6. Turn the dial of the receiver to 2000 meters (150 Kc.).
7. Set the signal generator to 2000 meters (150 Kc.).
8. Rock tuning control, at the same time adjusting the oscillator series aligner (see paragraph 4 above for location) until maximum signal output is obtained.
9. Repeat operations 2, 4 and 5.
10. Repeat operations 7 and 8.

POWER TRANSFORMER CONNECTIONS

Models M-109, 109-C, 109-X, 113 and 113-C have a double primary power transformer which when connected in parallel will operate between 105 and 130 volts A. C. and when connected in series (M-109-C and M-113-C) will operate between 210 and 250 volts A. C. If it is desired to change the operating voltage of these sets, see the wiring diagrams on Pages 6, 8 or 9 for the correct connections. These connections are located underneath the chassis and must be soldered. On Phonograph Models (M-113 and M-113-C) it is also necessary when changing the operating voltage to insert the proper plug on the phonograph motor. The plug having a double jumper wire is for 105 to 130 volts operation of the phonograph motor. The plug having a single jumper wire provides 200 to 250 volts A. C. operation of the phonograph motor.

PHONO MOTOR CONNECTIONS

The phonograph motor for the M-113-C should be inspected to see that the small plug having a **single jumper wire** is in place for operation on a line voltage of 200 to 250 volts A. C.

The phonograph motor for the M-113 should be inspected to see that the small plug having a **double jumper wire** is in place for operation on a line voltage of 100 to 130 volts.

To obtain correct turntable speed when operating the phonograph on a **50 cycle power supply**, remove the drive pulley from the motor shaft and replace it with the pulley enclosed in envelope stapled to cabinet.

INSTRUCTIONS FOR ADJUSTING PHONOGRAPH MECHANISM USED IN M-113 RECEIVERS

A. Adjusting Landing Position of Needle on Record

If needle comes down too far from the edge of the record so that record does not start at the beginning, **turn adjusting screw "A" very slightly counter-clockwise.**

If needle comes down too close to the edge of the record so that it slips off, **turn adjusting screw clockwise.**

B. Adjusting Tripping Mechanism

If trip mechanism fails to trip or operates during playing of record, adjust screw "B" to position where proper tripping is obtained. When this adjustment cannot be accomplished by means of screw "B" loosen adjusting nuts "D-D", make necessary adjustments with these nuts, then retighten.

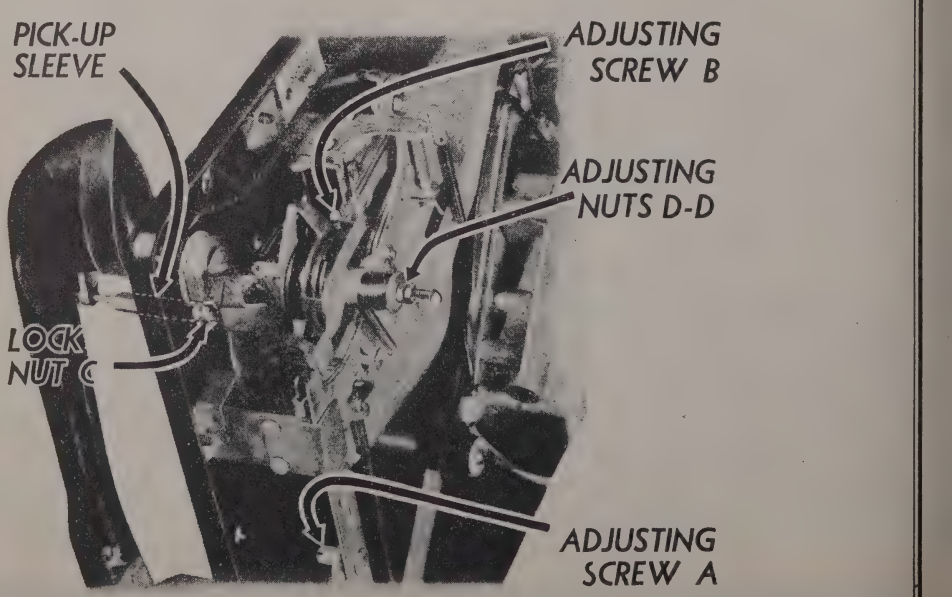
C. Adjusting Height to Which Pick-up Arm Rises

The arm should rise during the change cycle so that it clears the record above it by only ⅛". To make this adjustment, loosen the locknut "C" on pick-up sleeve and turn sleeve to lengthen or shorten the plunger. **Be sure to tighten locknut again after adjustment.**

No adjustment of the record separating knives is required as they are arranged to compensate for slight differences in record thickness automatically.

Handle the mechanism with care.

Do not lift it by the record holding knives.



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MODELS M-113, M-113C

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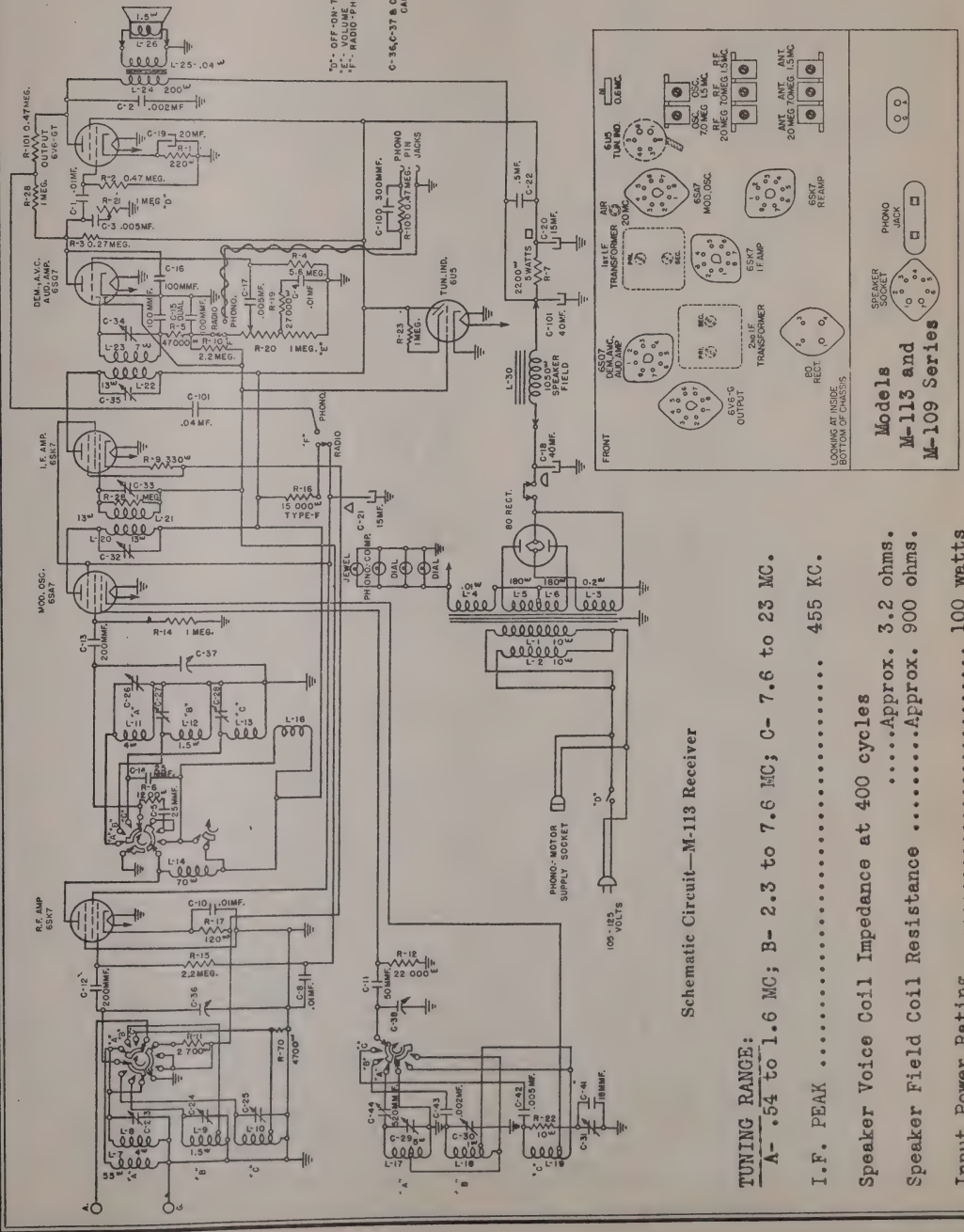

TUNING RANGE:
A- .54 to 1.6 MC; B- 2.3 to 7.6 MC; C- 7.6 to 23 MC.

I.F. PEAK ..... 455 KC.

Speaker Voice Coil Impedance at 400 cycles
.....Approx. 3.2 ohms.

Speaker Field Coil Resistance .....Approx. 900 ohms.

Input Power Rating ..... 100 watts

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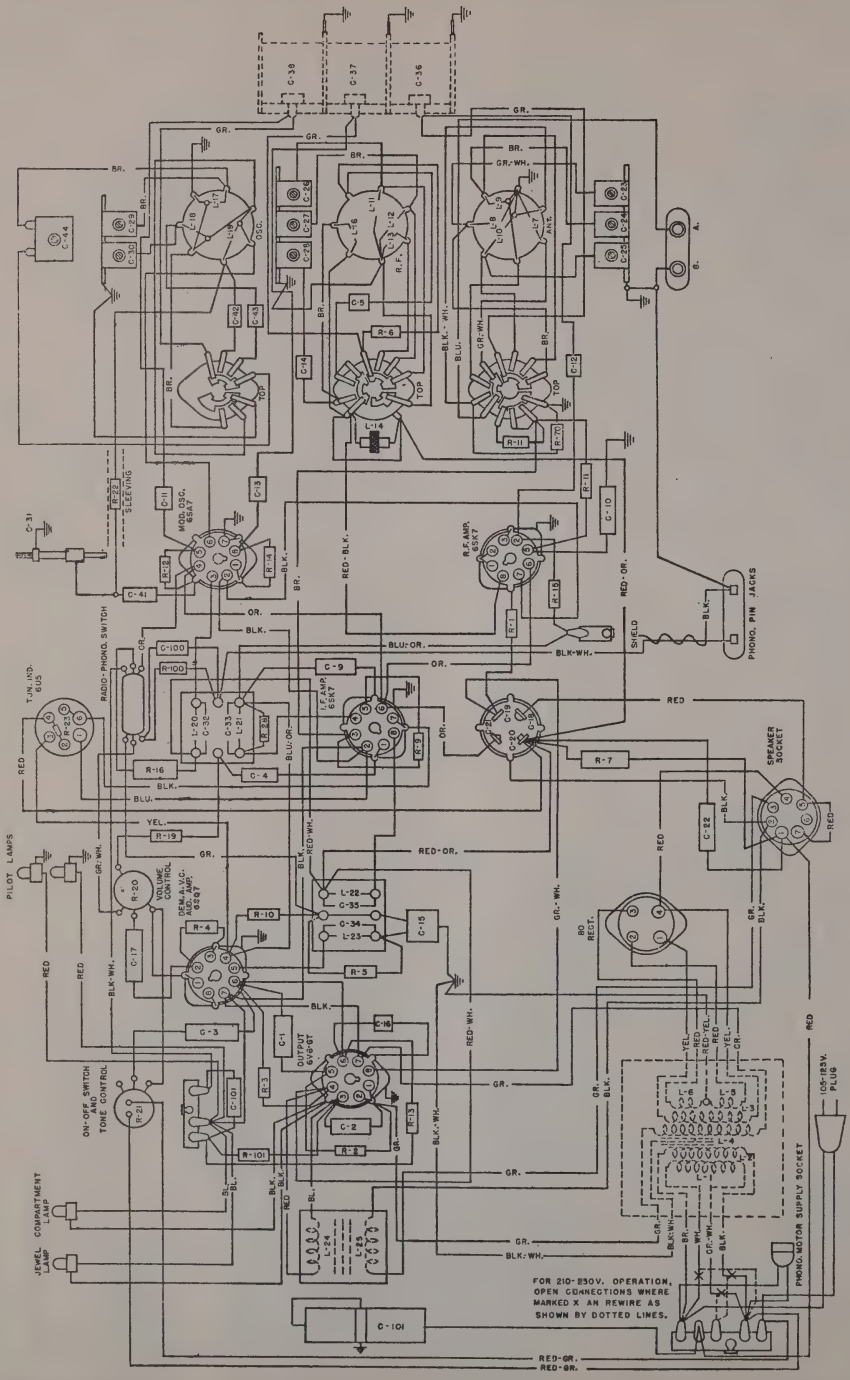
MODELS M-113,
M-113-C

WESTINGHOUSE ELEC. INTERNATIONAL CO.


C-39
C-37
C-36
GR.
BR.
GR.-WH.
C-44
C-29
C-30
C-28
C-27
C-26
C-25
C-24
C-23
C-22
C-21
L-17
L-18
OSC.
L-16
L-11
R.F.
L-12
L-13
L-10
L-9
L-8
L-7
ANT.
A.
B.
C-42
C-43
C-5
R-6
C-14
BLK.-WH.
BLU.
OR.-WH.
C-12
TOP
L-14
R-11
R-70
C-31
R-22
SLEEVING
C-11
C-13
MOD. OSC. 6SA7
R-21
R-14
BLK.
BR.
RED-BLK.
C-41
R.F. AMP. 6SK7
R-13
C-10
R-15
R-1
RED-OR.
SHIELD
BLK.
PHONO. PIN JACKS
OR.
BLK.
C-100
R-100
BLU-OR.
BLK.-WH.
C-9
I.F. AMP. 6SK7
C-18
C-19
C-20
R-23
RED
T.U.N. IND. 6U5
RADIO-PHONO. SWITCH
L-20
C-32
C-33
L-21
R-18
R-16
C-4
R-7
SPEAKER SOCKET
C-122
BLK.
BLU.
YEL.
R-19
PILOT LAMPS
GR.-WH.
VOLUME CONTROL
R-20
DEM. A.V.C. RECT. 6H6
L-22
C-35
C-34
L-23
C-15
R-10
R-4
R-5
RED-OR.
RED-WH.
GR.-WH.
BD. REST.
GR.
BLK.
C-17
BLK.-WH.
C-3
C-1
OUTPUT 6V6-GT
C-16
C-2
R-3
R-2
R-13
ON-OFF SWITCH AND TONE CONTROL
R-21
C-18
R-101
GR.
OR.
BLK.
YEL.
RED-YEL.
RED
105-125V. PL-68
COMPARTMENT LAMP
JEWEL LAMP
L-24
L-25
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L-27
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L-63

MODEL WRL-165

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MODEL WRL-165

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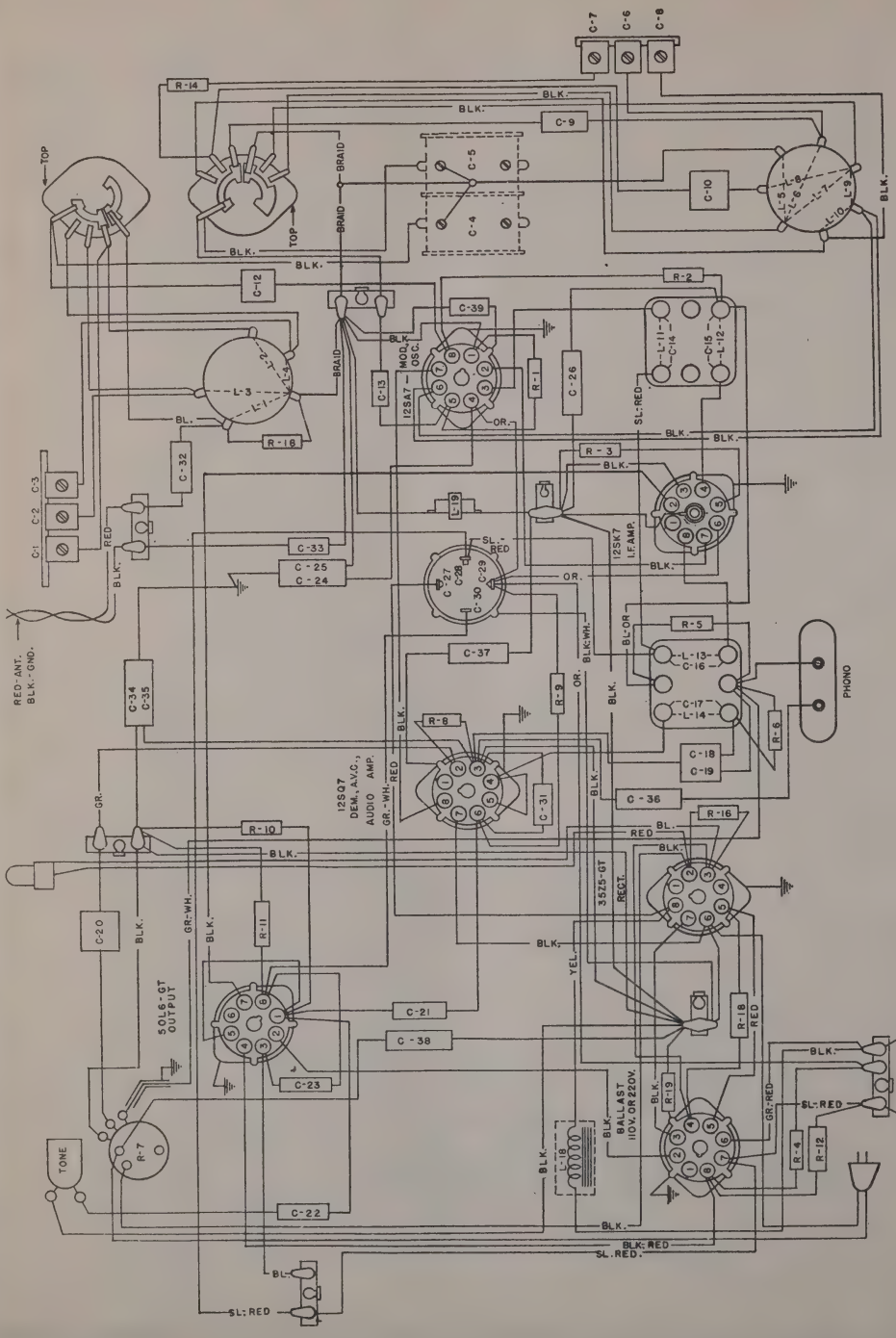

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NORMAL VOLTAGE READINGS FOR 120 VOLTS OPERATION

These voltage readings are obtained by measuring from the single terminal block (located between the 12SK7 I. F. tube and the electrolytic capacitor) and the various tube socket contacts with the tubes in their respective sockets. See Location Chart on Page 3. Voltages are given for a line voltage of 120 volts, using the W-32353 Ballast Resistor. Allowance should be made for the difference when the line voltage is slightly higher or lower.

Use a good high resistance voltmeter having a resistance of at least 1,000 ohms per volt. Take all D. C. readings on the 500 volt scale except when an asterisk appears.

When the receiver is being operated from an alternating current power supply circuit it will be necessary to have a high resistance A. C. voltmeter for checking the A. C. voltages. A large paper capacitor (2 microfarads or larger) should be used in series with the A. C. voltmeter to prevent the D. C. component from affecting the readings.

		TERMINALS OF SOCKETS							
Tube	*Circuit*	1	2	3	4	5	6	7	8
12SA7	Mod. and Osc.	+0.5*	*26*	+107	+93	−1*	0	*13*	0
12 SK7	I. F. Amp.	0	39	0	0	1.8*	+92	*26*	+107
12SQ7	Demod., A. V. C., and Audio	0	0	0	0	0	+42	0	*13*
50L6GT	Output	0	*90*	+103	+107	0	0	*89*	+8*
35Z5GT	Rectifier	—	*120*	*115*	—	*115*	0	*90*	+123
W32353	Ballast	—	*90*	*90*	*115*	*115*	+107	+107	+107

*Read on the lowest possible scale of voltmeter.

A. C. voltages are indicated by italics; when the receiver is operated from a D. C. power supply, D. C. voltages will be obtained in place of the A. C. voltages shown. Receiver tuned to 1000 K. C. no signal.

NORMAL VOLTAGE READINGS FOR 240 VOLTS OPERATION

These readings are obtained by measuring from the single terminal block (located between the 12SK7 I. F. tube and the electrolytic capacitor) and the various tube socket contacts with the tubes in their respective sockets. See Location Chart on Page 3. Voltages are given for a line voltage of 240 volts, using the W-32351 Ballast Resistor. Allowance should be made for the difference when the line voltage is slightly lower.

Use a good high resistance voltmeter having a resistance of at least 1,000 ohms per volt. Take all D. C. readings on the 500 volt scale except when an asterisk appears.

When the receiver is being operated from an alternating current power supply circuit, it will be necessary to have a high resistance A. C. voltmeter for checking the A. C. voltages. A large paper capacitor (2 microfarads or larger) should be used in series with the A. C. voltmeter to prevent the D. C. component from affecting the readings.

		TERMINALS OF SOCKETS							
Tube	*Circuit*	1	2	3	4	5	6	7	8
12SA7	Mod. and Osc.	+0.5*	*27*	+195	+100	−1.5*	0	*13.5*	0
12SK7	I. F. Amp.	0	*40*	0	0	+2*	+100	*27*	+195
12SQ7	Demod., A. V. C., and Audio	0	0	0	0	0	+52	0	*13.5*
50L6GT	Output	0	*100*	+180	+130	0	0	*40*	+8.5*
35Z5GT	Rectifier	0	*240*	*235*	0	*225*	0	*205*	+240
W32351	Ballast	0	*100*	*205*	*235*	*225*	+230	+195	+130

*Read on the lowest possible scale of voltmeter.

A. C. voltages are indicated by italics; when the receiver is operated from a D. C. power supply, D. C. voltages will be obtained in place of the A. C. voltages shown. Receiver tuned to 1000 K. C. no signal.

ALIGNING INFORMATION

Never Align Unless Absolutely Necessary

Use a good modulated signal generator (test oscillator) with variable output voltage and connect a sensitive output meter across the voice coil of the speaker.

Always align using the smallest possible signal from the signal generator. A strong signal makes adjustments inaccurate.

Always have receiver volume control full on. See Location Chart above for location of all the aligning adjustment screws.

Aligning procedure (follow this order exactly)

I. Dial pointer adjustment.

Make sure that the dial drive cord is in position on all pulleys, otherwise it will not be possible to correctly set the dial pointer. To correct the position of the dial pointer, first free the pointer ends from the drive cord, then, with the gang capacitor fully engaged, set the pointer directly on the index marks nearest to the letters "A" and "C" on the dial. Carefully re-tighten the pointer ends to the drive cord.

II. Intermediate frequency adjustments.

1. Set the range switch to the medium wave position ("A").
2. Tune set to extreme low frequency end of the dial.
3. Connect the ground terminal of the signal generator to the ground lead of the chassis.
4. Introduce a modulated signal of 455 Kilocycles to the grid of the 12SA7 Tube (Terminal No. 8), using a 0.1 microfarad capacitor in series with the output lead of the signal generator.
5. Adjust the I. F. Aligners for maximum output in the following order:

   a. Secondary of second I. F. transformer.

   b. Primary of second I. F. transformer.

   c. Secondary of first I. F. transformer.

   d. Primary of first I. F. transformer.

III. Radio frequency adjustments.

Short Wave Range, Scale "C".

1. Replace the 0.1 microfarad capacitor in series with the output lead of the signal generator, with a 400 ohm carbon type resistor, and connect it to the antenna lead of the chassis.
2. Set the range switch to the "C" short wave position.
3. Set the signal generator frequency and the receiver tuning dial to 20 megacycles.
4. Adjust the "OSC. 20 Mc." aligning capacitor for maximum signal. Two positions will be found at which maximum signal occurs. Always use the minimum capacitance (most counter-clockwise) position.
5. Adjust the "ANT. 20 Mc." aligning capacitor for maximum signal. Two positions may be found at which maximum signal occurs. Always use the maximum capacitance (most clockwise) position.

Short Wave Range, Scale "B".

(Leave the receiver connected to the signal generator in the same manner as above.)

1. Set the range switch to the "B" short wave position.
2. Set the signal generator frequency and the receiver tuning dial to 7 megacycles.
3. Adjust the "OSC. 7 Mc." and the "ANT. 7 Mc." aligning capacitors for maximum signal.

Medium Wave Range, Scale "A".

1. Replace the 400 ohm carbon type resistor in series with the output lead from the signal generator with a 200 micro-microfarad capacitor.
2. Set the range switch to the medium wave position ("A").
3. Set the signal generator frequency and the receiver tuning dial to 1.5 Mc.
4. Adjust the "OSC. 1.5 Mc." and the "ANT. 1.5 Mc." aligning capacitors for maximum signal.

Note: The calibration at the low frequency end of each range should be checked after the alignment of each range is completed. If the calibration is too inaccurate, repeat the aligning procedure, changing the dial setting slightly at the high-frequency end of the dial to compensate for the low frequency dial error.

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MODEL WR217

Listed by Underwriters Laboratories

Voltage rating	105-125 volts, 60 cycles, a.c.	Frequency ranges	540 to 1580 kc. and 1580 to 4200 kc.
Power consumption	45 watts	Power output	2.25 watts undistorted, 3 watts total

Tube Complement—*One* 6A7 pentagrid oscillator-modulator, *one* 6D6 i-f amplifier, *one* 75 diode detector, a-f amplifier, a.v.c., *one* 41 pentode power output, and *one* 80 full-wave rectifier.

GENERAL NOTES

1. The wave-trap in the receiver has been adjusted for maximum signal rejection at 456 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
2. The receiver should never be turned on with either the speaker plug or the 41 tube out of their sockets, since the rapid rise in rectifier voltage would damage the electrolytic condensers.
3. The pilot light may be replaced by removing the snap-on socket from the dial and unscrewing the bulb. It is not necessary to remove either the dial or chassis from the cabinet.
4. The color coding of the leads of the i-f transformers, is as follows:

Grid—green	Plate—blue
Grid return—black	B plus—red

5. The color coding of the power transformer leads is as follows:

Primary—two green leads	6.3 v. sec.—two heavy blue leads
High voltage sec.—two black leads	5 v. sec.—two heavy red leads
High voltage sec. center tap—yellow	

6. With a few exceptions, the color coding of the general wiring is as follows:

Plate—blue	A.v.c. and cathode—white or yellow
B plus—red	Grid—green
Screen—brown	Filament and ground—black

VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c.

Tube	*Plate*	*Screen*	*Cathode*	*Osc. Plate*	*Fil.*
6A7	182	70	0	182	6.3
6D6	182	70	0	—	6.3
75	87	—	0	—	6.3
41	165	182	0	—	6.3

Voltage across speaker field—70.
Voltage from B minus to chassis—80.
B plus at 80 tube filament—262.

ADJUSTMENTS

1. An oscillator with frequencies of 456 and 1400 kc is required.
2. An output meter should be used across the voice coil or output transformer for observing maximum response.
3. Always use as weak a test signal as possible when aligning the receiver.

LOCATION OF COILS AND TRIMMER ADJUSTMENTS

1. The two i-f transformers are located on top of the chassis deck. The first i-f transformer is the one directly behind the 6A7 tube. The trimmers for the two i-f transformers are available through holes in the tops of the cans.
2. The trimmers for the antenna and osc. coils are located on the variable cond. The trimmer on the front section is for the antenna coil.
3. The 456 kc wave-trap is mounted on the rear chassis wall directly beneath the wave-band switch. The trimmer for the 456 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.

I-F AND WAVE-TRAP ALIGNMENT

Rotate the wave-band switch(located on the rear wall of the chassis) to the broadcast position, clockwise, and swing the variable cond. to the minimum capacity position. Feed 456 kc to the grid-cap of the 6A7 tube and adjust the four i-f trimmers for maximum response. Feed 456 kc through a dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust the wave-trap trimmer for minimum response. (See General Notes paragraph No. 1.

R-F ALIGNMENT

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 1400. Feed 1400 kc. through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response. The police band is self-tracking and does not require any adjustment.

WRL-250 RADIO RECEIVER

FEATURES. This is a five-tube superheterodyne receiver designed for operation on either a direct current or alternating current power supply of 105 to 125 volts. Provision has also been made so that this set may be readily converted for operation on a power supply of 200 to 225 volts. (See below.) An automatic volume control circuit is provided in this receiver and a tone control is included.

ADAPTING RECEIVER TO 200-225 VOLTS OPERATION. A W-31826 Resistor must be installed inside of the chassis and connected according to the wiring diagram on page 3. Mounting holes for this resistor are provided on the rear of the chassis base.

ADJUSTING DIAL LAMP. To adjust the dial lamp simply push the pilot lamp and socket forward until maximum illumination of the dial is obtained.

ALIGNING INFORMATION. **Never realign unless absolutely necessary.**

Use a good modulated signal generator (test oscillator) with variable output voltage and a sensitive output meter across the voice coil of the speaker. Always align using the smallest possible input from the signal generator. A strong signal makes adjustments inaccurate.

Always have the volume control "full on".

Important: Be sure the metal plate is fastened in place on the bottom of the chassis before alignment is attempted.

ALIGNING PROCEDURE. See location chart on page 2 and proceed as follows:

I. Dial Pointer Adjustment.

With the plates of the gang tuning capacitor fully engaged, set the dial pointer in a vertical position directly on the calibration marks located at the top and bottom of the dial scale.

II. Intermediate Frequency Adjustments.

1. Tune the set to the extreme low frequency position. (Variable capacitor plates fully engaged.)
2. Connect the ground terminal of the signal generator to the chassis base.
3. Introduce a modulated signal of 455 kilocycles using a .01 mf. capacitor in series with the lead from the signal generator to the rear stator (green wire) of the variable capacitor.
4. Adjust the I. F. aligners for maximum output in the following order:
   A. Secondary of second I. F. Transformer.
   B. Primary of second I. F. Transformer.
   C. Secondary of first I. F. Transformer.
   D. Primary of first I. F. Transformer.

III. Radio Frequency Adjustments.

1. Replace the .01 mf. capacitor in series with the output lead of the signal generator with a 200 mmf. capacitor and connect it to the antenna lead (blue) of the chassis.
2. Set the signal generator frequency and the receiver tuning dial to 1.4 megacycles.
3. Adjust the oscillator and antenna aligning capacitors for maximum signal.
4. Set both the signal generator frequency and the receiver tuning dial to 0.6 megacycles and check calibration.

   NOTE: If the calibration is too far off at 0.6 megacycles, Operations 2 and 3 may be repeated, varying the 1.4 Mc. dial setting slightly until the best results are obtained.

REPLACEMENT PARTS

Capacitors

Piece Number		Part	List Price
W-24405	C-26	.04 mf. Capacitor	$ .20
W-25150	C-4	.02 mf. Capacitor	.20
W-27009	C-23	500 mmf. Capacitor	.15
W-27108	C-13, 16	Dual .05 Capacitor	.25
W-27305	C-24	50 mmf. Capacitor	.15
W-27538	C-25	.005 mf. Capacitor	.35
W-27998	C-5	200 mmf. Capacitor	.15
W-28588	C-7	100 mmf. Capacitor	.15
W-28973	C-29	.25 mf. Capacitor	.25
W-30322	C-6	.005 mf. Capacitor	.15
W-31466	C-17	25 mmf. Capacitor	.20
W-31481	C-8	.01 mf. Capacitor	.10
W-31682	C-1, 2, 3	Electrolytic Capacitor, 2—40 mfds., 150 volts; 1—15 mf., 150 volts	.95
W-31698	C-18, 19, 21, 22	Variable Capacitor and Pulley	2.10

Coils, Transformers and Speaker

W-31684	L-10, 11	Antenna Coil	.75
W-31685	L-8, 9	Oscillator Coil	.60
W-31686	L-6, 7		
	C-14, 15	1st I. F. Transformer	1.80
W-31690	L-4, 5		
	C-9, 10, 11, 12		
	R-8, 9	2nd I. F. Transformer	1.55
SD-234	L-1, 2	Output Transformer	.95
SD-267	L-3	Speaker Cone Assembly	1.50
W-31696	L-1, 2, 3	Speaker less Output Transformer	3.50

Controls and Knobs

W-31260		Knob	.10
W-31694	R-7	Off-On Switch and Volume Control	.70
W-31695		Tone Control Switch	.25
W-31801		Dial Drive Shaft	.10
W-31803		Rubber Pulley for Dial Drive; per doz.	.20
W-31367		"C" Washer for Dial Drive; per doz.	.20
W-31824		Dial Drive Cord and Spring	.15

Resistors

Piece Number		Part	List Price
W-26323	R-3	150 Ohm Resistor	$ .10
W-26341	R-20	4,700 Ohm Resistor (see note below)	.10
W-26349	R-10	22,000 Ohm Resistor	.10
W-26353	R-6	47,000 Ohm Resistor	.10
W-26362	R-5, 11	.27 Megohm Resistor	.10
W-26369	R-4, 12	1 Megohm Resistor	.10
W-26378	R-9	5.6 Megohm Resistor	.10
W-26381	R-6	10 Megohm Resistor	.10
W-31813	R-1	220 Ohm Resistor, 1 Watt	.10
W-31215	R-2	470 Ohm Resistor, 1 Watt	.10
W-31826	R-14	440 Ohm Resistor (Used for adapting WRL-250 for 200-225 Volts Operation), 25 Watts	.55

Note: R-20 is not shown on diagrams but is connected in parallel with L-10.

Miscellaneous

SD-272	Screws for Cabinet Back Panel; per doz.	.15
SD-273	Chassis Mounting Screws; per doz.	.30
W-28632	Power Supply Cord	.50
W-29379	Palnut for Control Shafts; per doz.	.15
W-30933	Pilot Lamp (Mazda No. 51)	.15
W-30937	Pilot Lamp Socket Assembly	.25
W-31680	8-prong Tube Socket	.10
W-31805	Dial Pointer	.35
W-31821	Speaker Baffle	.10
W-31822	Dial Lens	.25
W-31831	Cabinet less accessories	4.00
W-31992	Dial Assembly complete with Bracket Plate and Dial	.50
W-32032	Back Panel for Cabinet	.15
W-32036	Grille Cloth	.20
W-24608	Aligning Tool	.70

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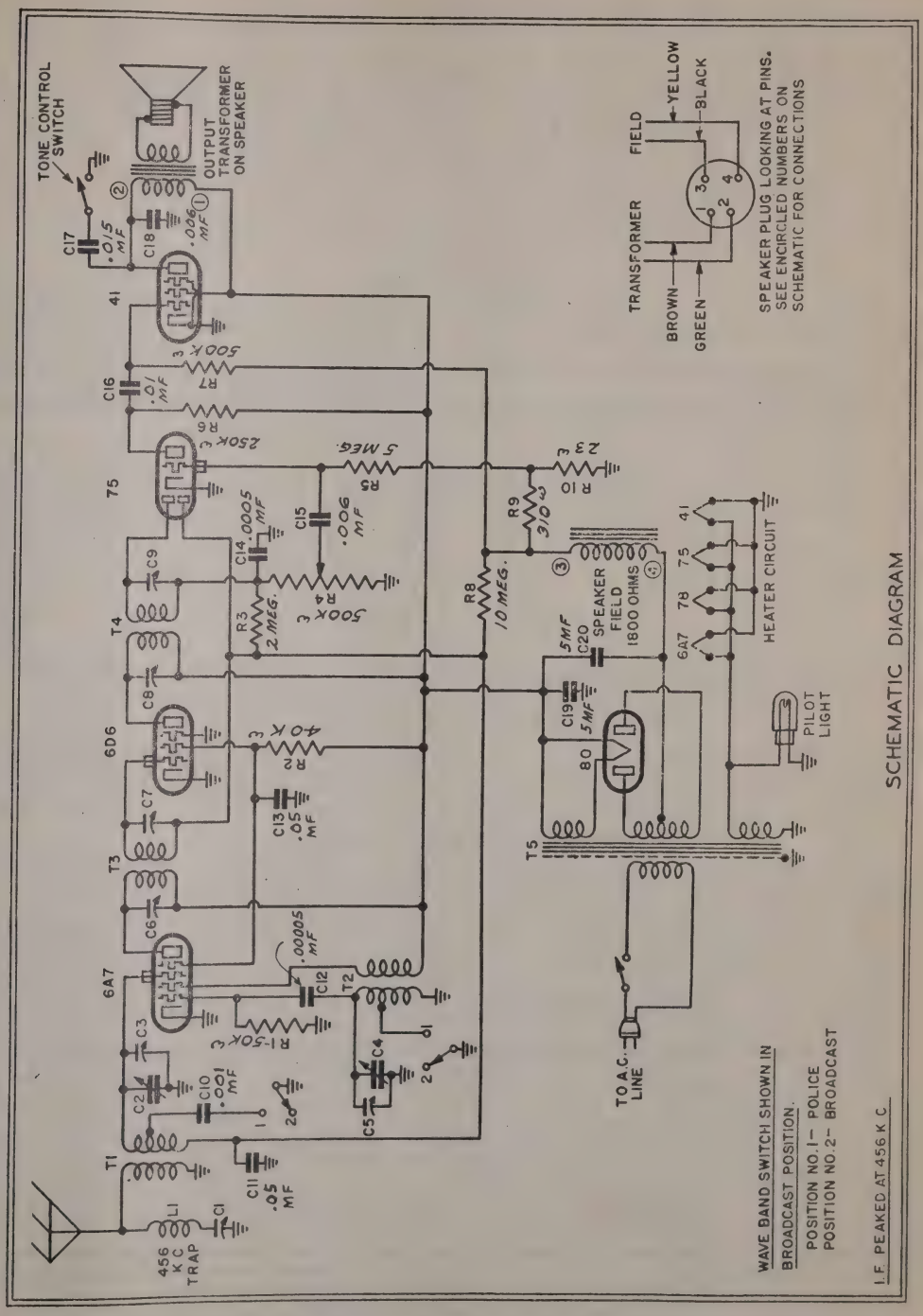
MODEL WRL-217



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MODEL WRL-250

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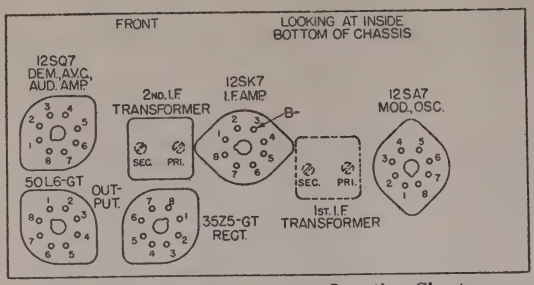

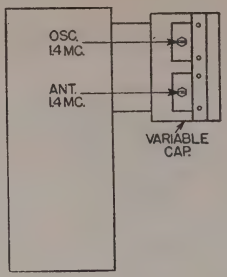

Location Chart

CONTINUITY TEST

Caution: Disconnect the receiver from the power supply and remove all tubes before making continuity test.

Use a good ohmmeter capable of measuring accurately up to several megohms.

The resistances given are often approximate owing to electrolytic capacitors in the circuit. When this is the case, be sure to reverse the test leads and read the highest resistance.

Read from indicated terminals to chassis base except when an asterisk appears. See location chart above for position and numbering of terminals.

		TERMINALS OF SOCKETS							
Tube	*Circuit*	1	2	3	4	5	6	7	8
12SA7	Mod. and Osc.	S	O	*690¶	*650¶	290000¶	270000¶	O	8M
12SK7	I. F. Amp.	S	O	270000¶	7M	270000¶	*650¶	O	*690¶
12SQ7	Demod.—A. V. C. Audio Amp.	S	10M	270000¶	1.3M	1.3M	*270000¶	O	270000¶
50L6GT	Output	S	O	*450¶	*650¶	1.2M	O	O	270000¶
35Z5GT	Rectifier	S	O	O	O	O	7M	O	400000¶ or Greater

Symbols used on chart are as follows: ¶—Ohms; M—Megohms; S—Short; O—Open.

***These readings should be made from indicated terminals to Terminal No. 8 of the rectifier socket (Type 35Z5GT Tube).**

Other tests not shown on chart:

Antenna Terminal to Chassis Base—"Open"

Ground Terminal to Chassis Base—"Open"

Between Antenna and Ground Terminals—50 Ohms

Terminals of Power Cord Plug to Chassis Base:

One Terminal should read 270,000 Ohms and the other Terminal should read "Open"

Between Terminals of Power Cord Plug—"Open"

NORMAL VOLTAGE READINGS

These voltage readings are obtained by measuring between the various tube socket contacts and the negative "B" supply (Terminal No. 3 of the 12SK7 Socket) with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. (See location chart above for the terminal layout of sockets with their proper terminal numbers.)

Voltages are given for a line voltage of 120 volts A. C. Allowance should be made when the line voltage is slightly higher or lower.

If the receiver is operated from a direct current power supply circuit, the various voltages measured will be slightly lower than those listed in the table.

Use a high resistance voltmeter having a resistance of at least 1000 ohms per volt. Take all D. C. readings on the 500 volt scale, except when an asterisk appears.

When the receiver is being operated from an alternating current power supply circuit, it will be necessary to have a high resistance A.C. voltmeter for checking the A.C. voltages.

		TERMINALS OF SOCKETS							
Tube	*Circuit*	1	2	3	4	5	6	7	8
12SA7	Modulator and Oscillator	0	*25*	+95	+95	—10*	0	*37*	0
12SK7	I. F. Amp.	0	*25*	0	0	0	+95	*12*	+95
12SQ7	Demod., A. V. C., Audio Amp.	0	0	0	0	0	+50	*12*	0
50L6GT	Output	0	*88*	+105	+95	0	—	*37*	+6*
35Z5GT	Rectifier	0	*120*	*115*	—	*115*	0	*88*	+120

A.C. voltages are indicated by italics; when the receiver is operated from a D.C. power supply, all voltages will be D.C. Receiver tuned to 1000 kc., no signal.

***Read on lowest possible scale of Voltmeter.**

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MODEL WRL-250

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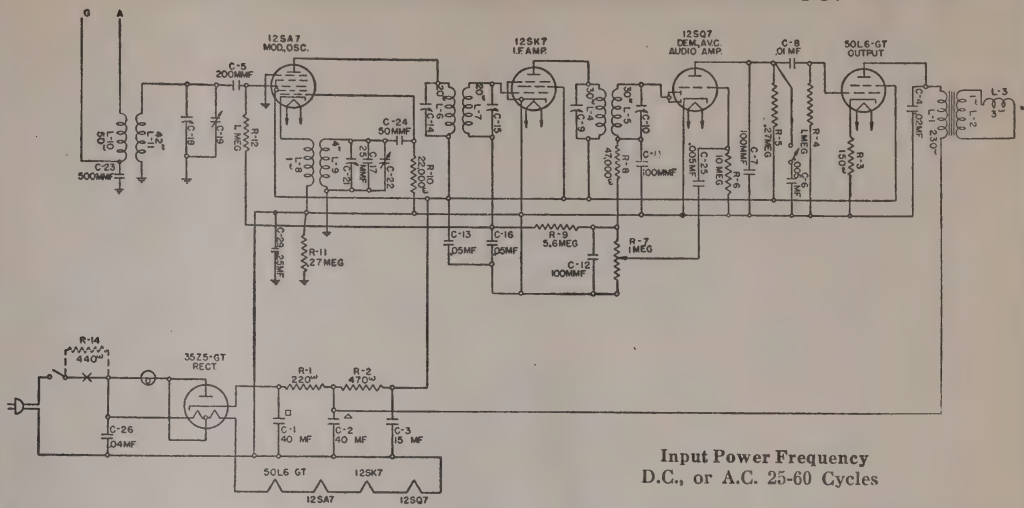
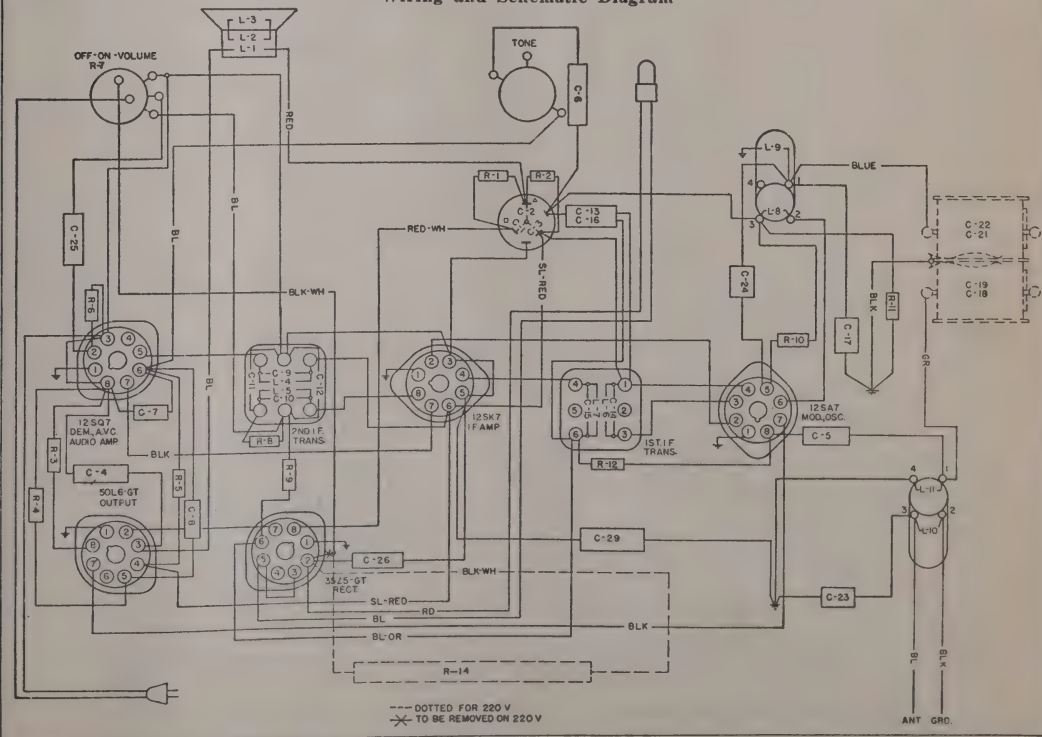


Input Power Frequency
D.C., or A.C. 25-60 Cycles

Voltage Rating	105-130 Volts; (See Adapting Receiver to 200-225 Volts Operation)
Type of Circuit	Superheterodyne
Tuning Range	0.54 to 1.65 Megacycles (182 to 550 Meters)
Input Power Rating at 130 Volts; 60 Cycles	30 Watts
Intermediate Frequency	455 Kilocycles
Speaker Voice Coil Impedance at 400 Cycles	Approximately 3.5 Ohms

Wiring and Schematic Diagram



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MODEL WRL-258, WRL-258C,
WRL-259, WRL-259C,
WRL-451, WRL-451C,
WRL-451D

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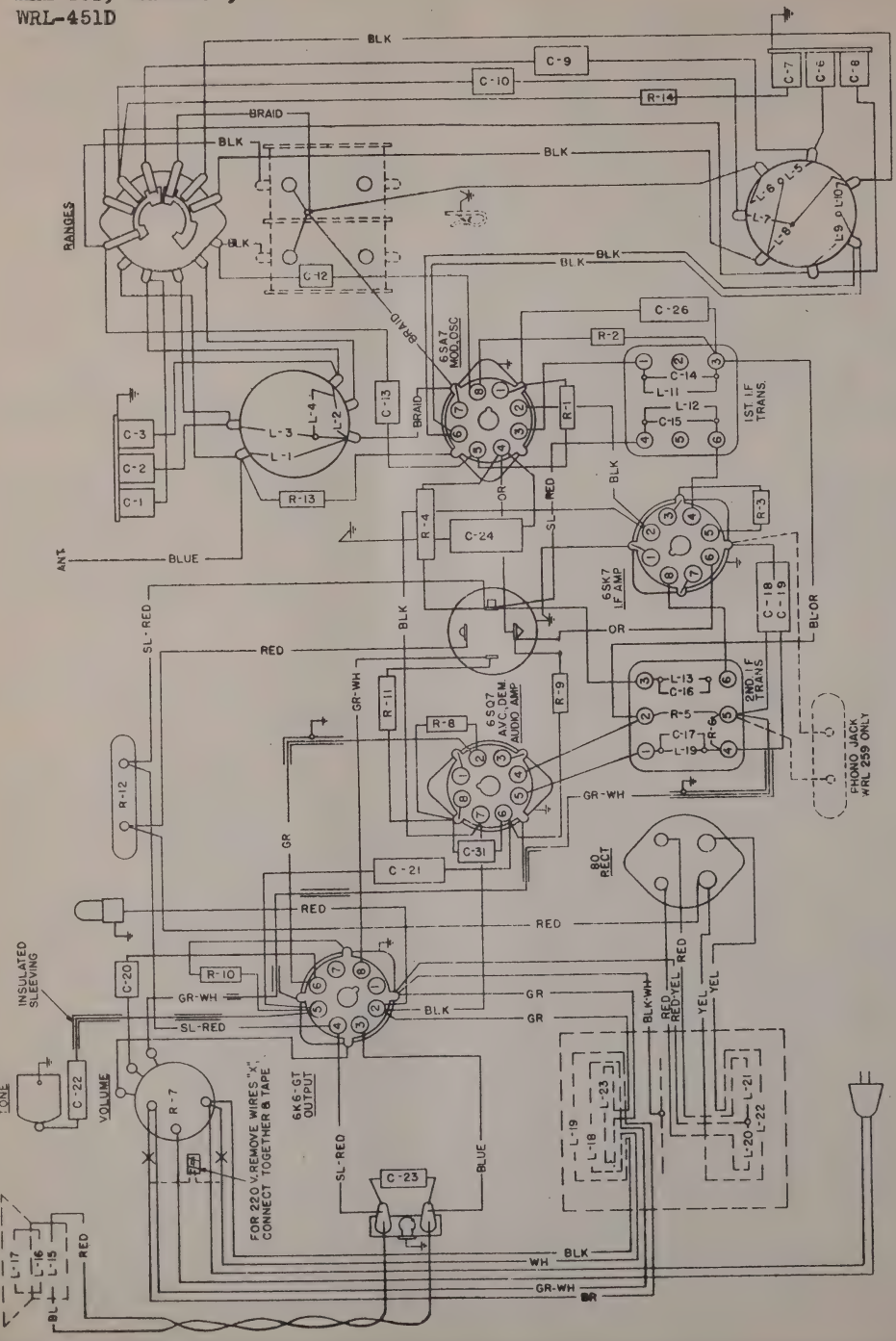

Wiring Diagram

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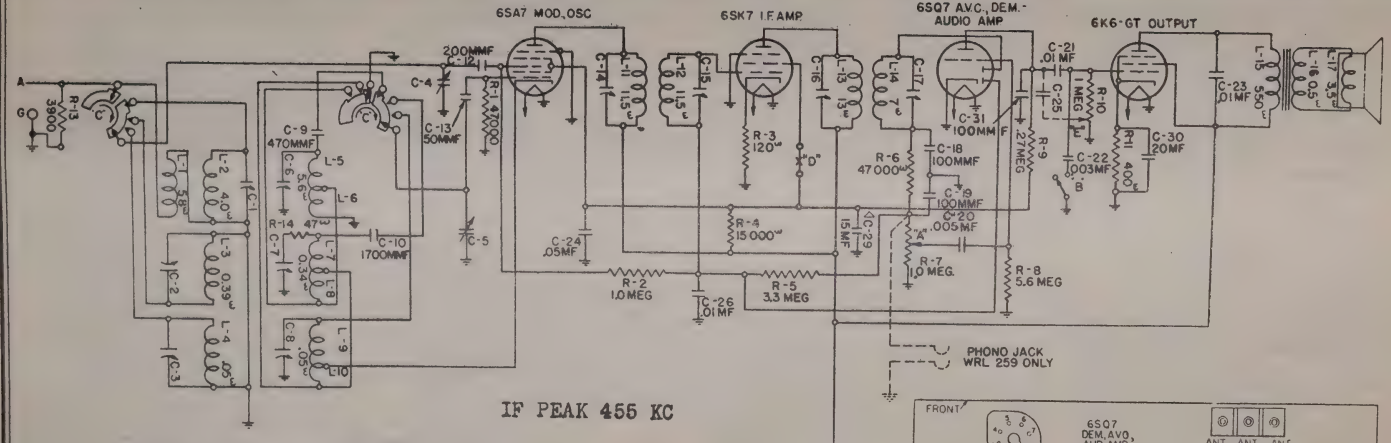
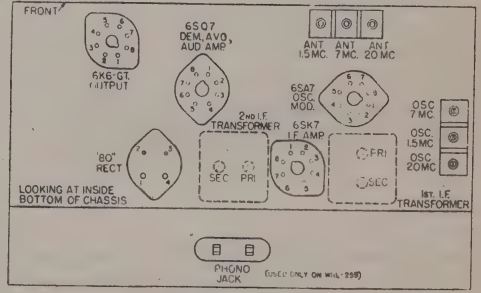
MODELS WRL-258, WRL-256C, WRL-259, WRL-259C, WRL-451, WRL-451C, WRL-451D

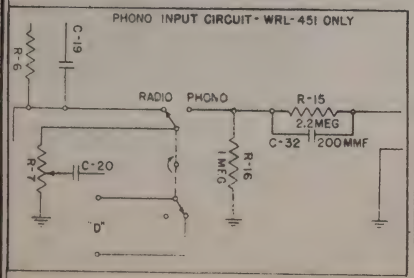


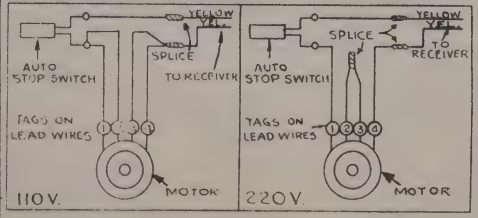
A- VOLUME CONTROL & A.C. SWITCH.
B- TONE CONTROL SWITCH OMITTED, TOGETHER WITH C-22 ON WRL 451
C- RANGE SWITCH IN BROADCAST POSITION MOST COUNTERCLOCKWISE ROTATION.
D- RADIO-PHONO CONNECTION, WRL 451 ONLY- OMIT WIRE ‡
E- VARIABLE TONE CONTROL R-10 & C-25 WRL 451 ONLY.

Schematic Circuit



Location Chart





Phonograph Motor Connections

Model	Input Power Frequency	Voltage
WRL-258	50-60 Cycles	105-130 Volts
WRL-258-C	50-60 Cycles	210-250 Volts
WRL-259	50-60 Cycles	105-130 Volts
WRL-259-C	50-60 Cycles	210-250 Volts
WRL-451	60 Cycles Only	105-130 Volts
WRL-451-C	60 Cycles Only	210-250 Volts
WRL-451-D	50 Cycles Only	105-130 Volts

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SPECIFICATIONS

Tuning Ranges ..... A—0.54 to 1.68 Mc; B—2.25 to 7.5 Mc; C—7.5 to 23 Mc

Number of Tubes 5
- 1—6SA7 Modulator and Oscillator
- 1—6SK7 I. F. Amplifier
- 1—6SQ7 Demodulator, A. V. C. and Audio Ampl.
- 1—6K6G Power Amplifier
- 1—80 Rectifier

Input Power Ratings { WRL-258, WRL-259 ..... 50 Watts; WRL-451 ..... 70 Watts

Intermediate Frequency ..... 455 Kilocycles

Speaker Voice-Coil Impedance at 400 Cycles ..... Approximately 3.5 Ohms

POWER TRANSFORMER CONNECTIONS

Models WRL-258, WRL-258-C, WRL-259 and WRL-259-C Receivers have a double primary power transformer which, when connected in parallel (WRL-258 and WRL-259) will operate between 105 and 130 volts A. C., and when connected in series (WRL-258-C and WRL-259-C) will operate between 210 and 250 volts A.C.

If it is desired to change the operating voltage of a WRL-258, WRL-259, WRL-258-C and WRL-259-C, see the wiring diagram for the correct connections. These connections are located underneath the chassis and must be soldered.

All WRL-451 Models can be changed from one voltage to another in the same manner as above, but it will also be necessary to change the phonograph motor connections as shown

It should be remembered that the WRL-451 and WRL-451-C are for 60 cycles only while the WRL-451-D is for 50 cycles only, and a change in voltage connections does not change the frequency.

ALIGNING INFORMATION

Never Align Unless Absolutely Necessary

Use a good modulated signal generator (test oscillator) with variable output voltage and connect a sensitive output meter across the voice coil of the speaker.

Always align using the smallest possible output from the signal generator. A strong signal makes adjustments inaccurate.

Always have receiver volume control full on. See Location Chart below for location of all the aligning adjustment screws.

Aligning procedure (follow this order exactly)

I. Dial pointer adjustment.

Make sure that the dial drive cord is in position on all pulleys, otherwise it will not be possible to correctly set the dial pointer. To correct the position of the dial pointer, first free the pointer ends from the drive cord, then, with the gang capacitor fully engaged, set the pointer directly on the index marks nearest to the letters "A" and "C" on the dial. Carefully re-tighten the pointer ends to the drive cord.

II. Intermediate frequency adjustments.

1. Set the range switch to the medium wave position ("A").
2. Tune set to extreme low frequency end of the dial.
3. Connect the ground terminal of the signal generator to the ground terminal of the chassis.
4. Introduce a modulated signal of 455 Kilocycles to the grid of the 6SA7 Tube (Terminal No. 8), using a 0.1 microfarad capacitor in series with the output lead of the signal generator.
5. Adjust the I. F. Aligners for maximum output in the following order:
   a. Secondary of second I. F. transformer.
   b. Primary of second I. F. transformer.
   c. Secondary of first I. F. transformer.
   d. Primary of first I. F. transformer.

III. Radio frequency adjustments.

Short Wave Range, Scale "C".

1. Replace the 0.1 microfarad capacitor in series with the output lead of the signal generator, with a 400 ohm carbon type resistor, and connect it to the antenna lead of the chassis.
2. Set the range switch to the "C" short wave position.
3. Set the signal generator frequency and the receiver tuning dial to 20 megacycles.
4. Adjust the "OSC. 20 Mc." aligning capacitor for maximum signal. Two positions will be found at which maximum signal occurs. Always use the minimum capacitance (most counter-clockwise) position.
5. Adjust the "ANT. 20 Mc." aligning capacitor for maximum signal. Two positions may be found at which maximum signal occurs. Always use the maximum capacitance (most clockwise) position.

Short Wave Range, Scale "B".

(Leave the receiver connected to the signal generator in the same manner as above.)

1. Set the range switch to the "B" short wave position.
2. Set the signal generator frequency and the receiver tuning dial to 7 megacycles.
3. Adjust the "OSC. 7 MC." and the "ANT. 7 MC." aligning capacitors for maximum signal.

Medium Wave Range, Scale "A".

1. Replace the 400 ohm carbon type resistor in series with the output lead from the signal generator with a 200 micro-microfarad capacitor.
2. Set the range switch to the medium wave position ("A").
3. Set the signal generator frequency and the receiver tuning dial to 1.5 MC.
4. Adjust the "OSC. 1.5 MC." and the "ANT. 1.5 MC." aligning capacitors for maximum signal.

Note: The calibration at the low frequency end of each range should be checked after the alignment of each range is completed. If the calibration is too inaccurate, repeat the aligning procedure, changing the dial setting slightly at the high-frequency end of the dial to compensate for the low frequency dial error.

NORMAL VOLTAGE READINGS

Take all readings with chassis operating and tuned to approximately 1000 Kc.—no signal.

Use a line voltage of 120 volts (240 volts for "C" models), or make allowance for any slight variation.

Use a good high resistance voltmeter having a resistance of at least 1000 ohms per volt. Take all D.C. readings on the 500 volt scale except when an asterisk appears.

Read from indicated terminals to chassis base. See location chart on page 3 for position of terminals.

A.C. voltages are indicated by *italics*.

		TERMINALS OF SOCKETS							
Tube	*Circuit*	1	2	3	4	5	6	7	8
6SA7	Mod. and Osc.	—	*6.0*	+250	+100	—5*	0	—	0
6SK7	I. F. Amp.	—	*6.0*	—	0	+2*	+100	—	+250
6SQ7	Demod., A. V. C., Audio Amp.	—	0	0	0	0	+60*	*6.0*	—
6K6G	Output	—	*6.0*	+240	+250	0	0	—	+15*
80†	Rectifier	+340	*310*	*310*	+340	—	—	—	—

*Read on lowest possible scale of voltmeter

†Between terminals 1 and 4 of rectifier socket: 4.5 volts A. C.

CONTINUITY TEST

CAUTION: Remove all tubes and disconnect the receiver from the power supply before making continuity test. The speaker should remain connected.

Use a good ohmmeter capable of measuring accurately up to several megohms.

The resistances given are often approximate, owing to electrolyfic capacitors in the circuit. When this is the case, be sure to reverse the test leads and read the highest resistance.

Read from indicated terminals (see Location Chart, page 3) to chassis base unless otherwise specified.

		TERMINALS OF SOCKETS							
Tube	*Circuit*	1	2	3	4	5	6	7	8
6SA7	Mod. and Osc.	S	S	*1400¶	*1600¶	47000¶	R	S	5M
6SK7	I. F. Amp.	S	S	S	4M	120¶	*16000¶	S	*14000¶
6SQ7	Demod., A. V. C., Audio Amp.	S	5.6M	S	4.3M	1M	280000¶	S	S
6K6G	Output	100000¶	S	*1950¶	*1400¶	100000¶	5M	S	400¶
80	Rectifier	200000¶ or Greater	240¶	240¶	200000¶ or Greater	—	—	—	—

Symbols used are as follows: ¶—ohms; M—megohms; S—short; O—open.

*These readings should be taken from indicated terminal to terminal No. 1 of the rectifier socket (type 80 tube). R—Range Switch in position: A = 1 ohm; B = "short"; C = "short".

Other Tests Not Shown on Chart

Antenna lead to Chassis Base:

Range switch in "A", medium wave position ..... 60 Ohms

Range switch in "B", short wave position ..... 4 Ohms

Range switch in "C", short wave position ..... 0.5 Ohm

Between Terminals of A.C. Plug:

A.C. switch closed (WRL-258, WRL-259, and WRL-451) ..... 10 Ohms

A.C. switch closed (WRL-258-C WRL-259-C, and WRL-451-C) .. 40 Ohms

Terminals of A.C. plug to chassis base .. "Open"

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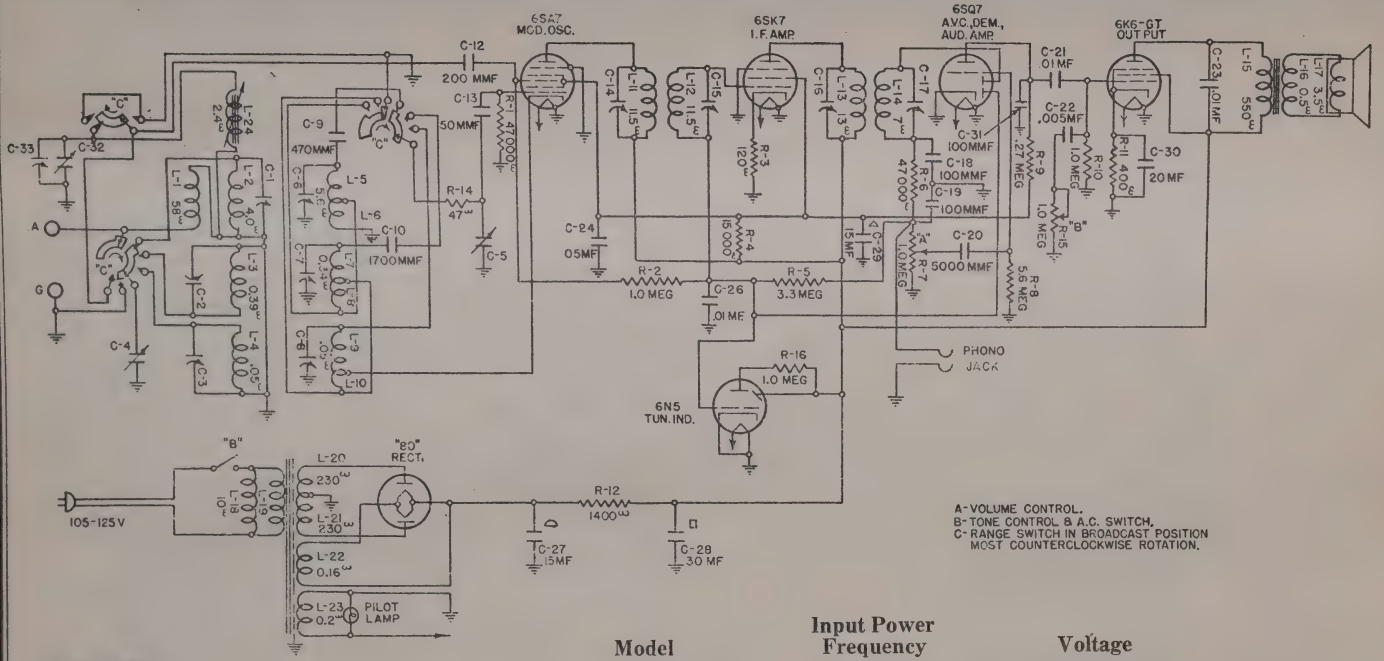
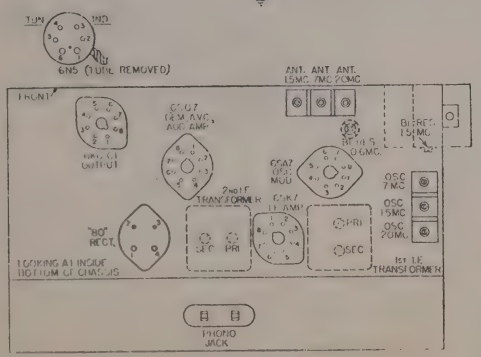




Location Chart

Model	Input Power Frequency	Voltage
WRL-263	50-60 Cycles	105-130 Volts
WRL-263-C	50-60 Cycles	210-250 Volts

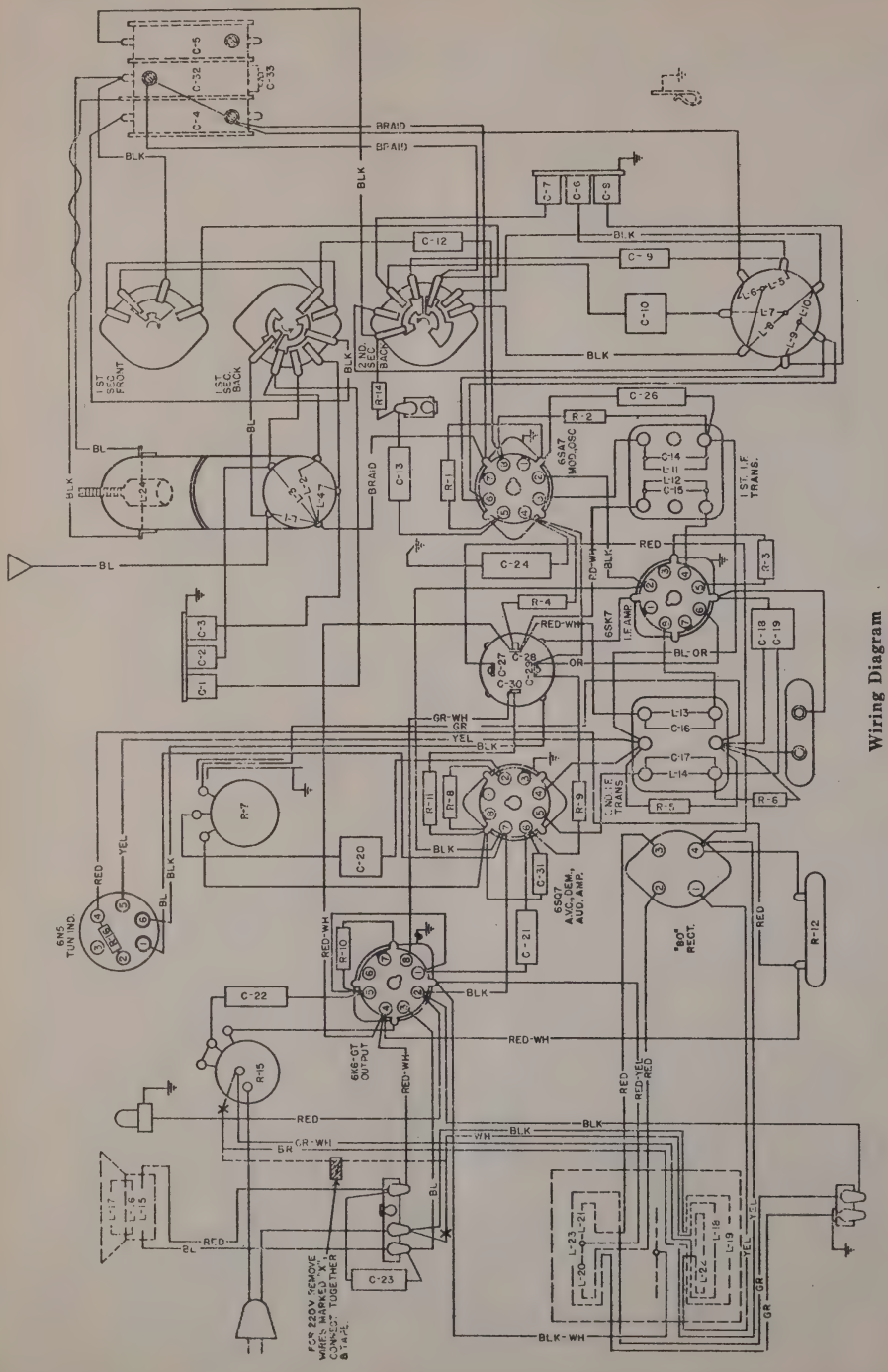
Models WRL-263 and WRL-263-C Receivers have a double primary power transformer which, when connected in parellel (WRL-263) will operate between 105 and 130 Volts A. C., and when connected in series (WRL-263-C) will operate between 210 and 250 volts A. C.

Tuning Ranges ..... A—0.54 to 1.68 Mc; B—2.25 to 7.5 Mc; C—7.5 to 23 Mc

Input Power Rating ..... 50 Watts
Intermediate Frequency ..... 455 Kilocycles
Speaker Voice-Coil Impedance at 400 Cycles ..... Approximately 3.5 Ohms

MODELS WRL-263, WRL-263C

WESTINGHOUSE ELEC. INTERNATIONAL CO.



Wiring Diagram

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ALIGNING INFORMATION

Never Align Unless Absolutely Necessary

I. Dial pointer adjustment:

Make sure that the dial drive cord i in position on all pulleys, otherwise it will not be possible to correctly set the dial pointer. To correct the position of the dial pointer, first free the pointer ends from the drive cord, then, with the gang capacitor fully engaged, set the pointer directly on the index marks nearest to the letters "A" and "C" on the dial. Carefully re-tighten the pointer ends to the drive cord.

II. Intermediate frequency adjustments.

1. Set the range switch to the medium wave position ("A").
2. Tune set to extreme low frequency end of the dial.
3. Connect the ground terminal of the signal generator to the ground terminal of the chassis.
4. Introduce a modulated signal of 455 Kilocycles to the stator terminal of the center section of the gang capacitor, using a 0.1 microfarad capacitor in series with the output lead of the signal generator.
5. Adjust the I. F. Aligners for maximum output in the following order:
   a. Secondary of second I. F. transformer.
   b. Primary of second I. F. transformer.
   c. Secondary of first I. F. transformer.
   d. Primary of first I. F. transformer.

III. Radio frequency adjustments.

Short Wave Range, Scale "C".

1. Replace the 0.1 microfarad capacitor in series with the output lead of the signal generator, with a 400 ohm carbon type resistor, and connect it to the antenna lead of the chassis.
2. Set the range switch to the "C" short wave position.
3. Set the signal generator frequency and the receiver tuning dial to 20 megacycles.
4. Adjust the "OSC. 20 Mc." aligning capacitor for maximum signal. Two positions will be found at which maximum signal occurs. Always use the minimum capacitance (most counter-clockwise) position.
5. Adjust the "ANT. 20 Mc." aligning capacitor for maximum signal. Two positions may be found at which maximum signal occurs. Always use the maximum capacitance (most clockwise) position.

Short Wave Range, Scale "B".

(Leave the receiver connected to the signal generator in the same manner as above.)

1. Set the range switch to the "B" short wave position.
2. Set the signal generator frequency and the receiver tuning dial to 7 megacycles.
3. Adjust the "OSC. 7 MC." and the "ANT. 7 MC." aligning capacitors for maximum signal.

Medium Wave Range, Scale "A".

1. Replace the 400 ohm carbon type resistor in series with the output lead from the signal generator with a 200 micro-microfarad capacitor.
2. Set the range switch to the medium wave position ("A").
3. Set the signal generator frequency and the receiver tuning dial to 1.5 MC.
4. Adjust the "OSC.", "BI-RESONATOR" and "ANT." Aligning Capacitors for maximum signal (the "Bi-Resonator" Aligning Capacitor is located on the side of the variable gang capacitor).
5. Set the signal generator frequency and the receiver tuning dial to 0.6 megacycles.
6. Adjust the 0.6 megacycle "Bi-Resonator" (iron core) for maximum signal.
7. Repeat operations 3 and 4.

Note: The calibration at the low frequency end of each range should be checked after the alignment of each range is completed. If the calibration is too inaccurate, repeat the aligning procedure, changing the dial setting slightly at the high-frequency end of the dial to compensate for the low frequency dial error.

NORMAL VOLTAGE READINGS

Take all readings with chassis operating and tuned to approximately 1000 Kc. no signal. Use a good high resistance voltmeter having a resistance of at least 1000 ohms per volt. Take all D. C. readings on the 500 volt scale except when an asterisk appears.

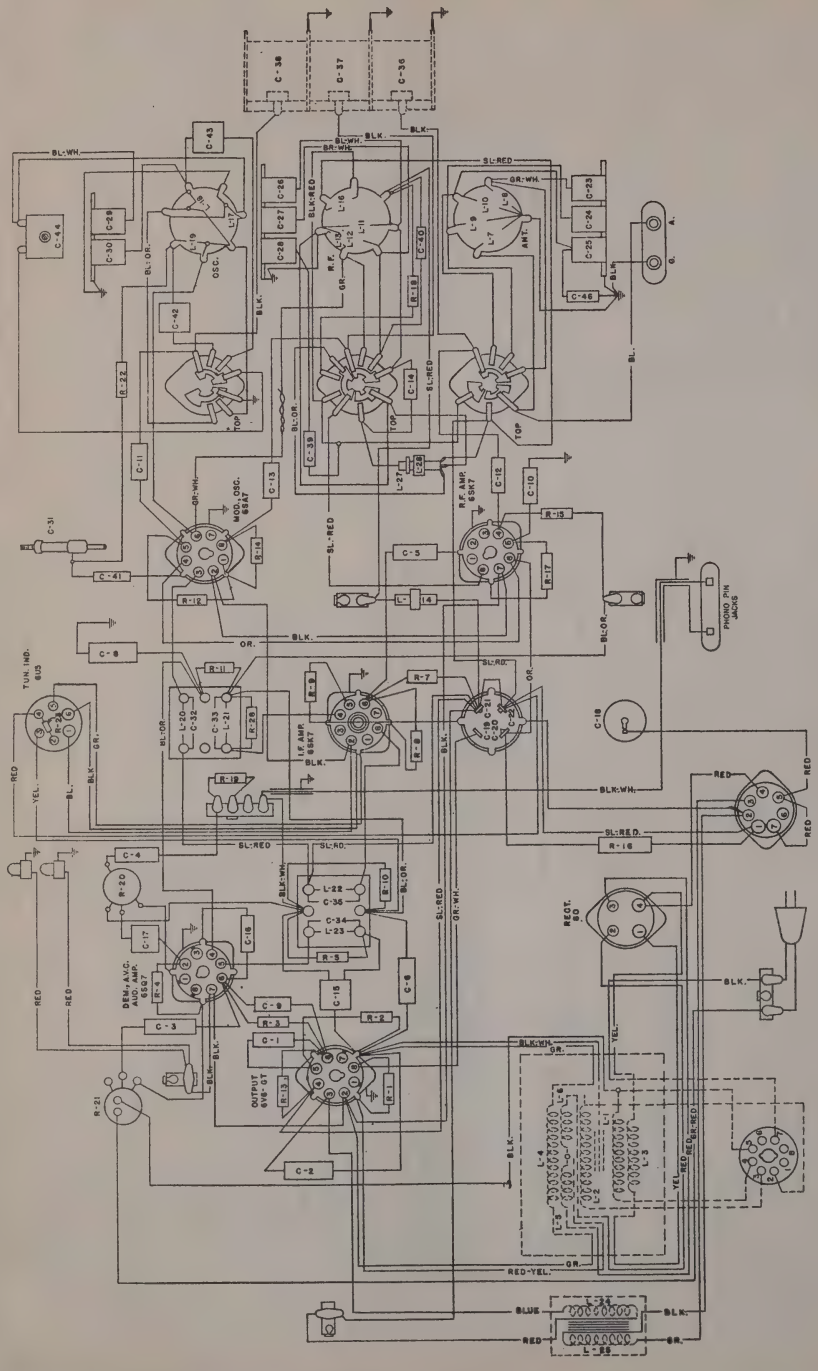
		TERMINALS OF SOCKETS							
Tube	*Circuit*	1	2	3	4	5	6	7	8
6SA7	Mod. and Osc.	—	*6.0*	+250	+100	−5*	0	—	0
6SK7	I. F. Amp.	—	*6.0*	—	0	+2*	+100	—	+250
6SQ7	Demod., A. V. C., Audio Amp.	—	0	0	0	0	+60*	*6.0*	—
6K6G	Output	—	*6.0*	+240	+250	0	0	—	+15*
6N5	Tuning Ind.	*6.0*	+25	0	+250	0	0	—	—
80†	Rectifier	+340	*310*	*310*	+340	—	—	—	—

*Read on lowest possible scale of voltmeter.
†Between terminals 1 and 4 of rectifier socket: 4.5 volts A. C.

A. C. voltages are indicated by *italics*.

MODELS WRL-277,
WRL-277B

WESTINGHOUSE ELEC. INTERNATIONAL CO.



Wiring Diagram—WRL-277 Receiver

Number of Tubes..... 7

- 1—6SK7 R. F. Amplifier
- 1—6SA7 Modulator and Oscillator
- 1—6SK7 I. F. Amplifier
- 1—6SQ7 Demodulator, A. V. C. and Audio Amplifier
- 1—6V6G Output
- 1—80 Rectifier
- 1—6U5 Tuning Indicator

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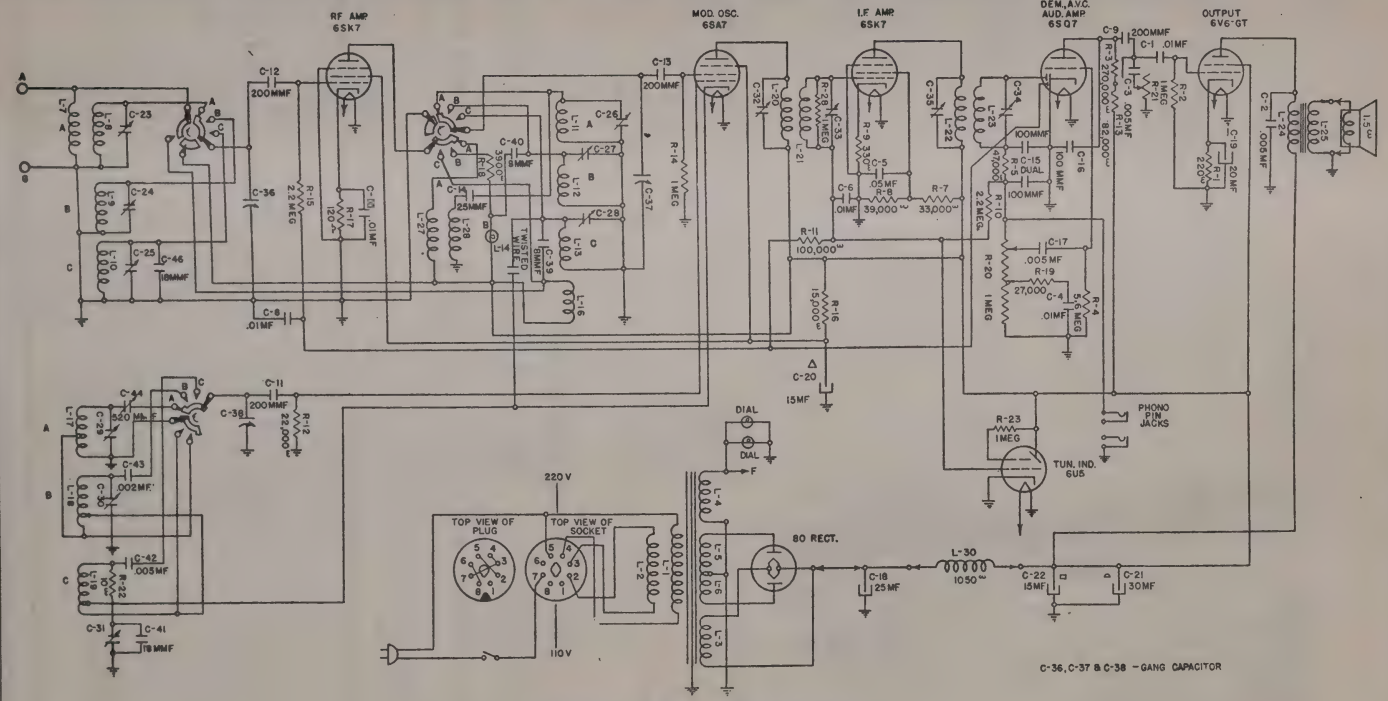
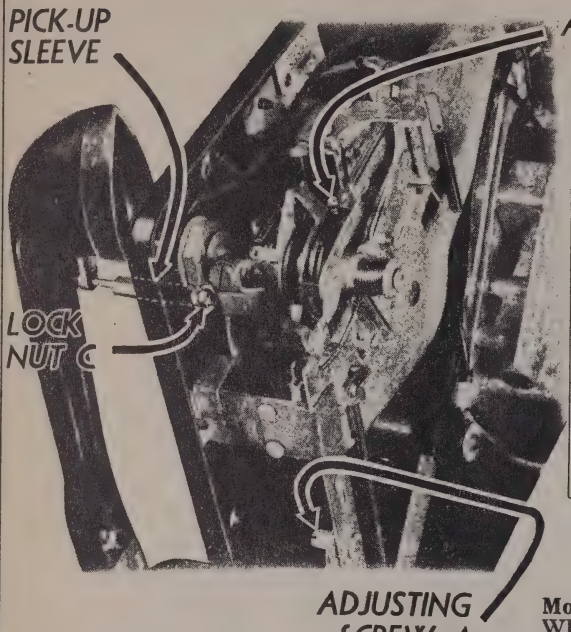


Schematic Circuit—WRL-277 Receiver

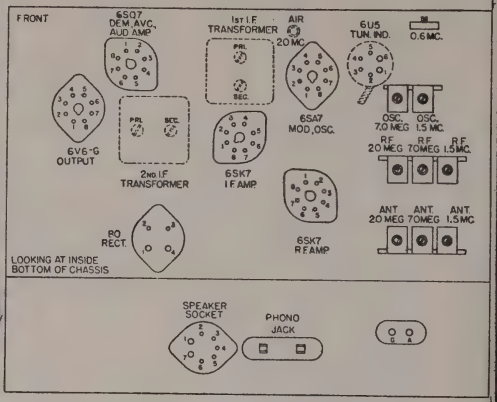
Voltage Rating	Adjustable for 100 to 120 or 200 to 240 Volts A. C. (See "Adjustment of Receiver to various line voltages")
Type of Circuit	Superheterodyne
Tuning Ranges	A—0.54 to 1.6 Mc.; B—2.3 to 7.6 Mc.; C—7.6 to 23 Mc.
Input Power Rating	WRL-277 and WRL-371 ..... 80 Watts
	WRL-471 ..... 100 Watts
Intermediate Frequency	455 Kilocycles
Speaker Voice Coil Impedance at 400 cycles	Approximately 1.5 Ohms
Speaker Field Coil Resistance	Approximately 1050 Ohms

MODELS WRL-277, WRL-277B, WRL-371, WRL-471, WRL-471D

WESTINGHOUSE ELEC. INTERNATIONAL CO.



Model WRL-471 Receiver
Phonograph Mechanism



Location Chart

Model	Input Power Frequency
WRL-277	40-60 Cycles
WRL-277-B	25-60 Cycles (115 Volts only)
WRL-371	40-60 Cycles
WRL-471	60 Cycles only
WRL-471-D	50 Cycles only

NORMAL VOLTAGE READINGS

Take all readings with receiver operating and tuned to approximately 1000 Kc.—no signal.

Use a line voltage of 120 volts, or make allowance for any slight variation.

Use a good high resistance voltmeter having a resistance of at least 1000 ohms per volt.

Take all D. C. readings on the 500 volt scale except when an asterisk appears.

Read from indicated terminals to chassis base.

See location chart above for position of terminals.

A. C. voltages are indicated by *italics*.

		TERMINALS OF SOCKETS							
Tube	*Circuit*	1	2	3	4	5	6	7	8
6SK7	R. F. Amp.	0	0	0	0	+2*	+105	*6.0*	+265
6SA7	Mod. and Osc.	0	0	+265	+105	—5*	0	*6.0*	0
6SK7	I. F. Amp.	0	0	—	0	+3*	+105	*6.0*	+265
6SQ7	Demod., A. V. C., Audio Ampl.	0	0	0	0	0	+90	*6.0*	—
6V6G	Output	0	0	+250	+265	0	0	*6.0*	+12*
80†	Rectifier	+380	*370*	*370*	+380	—	—	—	—
6U5	Tuning Ind.	0	+25	0	+265	0	*6.0*	—	—
	Speaker Socket	+265	0	0	+380	+380	0	+380	—

***Read on lowest possible scale of voltmeter.**
†Between terminals 1 and 4 of rectifier socket: 4.5 volts A. C.

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SERVICE NOTES
WESTINGHOUSE WRL-277, WRL-371 AND WRL-471 RADIO RECEIVERS

ALIGNING INFORMATION

Never Align Unless Absolutely Necessary

Use a good modulated signal generator (test oscillator) with variable output voltage and connect a sensitive output meter across the voice coil of the speaker.

Always align using the smallest possible signal from the signal generator. A strong signal makes adjustments inaccurate.

Always have receiver volume control full on.

See location chart on Page 4 for location of all the aligning adjustment screws.

Aligning procedure (follow this order exactly)

I. Dial pointer adjustment.

Make sure that the dial drive cord is in position on all pulleys, otherwise it will not be possible to correctly set the dial pointer. To correct the position of the dial pointer, first free the pointer ends from the drive cord, then with the gang capacitor fully engaged, set the pointer directly behind the horizontal line at the top of the dial. Carefully retighten the pointer ends to the drive cord.

II. Intermediate frequency adjustments.

1. Set the range switch to the medium wave position ("A").
2. Tune set to extreme low frequency end of the dial.
3. Connect the ground terminal of the signal generator to the ground terminal of the chassis.
4. Introduce a modulated signal of 455 Kilocycles to the stator terminal (top) of the center section of the gang capacitor, using a 0.1 microfarad capacitor in series with the output lead of the signal generator.
5. Adjust the I F. Aligners for maximum signal in the following order:
   A. Secondary of second I. F. transformer.
   B. Primary of second I. F. transformer.
   C. Secondary of first I. F. transformer.
   D. Primary of first I. F. transformer.

III. Radio frequency adjustments.

Short Wave Range, Scale "C".

1. Replace the 0.1 microfarad capacitor in series with the output lead of the signal generator with a 400 ohm carbon type resistor, and connect it to the antenna terminal of the chassis.
2. Set the range switch to the "C" short-wave position.
3. Set the signal generator frequency and the receiver tuning dial to 20 megacycles.
4. Adjust the "OSC. 20 MC." (air trimmer) aligner by loosening the lock nut and moving the plunger in or out until maximum signal is obtained. If two positions are found at which maximum signal occurs, always use the minimum capacitance position (most outward position of plunger). Always be sure to tighten the lock nut after the aligning adjustment has been completed. An S. D. 76 aligning tool is recomanended for alignment of air trimmer capacitors of the plunger type.
5. Adjust the "20 MC." R. F. and ANTenna aligning capacitors for maximum signal.

Short Wave Range, Scale "B".

(Leave the receiver connected to the signal generator in the same manner as above.)

1. Set the range switch to the "B" short-wave position.
2. Set the signal generator frequency and the receiver tuning dial to 7 Mc.
3. Adjust the "7 MC." OSCillator aligning capacitor for maximum signal. If two positions are found at which maximum signal occurs, always use the minimum capacitance position (most counter-clockwise position).
4. Adjust the "7 MC." R. F. and ANTenna aligning capacitors for maximum signal.

Medium Wave Range, Scale "A".

1. Replace the 400 ohm carbon type resistor is series with the output lead from the signal generator with a 200 micro-microfarad capacitor.
2. Set the range switch to the medium wave position, "A".
3. Set the signal generator frequency and the receiver tuning dial to 1.5 Mc.
4. Adjust the "1.5 MC." OSCillator. R. F. and ANTenna aligners (iron cores) for maximum signal.
5. Set the signal generator frequency and the receiver tuning dial to 0.6 Mc.
6. Adjust the "0.6 MC." OSCillator aligning capacitor for maximum signal.
7. Repeat operations 3 and 4.

ADJUSTMENT OF RECEIVER TO VARIOUS LINE VOLTAGES

The power transformer used in these receivers is adjustable for operation on 100 to 120 Volts, 40-60 Cycles, or 200 to 240 Volts, 40-60 Cycles. Provision is also made for operation on 120 to 130 Volts, 40-60 Cycles, or 130 to 150 Volts, 40-60 Cycles, by using the proper "Plug-in Resistor".

To correctly adjust the receiver to any of the line voltages given below, an accurate A. C. voltmeter should be used to measure the line voltage at the location where the receiver is to be installed.

CAUTION: Never make any adjustments of the power transformer without first removing the receiver's power supply cord from its power supply receptacle.

Operation on Line Voltage of 200 to 240 Volts, 40-60 Cycles

When shipped from the factory, these receivers are adjusted for a line voltage of 200 to 240 volts.

Care should be taken to see that the white dot on the voltage changer plug indicates the "220 V" marking on top of the power transformer.

The phonograph motor of Model WRL-471 should also be inspected to see that the small plug having a **single jumper wire** is in place.

To Adjust the Receiver for a Line Voltage of 100 to 120 Volts, 40-60 Cycles

Loosen the screw and bracket so that the voltage changer plug may be removed from its socket on top of the power transformer.

Replace the voltage changer plug in its socket with the white dot set to the "110 V" marking. Screw the bracket in place.

With Model WRL-471 it is also necessary to remove the **single** jumper plug from the socket of the phonograph motor and insert the **double jumper** plug, which will be found attached to the inside of the cabinet.

To Adjust the Receiver for a Line Voltage of 120 to 130 Volts, 40-60 Cycles

Loosen the screw and bracket so that the voltage changer plug can be removed from its socket on top of the power transformer.

Remove the voltage changer plug and insert a W-32486 Plug-in Resistor into the socket on top of the power transformer.

With Model WRL-471 it is also necessary to remove the single jumper plug from the socket of the phonograph motor and insert the **double jumper** plug, which will be found attached to the inside of the cabinet.

To Adjust the Receiver for a Line Voltag. of 130 to 150 Volts, 40-60 Cycles

Loosen the screw and bracket so that the voltage changer plug can be removed from its socket on top of the power transformer.

Remove the voltage changer plug and insert a W-32187 Plug-in Resistor into the socket on top of the power transformer.

With Model WRL-471 it is also necessary to remove the single jumper plug from the socket of the phonograph motor and insert the **double jumper** plug, which will be found attached to the inside of the cabinet. In addition, a W-32485 Resistor must be inserted between the phonograph power cord and the radio chassis.

Playing Records

Any record player equipped with a high impedance pick-up can be attached to the WRL-277 and WRL-371 receivers.

Connect the pick-up directly to the two receptacles (jacks) provided in the back of the chassis.

When operating a record player with the WRL-277 Receiver tune the receiver to a quiet place on either of the short wave ranges and proceed to operate. Model WRL-371 has a phonograph position incorporated on the range switch; when operating a record player in conjunction with this receiver this control should be set so the arrow points to the star.

A shielded cable of the low-capacity type should be used to connect the pick-up to the receiver. The shield must be connected to the ground terminal of the receiver.

The volume may be controlled with the volume control at the receiver, or (if such is provided) with the volume control on the record player.

A low impedance phonograph pick-up may also be used, but a matching transformer must be placed between the pick-up and the phono receptacles (jacks) on the back of the chassis.

Model WRL-471 is equipped with an automatic record changer using a crystal pick-up. This record player shifts and plays the standard 10 or 12 inch records.

Care of the Cabinet

The finish of Westinghouse Radio cabinets should be protected by using a good cabinet polish regularly. It is available in pint cans, designated as W-28601.

Nicks and scratches of most kinds can be repaired quickly and easily by proper use of the W-26962 Touch-up Kit. Complete instructions are provided with each kit.

INSTRUCTIONS FOR ADJUSTING PHONOGRAPH MECHANISM USED IN WRL-471 RECEIVER

A. Adjusting Landing Position of Needle on Record

If needle comes down too far from the edge of the record so that record does not start at the beginning, **turn adjusting screw "A" very slightly counter-clockwise.**

If needle comes down too close to the edge of the record so that it slips off, **turn adjusting screw clockwise.**

B. Adjusting Tripping Mechanism

If trip mechanism fails to trip or operates during playing of record, adjust screw "B" to position where proper tripping is obtained.

C. Adjusting Height to Which Pick-up Arm Rises

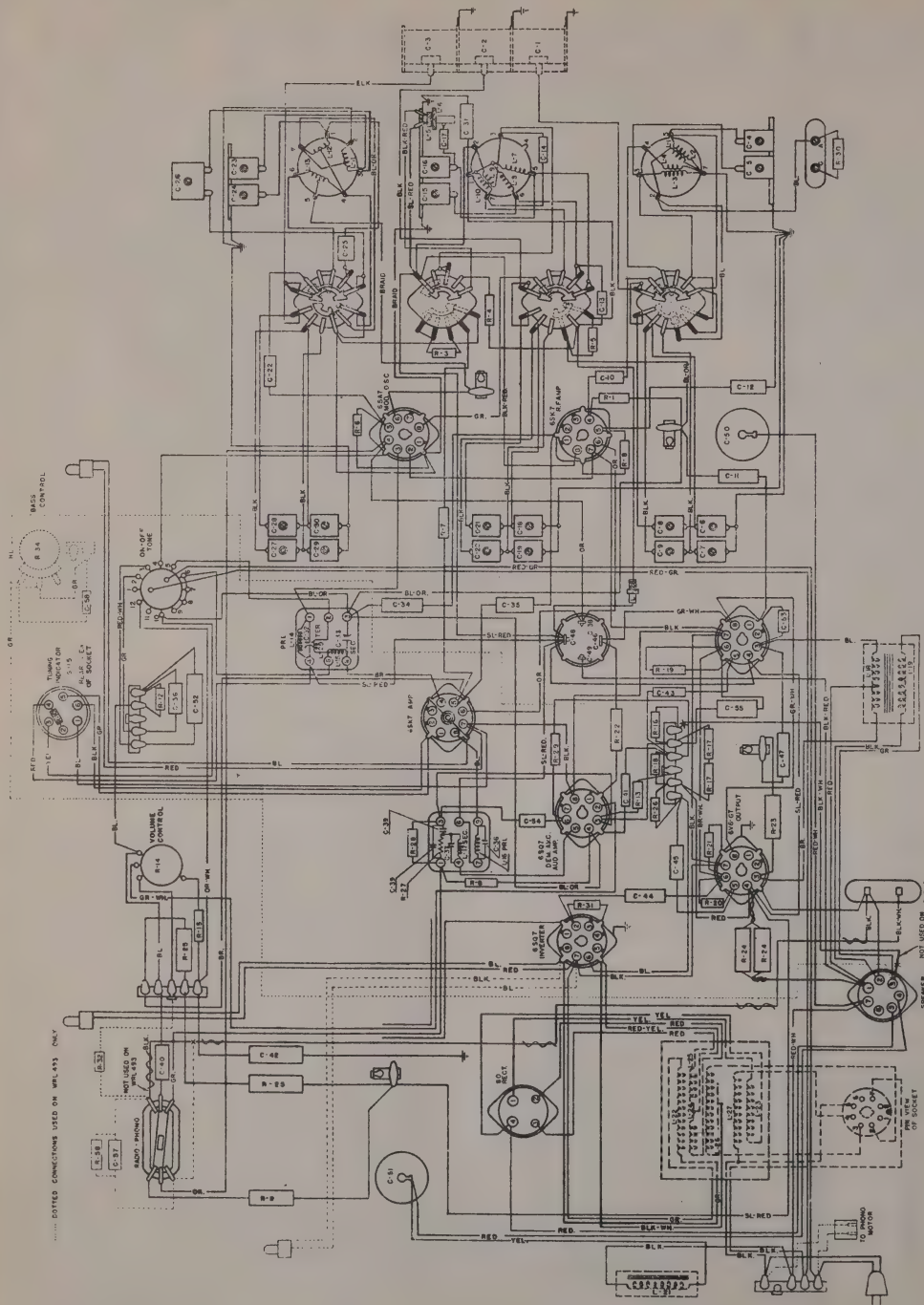
The arm should rise during the change cycle so that it clears the record above it by only 1/8". To make this adjustment, loosen the locknut "C" on pick up sleeve and turn sleeve to lengthen or shorten the plunger. **Be sure to tighten locknut again after adjustment.**

No adjustment of the record separating knives is required as they are arranged to compensate for slight differences in record thickness automatically.

Handle the mechanism with care.

Do not lift it by the record holding knives.

MODELS WRL-295, WRL-295B,
WRL-493, WRL-493D WESTINGHOUSE ELEC. INTERNATIONAL CO.



Wiring Diagram

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WESTINGHOUSE ELEC. INTERNATIONAL CO.

MODELS WRL-295, WRL-295B, WRL-493, WRL-493D

Schematic Circuit

SPECIFICATIONS

Voltage Rating ..... { Adjustable for 100 to 120 or 200 to 240 Volts A. C. / See "Adjustment of Receiver to Various Line Voltages")

Type of Circuit ..... Superheterodyne

Tuning Ranges ..... A—0.54 to 1.62 Mc.; B—2.3 to 7.2 Mc.; C—8.6 to 12.1 Mc.; D—14.7 to 18.2 Mc.

Input Power Rating { WRL-295 ..... 105 Watts / WRL-493 ..... 135 Watts

Intermediate Frequency ..... 455 Kilocycles

Speaker Voice Coil Impedance at 400 cycles ..... Approximately 1.5 Ohms

Speaker Field Coil Resistance ..... Approximately 505 Ohms

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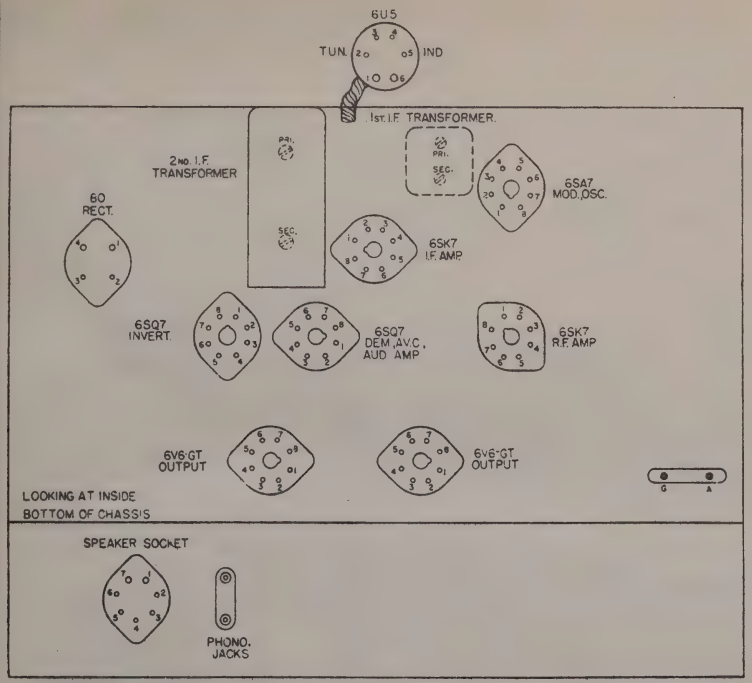
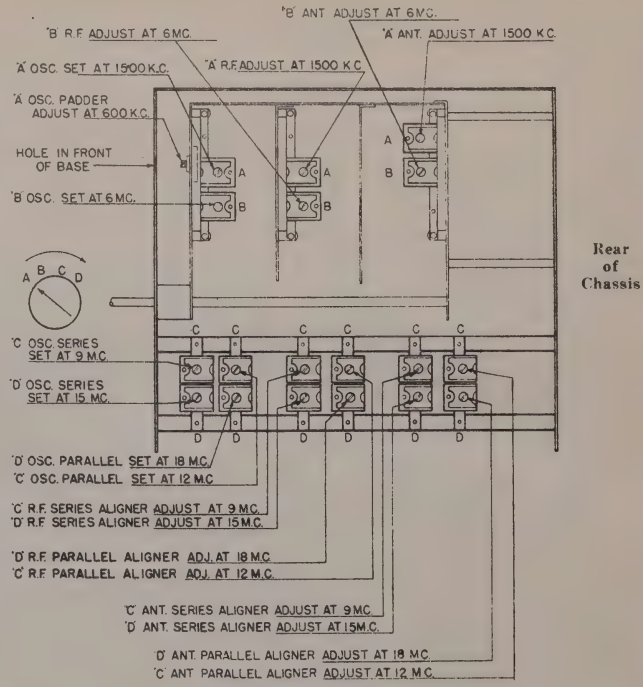


Location and I. F. Aligning Chart


'B' ANT. ADJUST AT 6 M.C.
'B' R.F. ADJUST AT 6 M.C.
'A' ANT. ADJUST AT 1500 K.C.
'A' OSC. SET AT 1500 K.C.
'A' R.F. ADJUST AT 1500 K.C.
'A' OSC. PADDER ADJUST AT 600 K.C.
HOLE IN FRONT OF BASE
'B' OSC. SET AT 6 M.C.
Rear of Chassis
'C' OSC. SERIES SET AT 9 M.C.
'D' OSC. SERIES SET AT 15 M.C.
'D' OSC. PARALLEL SET AT 18 M.C.
'C' OSC. PARALLEL SET AT 12 M.C.
'C' R.F. SERIES ALIGNER ADJUST AT 9 M.C.
'D' R.F. SERIES ALIGNER ADJUST AT 15 M.C.
'D' R.F. PARALLEL ALIGNER ADJ. AT 18 M.C.
'C' R.F. PARALLEL ALIGNER ADJ. AT 12 M.C.
'C' ANT. SERIES ALIGNER ADJUST AT 9 M.C.
'D' ANT. SERIES ALIGNER ADJUST AT 15 M.C.
'D' ANT. PARALLEL ALIGNER ADJUST AT 18 M.C.
'C' ANT. PARALLEL ALIGNER ADJUST AT 12 M.C.

R. F. Aligning Chart

Model	Input Power Frequency	Chassis	Cabinet	Speaker	Phono Equipment
WRL-295	40-60 Cycles	32922	33128	33135	—
WRL-295-B	25-60 Cycles (115 Volts only)	32856	33128	33135	—
WRL-493	60 Cycles only	33183	33185	27504	32777
WRL-493-D	50 Cycles only	33183	33185	27504	32834

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ALIGNING INFORMATION—WRL-295

Never Align Unless Absolutely Necessary

Use a good modulated signal generator (test oscillator) with variable output voltage and connect a sensitive output meter across the voice coil of the speaker.

It is essential that the **exact** frequencies of 18, 15, 12 and 9 Megacycles be obtained from the signal generator in order to insure proper calibration of the D and C scales. The accuracy of the signal generator may be checked by "beating" with known short-wave stations using any receiver that is in good operating condition.

Always align using the smallest possible signal from the signal generator. A strong signal makes adjustments inaccurate.

Always have receiver volume control full on and the tone control must **not** be set to the high fidelity (most clockwise) position.

See location chart on Page 3 for location of all the aligning adjustment screws.

Aligning procedure (follow this order exactly)

I. Dial pointer adjustment.

Make sure that the dial drive cord is in position on all pulleys. To correct the position of the dial pointer, first set the gang capacitor so that it is fully engaged, and remove the two clips which hold the dial cord and the drive cord together. Then, without disturbing the drive cord, move the **dial cord** so that the pointer is directly behind the two diamond-shaped index marks at the low frequency end of the dial scales. Now fasten the dial cord and drive cord together at the extreme left (when viewed from the rear of the cabinet) by means of the two small clips.

II. Intermediate frequency adjustments.

1. Set the range switch to the medium wave position ("A").
2. Tune set to extreme low frequency end of the dial.
3. Connect the ground terminal of the signal generator to the ground terminal of the chassis.
4. Introduce a modulated signal of 455 Kilocycles to the stator terminal (top) of the center section of the gang capacitor, using a 0.1 microfarad capacitor in series with the output lead of the signal generator.
5. Adjust the I. F. Aligners for maximum signal in the following order:
   a. Secondary of second I. F. transformer.
   b. Primary of second I. F. transformer.
   c. Secondary of first I. F. transformer.
   d. Primary of first I. F. transformer.

III. Radio frequency adjustments. (See R. F. Aligning Chart for position of alignment adjusting screws.)

Short Wave Range, Scale "D"

1. Replace the 0.1 mf. capacitor in series with the output lead of the signal generator with a 400 ohm carbon type resistor and connect it to the antenna terminal of the chassis.
2. Set the range switch to the "D" short-wave position.
3. Set the signal generator frequency and the receiver tuning dial to 18 megacycles.
4. Adjust the "D" OSC. PARALLEL 18 MC. aligner for maximum signal. Two positions will be found at which maximum signal occurs. Be sure to use the **minimum** capacitance position (most counter-clockwise position of screw).
5. Adjust the "D" R. F. PARALLEL 18 MC. and the "D" ANT. PARALLEL 18 MC. aligners for maximum signal. Two positions may be found at which maximum signal occurs. Be sure to use the **maximum** capacitance position (most clockwise position of screw).
6. Set the signal generator frequency and the receiver tuning dial to 15 megacycles.
7. Adjust the "D" OSC. SERIES 15 MC. aligner for maximum signal. Two positions will be found at which maximum signal occurs. Be sure to use the **minimum** capacitance position (most counter-clockwise position of screw).
8. Adjust the "D" R. F. SERIES 15 MC. and the "D" ANT. SERIES 15 MC. aligners for maximum signal. Two positions will be found at which maximum signal occurs. Be sure to use the **maximum** capacitance position (most clockwise position of screw).
9. Repeat operations 3, 4, 5, 6, 7 and 8 until no further improvement results.

Short Wave Range, Scale "C".

(Leave the receiver connected to the signal generator in the same manner as above.)

1. Set the range switch to the "C" short-wave position.
2. Set the signal generator frequency and the receiver tuning dial to 12 megacycles.
3. Adjust the "C" OSC. PARALLEL 12 MC. aligner for maximum signal. Two positions will be found at which maximum signal occurs. Be sure to use the **minimum** capacitance position (most counter-clockwise of screw).
4. Adjust the "C" R. F. PARALLEL 12 MC. and the "C" ANT. PARALLEL 12 MC. aligners for maximum signal. Two positions will be found at which maximum signal occurs. Be sure to use the **maximum** capacitance position (most clockwise position of screw).
5. Set the signal generator frequency and the receiver tuning dial to 9 megacycles.
6. Adjust the "C" OSC. SERIES 9 MC. aligner for maximum signal. Two positions will be found at which maximum signal occurs. Be sure to use the **minimum** capacitance position (most counter-clockwise of screw).
7. Adjust the "C" R. F. SERIES 9 MC. and the "C" ANT. SERIES 9 MC. aligner for maximum signal. Two positions will be found at which maximum signal occurs. Be sure to use the **maximum** capacitance position (most clockwise of screw).
8. Repeat operations 2, 3, 4, 5, 6 and 7 until no further improvement results.

Short Wave Range, Scale "B".

(Leave the receiver connected to the signal generator in the same manner as above.)

1. Set the range switch to the "B" short-wave position.
2. Set the signal generator frequency and the receiver tuning dial to 6 Mc.
3. Adjust the "B" OSCillator "6 MC." aligning capacitor for maximum signal. If two positions are found at which maximum signal occurs, always use the minimum capacitance position (most counter-clockwise position).
4. Adjust the "B" R. F. and ANTenna "6 MC." aligning capacitors for maximum signal.

Medium Wave Range, Scale "A".

1. Replace the 400 ohm carbon type resistor in series with the output lead from the signal generator with a 200 micro-microfarad capacitor.
2. Set the range switch to the medium wave position, "A".
3. Set the signal generator frequency and the receiver tuning dial to 1500 Kc.
4. Adjust the "A" OSCillator, R. F. and ANTenna "1500 KC." aligners for maximum signal.
5. Set the signal generator frequency and the receiver tuning dial to 600 Kc.
6. Adjust the "A" OSCillator padder "600 KC." aligner for maximum signal.
7. Repeat operations 3 and 4.

ALIGNING INFORMATION WRL-493

In order to align the WRL-493, the chassis must be removed from the cabinet. Therefore, it is necessary to use the auxiliary scale (on the back of the large pulley) in place of the tuning dial. This auxiliary scale is calibrated in degrees and a temporary indicator can be provided by soldering a short piece of bare copper wire (approx. No. 22 B.S.) to the upright dial drive support. This wire should be so located that it indicates 180° when the gang tuning capacitor is fully engaged.

Alignment procedure is exactly the same as given for the WRL-295 except that the following positions in degrees must be used in place of the tuning dial settings.

"D" range	18 Mc. use	166	degrees.
"D" range	15 Mc. use	27	degrees.
"C" range	12 Mc. use	162	degrees.
"C" range	9 Mc. use	39	degrees.
"B" range	6 Mc. use	148.5	degrees.
"A" range	1500 Kc. use	157	degrees.
"A" range	600 Kc. use	30	degrees.

ADJUSTMENT OF RECEIVER TO VARIOUS LINE VOLTAGES

The power transformer used in these receivers is adjustable for operation on 100 to 120 Volts, 40-60 Cycles, or 200 to 240 Volts, 40-60 Cycles. Provision is also made for operation on 120 to 130 Volts, 40-60 Cycles, or 130 to 150 Volts, 40-60 Cycles, by using the proper "Plug-in Resistor".

To correctly adjust the receiver to any of the line voltages given below, an accurate A. C. voltmeter should be used to measure the line voltage at the location where the receiver is to be installed.

CAUTION: Never make any adjustments of the **power transformer** without first removing the receiver's power supply cord from its power supply receptacle.

Operation on Line Voltage of 200 to 240 Volts

When shipped from the factory, these receivers are adjusted for a line voltage of 200 to 240 volts.

Care should be taken to see that the white dot on the voltage changer plug indicates the "220 V" marking on top of the power transformer.

The **phonograph motor of Model WRL-493** should also be inspected to see that the small plug having a **single jumper wire** is in place.

To Adjust the Receiver for a Line Voltage of 100 to 120 Volts

Loosen the screw and bracket so that the voltage changer plug may be removed from its socket on top of the power transformer.

Replace the voltage changer plug in its socket with the white dot set to the "110 V" marking. Screw the bracket in place.

With Model WRL-493 it is also necessary to remove the single jumper plug from the socket of the phonograph motor and insert the **double jumper** plug, which will be found attached to the inside of the cabinet.

To Adjust the Receiver for a Line Voltage of 120 to 130 Volts

Loosen the screw and bracket so that the voltage changer plug can be removed from its socket on top of the power transformer.

Remove the voltage changer plug and insert a W-30971 (32488) Plug-in Resistor into the socket on top of the power transformer.

With Model WRL-493 it is also necessary to remove the single jumper plug from the socket of the phonograph motor and insert the **double jumper** plug, which will be found attached to the inside of the cabinet.

To Adjust the Receiver for a Line Voltage of 130 to 150 Volts

Loosen the screw and bracket so that the voltage changer plug can be removed from its socket on top of the power transformer.

Remove the voltage changer plug and insert a W-30972 (32489) Plug-in Resistor into the socket on top of the power transformer.

With Model WRL-493 it is also necessary to remove the single jumper plug from the socket of the phonograph motor and insert the **double jumper** plug, which will be found attached to the inside of the cabinet. In addition, a W-32485 Resistor must be inserted between the phonograph power cord and the radio chassis.

Playing Records

Any record player equipped with a high impedance pick-up can be attached to the WRL-295 receiver.

Model WRL-295 has a Radio-Phono switch; when operating a record player in conjunction with this receiver this control should be set so the arrow points to "Phono".

A shielded cable of the low-capacity type should be used to connect the pick-up to the receiver. The shield must be connected to the ground terminal of the receiver.

The volume may be controlled with the volume control at the receiver, or (if such is provided) with the volume control on the record player.

A low impedance phonograph pick-up may also be used, but a matching transformer must be placed between the pick-up and the phono receptacles (jacks) on the back of the chassis.

Model WRL-493 is equipped with an automatic record changer using a crystal pick-up. This record player shifts and plays the standard 10 or 12 inch records.

Care of the Cabinet

The finish of Westinghouse Radio cabinets should be protected by using a good cabinet polish regularly. It is available in pint cans, designated as W-28601.

Nicks and scratches of most kinds can be repaired quickly and easily by proper use of the W-26962 Touch-up Kit. Complete instructions are provided with each kit.

MODELS WRL-295, WRL-295B, WRL-493, WRL-493B

WESTINGHOUSE ELEC. INTERNATIONAL CO.

INSTRUCTIONS FOR ADJUSTING PHONOGRAPH MECHANISM USED IN WRL-493 RECEIVER

A. Adjusting Landing Position of Needle on Record

If needle comes down too far from the edge of the record so that record does not start at the beginning, **turn adjusting screw "A" very slightly counter-clockwise.**

If needle comes down too close to the edge of the record so that it slips off, **turn adjusting screw clockwise.**

B. Adjusting Tripping Mechanism

If trip mechanism fails to trip or operates during playing of record, adjust screw "B" to position where proper tripping is obtained.

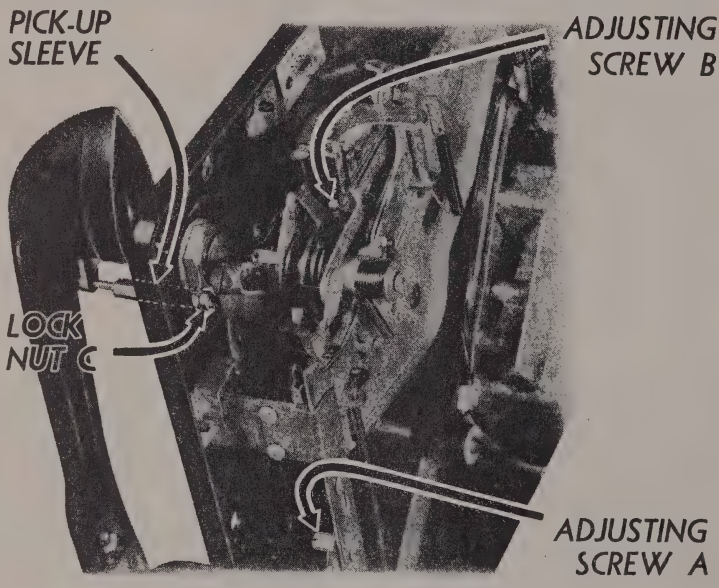
C. Adjusting Height to Which Pick-up Arm Rises

The arm should rise during the change cycle so that it clears the record above it by only 1/8". To make this adjustment, loosen the locknut "C" on pick-up sleeve and turn sleeve to lengthen or shorten the plunger. **Be sure to tighten locknut again after adjustment.**

No adjustment of the record separating knives is required as they are arranged to compensate for slight differences in record thickness automatically.

Handle the mechanism with care.

Do not lift it by the record holding knives.



NORMAL VOLTAGE READINGS

Take all readings with receiver operating and tuned to approximately 1000 Kc.—no signal.
Use a line voltage of 120 volts, or make allowance for any slight variation.
Use a good high resistance voltmeter having a resistance of at least 1000 ohms per volt.

Take all D. C. readings on the 500 volt scale except when an asterisk appears.
Read from indicated terminals to chassis base.
See location chart on Page 3 for position of terminals.
A. C. voltages are indicated by *italics*.

		TERMINALS OF SOCKETS							
Tube	*Circuit*	1	2	3	4	5	6	7	8
6SK7	R. F. Amp.	0	0	0	0	+1.5*	+100	*6.0*	+270
6SA7	Mod. and Osc.	0	*6.0*	+270	+100	−4*	0	0	0
6SK7	I. F. Amp.	0	0	0	0	+8*	+100	*6.0*	+270
6SQ7	Demod., A. V. C. Audio Ampl.	0	0	0	0	0	+60	0	*6.0*
6SQ7	Inverter	0	0	0	0	0	+70	*6.0*	0
6V6GT (both)	Output	0	0	+315	+270	0	0	*6.0*	+15*
80†	Rectifier	+390	*380*	*380*	+390	—	—	—	—
6U5	Tuning Ind.	*6.0*	+25	0	+270	0	0	—	—
—	Speaker Socket	+330	0	0	+380	+390	0	+380	—

* Read on lowest possible scale of voltmeter. † Between terminals 1 and 4 of rectifier socket: 5 volts A. C.

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MODELS WRL-371, WRL-471,
WRL-471-D

WESTINGHOUSE ELEC. INTERNATIONAL CO.

OUTPUT 6V6
TREBLE CONT.
DEM., AVC., AUD. AMP. 6SQ7
I.F AMP. 6SK7
MOD OSC. 6SA7
R.F. AMP. 6SK7
6U5 TUN. IND.
"80" RECT.
DIAL
PHONO.
TWISTED WIRE
TOP VIEW OF SOCKET
TOP VIEW OF PLUG
220 V.
110 V.
ON SECTION NO. 1 OF RANGE SWITCH SHOWN IN PHONO. POSITION.
RANGE SWITCH SHOWN IN PHONO. POSITION, NOT CONNECTED TO CIRCUIT. DOTTED LINES FOR WRL-471 REC. & D. WIZ C-36, C-37 & C-38 - GANG CAPACITOR.

Schematic Circuit—WRL-371 and WRL-471 Receivers

Voltage Rating	Adjustable for 100 to 120 or 200 to 240 Volts A. C. (See "Adjustment of Receiver to various line voltages")
Type of Circuit	Superheterodyne
Tuning Ranges	A-0.54 to 1.6 Mc.; B-2.3 to 7.6.; C-7.6 to 23 Mc.
Input Power Rating	WRL-277 and WRL-371 ..... 80 Watts WRL-471 ..... 100 Watts
Intermediate Frequency	455 Kilocycles
Speaker Voice Coil Impedance at 400 cycles	Approximately 1.5 ohms
Speaker Field Coil Resistance	Approximately 1050 ohms

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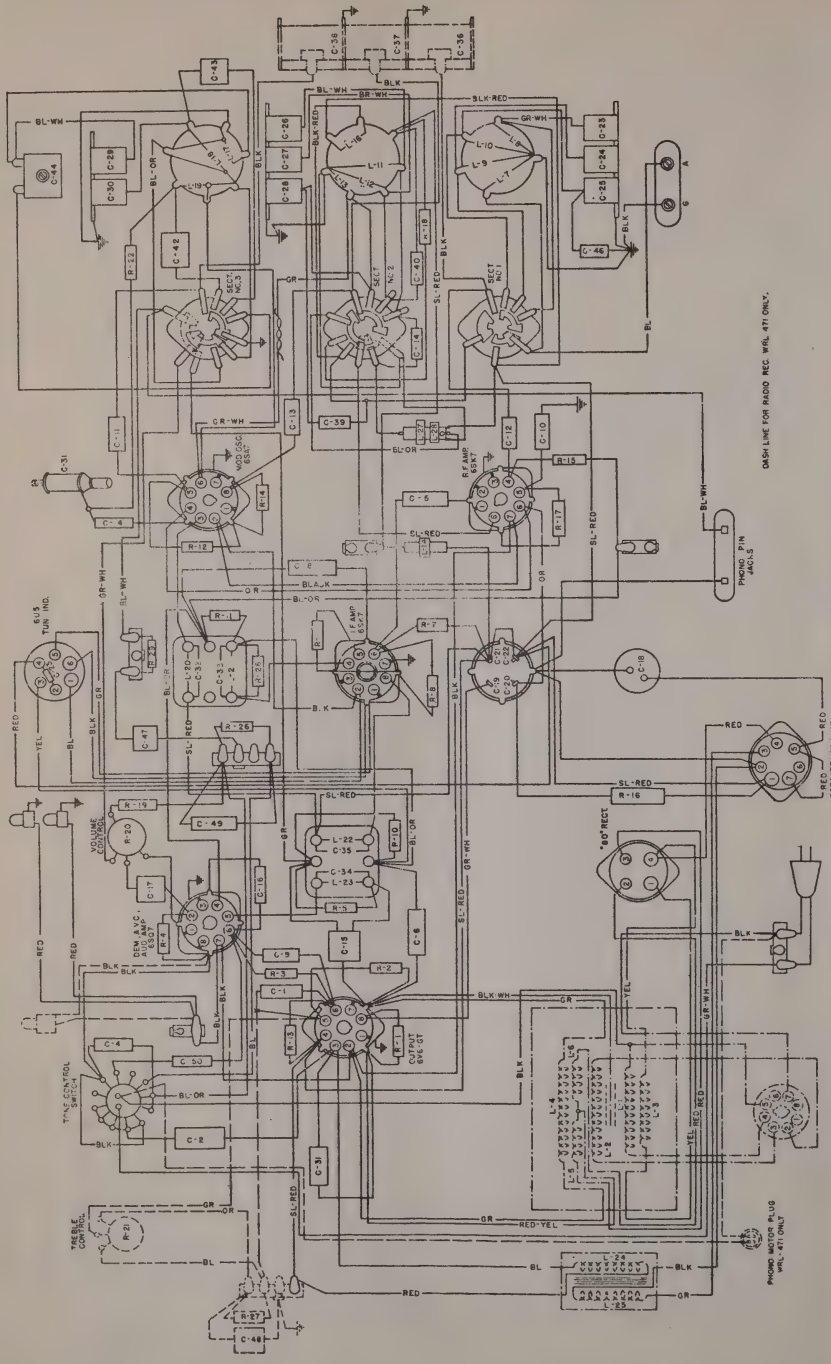
MODELS WRL-371, WRL-471,
WRL-471D

WESTINGHOUSE ELEC. INTERNATIONAL CO.



Wiring Diagram—WRL-371 and WRL-471 Receivers

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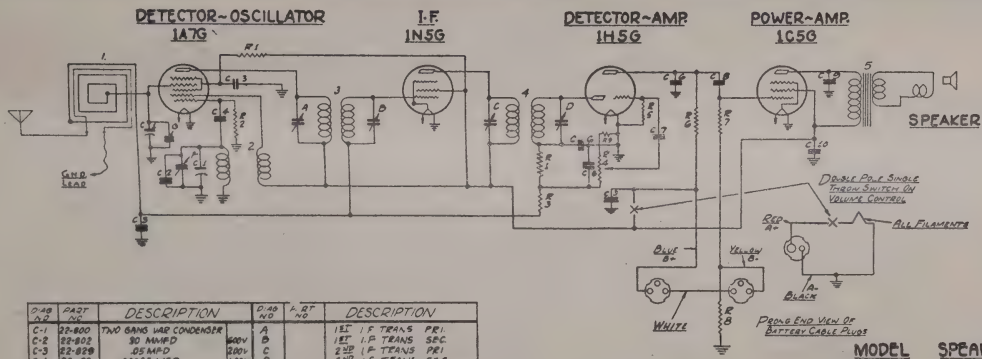


D-AB NO.	PART NO.	DESCRIPTION		D-AB NO.	PART NO.	DESCRIPTION
C-1	22-800	TWO GANG VAR CONDENSER		A		1ST I.F. TRANS PRI.
C-2	22-802	30 MMFD	600V	B		1ST I.F. TRANS SEC.
C-3	22-828	.05 MFD	200V	C		2ND I.F. TRANS PRI.
C-4	22-182	.00025 MFD	600V	D		2ND I.F. TRANS SEC.
C-5	22-828	.05 MFD	400V	E		BROADCAST OSC. (ON GANG)
C-6	22-162	.0001 MFD	600V	F		ANTENNA BROAD. (ON GANG)
C-7	22-826	.01 MFD	200V			
C-8	22-248	.01 MFD	400V			
C-9	22-448	.004 MFD	600V	1	54888	LOOP ASSEMBLY
C-10	22-686	8MFD ELECTROLYTIC	150V	2	54069	OSCILLATOR COIL ASSM.
				3	55-593	1ST I.F. TRANSFORMER
				4	55-594	2ND I.F. TRANSFORMER
R-1	63-593	47M OHMS	½W	5		SPEAKER TRANSFMR.
R-2	63-654	180M OHMS	½W			
R-3	63-669	3.9 MEGOHMS	½W			
R-4	63-1026	VOLUME CONTROL				
R-5	63-604	10 MEGOHMS	½W			
R-6	63-271	1 MEGOHM	½W			
R-7	63-601	2.2 MEGOHMS	½W			
R-8	63-238	1000 OHMS	1W			
R-9	63-567	4700 OHMS	1W			

I.F. FREQUENCY 455 K.C.

4 TUBE BATTERY SUPERHETERODYNE

CHASSIS No. 5416

ZENITH RADIO CORPORATION

CHICAGO, ILLINOIS

MODEL	SPEAKER
4K400D	49-294
4K400L	49-294
4K400M	49-294
4K400S	49-294

NOTE:

All measurements with 1000 ohms per voltmeter — loop antenna not connected — volume at minimum — All readings made with fresh Zenith (part No. Z-59) battery pack with speaker in circuit.

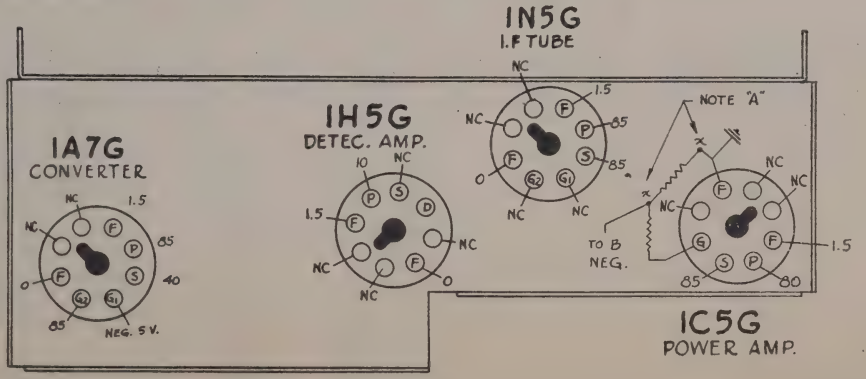
NOTE: "A"

Bias for 1C5 measured across 1000 ohm resistor at points marked X—X.

Bias is neg. 10 volts.

LEGEND

F — FILAMENT
P — PLATE
S — SCREEN
G — GRID
D — DIODE
NC — NO CONNECTION

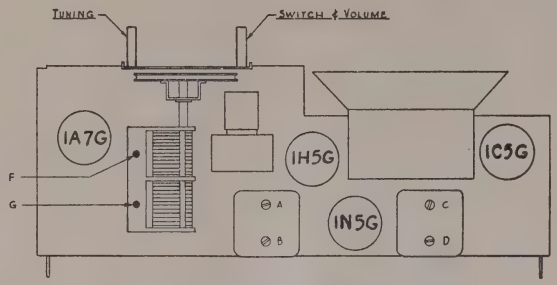


FRONT OF CHASSIS

MODELS 4K400D, 4K400L,
4K400M, 4K400S
Chassis 5416

ZENITH RADIO CORP.

MODELS 4K400D, 4K400S, 4K400L, 4K400M
Chassis 5416



ALIGNMENT PROCEDURE

Operation	Connect Test Oscillator to	Dummy Antenna	Set Test Osc. to	Band	Set Dial At	Adjust Trimmers	Purpose
1	1st Det. Grid	1/2 Mfd.	455	Br'dc't	600	ABCD	I. F. Alignment
2	Separate 3 foot antenna		1500	"	1500	F	Set Osc. to Scale
3	Separate 3 foot antenna		1500	"	1500	G	Al'gment of Ant.

PARTS LIST

Chassis 5416

MODELS 4K400D, 4K400S, 4K400L, 4K400M

Dial Assembly

26-220	Dial scale	$ .20
59-75	Dial pointer	.10
76-278	Dial drive shaft	.10
80-69	Dial cord tension spring	.02
93-371	Dial spacer bakelite washer	.25
192-38	Dial crystal	.15
MS-418	Pulley and bracket assembly	.10
S-6870	Indicator disc and bushing	.15
S-6893	Dial cord and eyelet assembly	.15

Coils

95-593	1st I. F. Transformer	1.00
95-594	2nd I. F. Transformer	1.00
S-6869	Oscillator coil assembly	.60
S-6888	Loop antenna assembly	1.35

Condensers

22-162	.0001 mfd. ... 600 volt	.15
22-182	.00025 mfd. .. 600 volt	.15
22-243	.01 mfd. ..... 400 volt	.15
22-448	.004 mfd. .... 600 volt	.18
22-684	8. mfd. ..... 150 volt Dry Electrolytic	.45
22-800	Two gang variable	2.00
22-802	30 mmfd. .... 600 volt	1.00
22-826	.01 mfd. ..... 200 volt	.12
22-828	.05 mfd. ..... 400 volt	.15
22-829	.05 mfd. ..... 200 volt	.12

Resistors

63-238	1000 ohm .... ¼ watt	.07
63-271	1 megohm .... ¼ watt	.07
63-593	47 M ohm .... ¼ watt	.07
63-600	2.2 megohm .. ¼ watt	.07
63-604	10 megohm ... ¼ watt	.07
63-654	180 M ohm ... ¼ watt	.07
63-669	3.9 megohm .. ¼ watt	.07
63-1026	Volume control and switch	1.50

Miscellaneous

46-273	Tuning control knob	.10
49-294	Speaker—5½" PM—all models	6.25
	208-294 cone and voice coil	1.50
	206-294 output transformer	1.25
78-208	Speaker plug socket	.10
78-246	Socket 1A7G tube	.10
78-247	Socket 1N5G tube	.10
78-248	Socket 1H5G tube	.10
78-249	Socket 1C5G tube	.10
83-658	Pin jack terminal strip	.06
126-297	Tube shield	.10
S-6872	Battery cable and plugs	.45

ALL PRICES LIST SUBJECT TO REGULAR PARTS DISCOUNT
AND CHANGE WITHOUT NOTICE

APRIL 4, 1939

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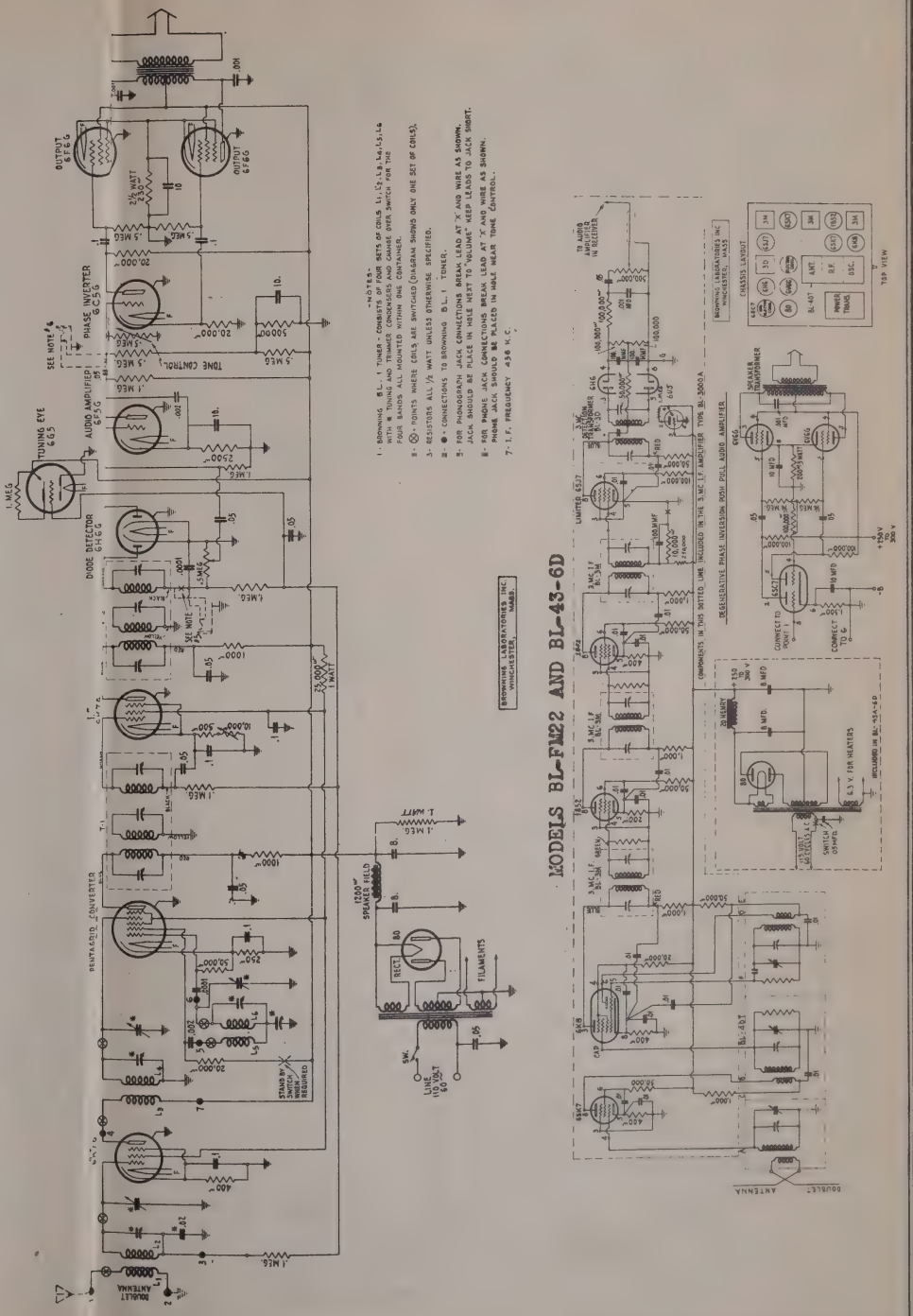
MODEL 83

BROWNING LABORATORIES, INC.

MODEL BL-FM22
MODEL BL-43-6D


MODEL 83
MODELS BL-FM22 AND BL-43-6D
NOTES:
1- BROWNING BL-1 TUNER - CONSISTS OF FOUR SETS OF COILS L1, L2, L3, L4, L5, L6 WITH M TUNING AND TRIMMER CONDENSERS AND GANGED OVER SWITCH FOR THE FOUR BANDS ALL MOUNTED WITHIN ONE CONTAINER.
2- ⊗- POINTS WHERE COILS ARE SWITCHED (DIAGRAM SHOWS ONLY ONE SET OF COILS).
3- RESISTORS ALL ½ WATT UNLESS OTHERWISE SPECIFIED.
4- ● - CONNECTIONS TO BROWNING BL-1 TUNER.
5- FOR PHONOGRAPH JACK CONNECTIONS BREAK LEAD AT 'X' AND WIRE AS SHOWN. JACK SHOULD BE PLACE IN HOLE NEXT TO "VOLUME" KEEP LEADS TO JACK SHORT.
6- FOR PHONE JACK CONNECTIONS BREAK LEAD AT 'X' AND WIRE AS SHOWN. PHONE JACK SHOULD BE PLACED IN HOLE NEAR TONE CONTROL.
7- I.F. FREQUENCY 456 K.C.
BROWNING LABORATORIES INC. MUSCATINE, IOWA
REGENERATIVE PHASE INVERSION PUSH PULL AUDIO AMPLIFIER
COMPONENTS IN TWO DOTTED LINE ENCLOSURE ON THE 3 MC I.F. AMPLIFIER TYPE BL-3005A
CHASSIS LAYOUT
TOP VIEW
BL-40T
POWER TRANS.
DISC.
ANT.
R.F.
OUTPUT 6F6G
PHASE INVERTER 6C5G
AUDIO AMPLIFIER 6F5G
TUNING EYE 6G5
DIODE DETECTOR 6H6G
BEAT OSCILLATOR CONVERTER 6A8
I.F. AMPLIFIER 6K7G
LIMITER 6SJ7
SPEAKER TRANSFORMER
SPEAKER FIELD
RECT. 80
FILAMENTS
SW.
LINE VOLTAGE 60 ~
TONE CONTROL
VOLUME CONTROL
SWITCH GANGED WITH VOLUME CONTROL
SWITCH GANGED WITH TONE CONTROL
SEE NOTE 4
SEE NOTE 5
STAND BY SWITCH WHEN REQUIRED
DOUBLET ANTENNA
ANTENNA
TO AUDIO AMPLIFIER IN RECEIVER
CONNECT TO POINT 1
CONNECT TO 1-0
+150V 300 V.
6.3 V. FOR HEATERS
INCLUDED IN BL-43A-6D

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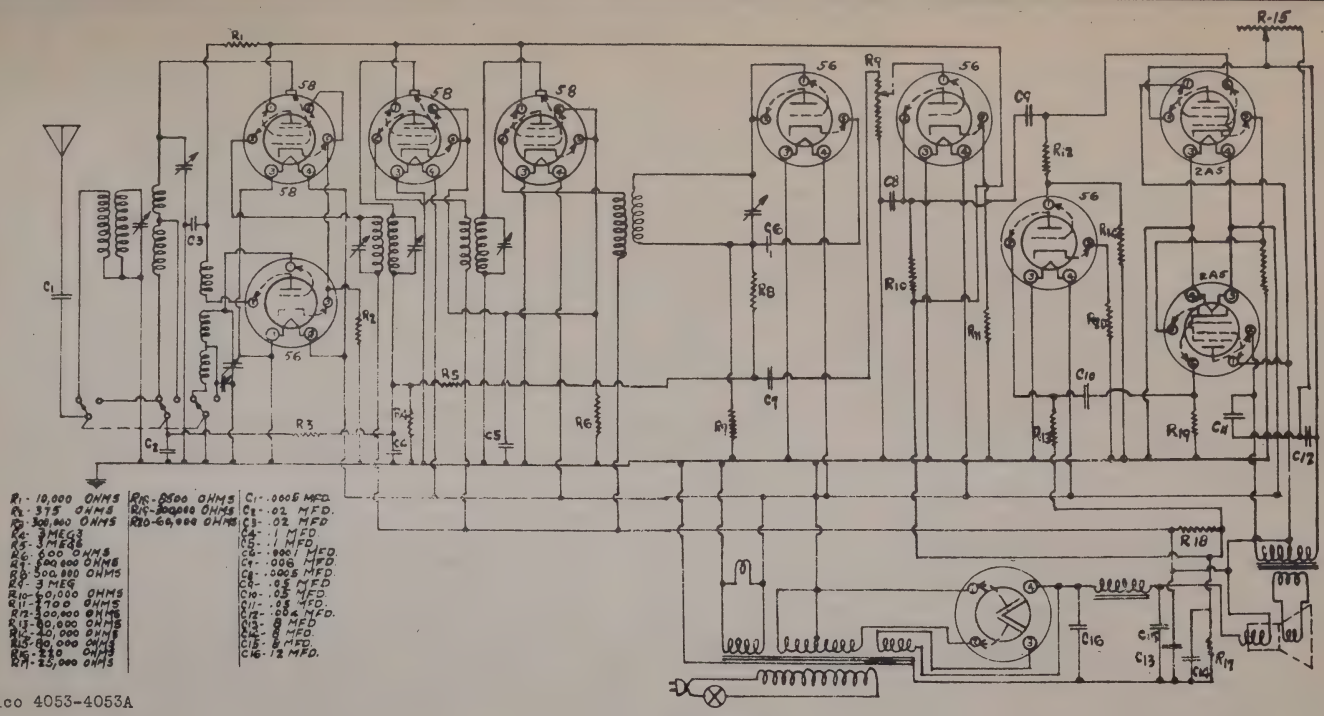

Delco 4053-4053A

Date: 12-1-41

ALIGNMENT

1. Intermediate Frequency 181.5 K.C.

   Connect signal generator to grid of 58 detector tube through a .1 mfd. condenser. Adjust I-F trimmers.

2. 1400 K.C. Alignment

   Connect signal generator to antenna connector through a .001 mfd. condenser. Tune receiver to 1400 K.C. Adjust oscillator, R.F. and antenna trimmers.

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FERGUSON RADIO, INC.

MODELS 1 TUBE, 2 TUBE, 4 TUBE PHONOGRAPHS

CHAMPION RADIO - FOUR TUBE PHONOGRAPH
CHAMPION RADIO
AMPLIFIER MODEL 741.
POWER TRANSFORMER ON TOP OF CHASSIS
2-16 MFD. 500 VOLT FILTERS.
SECONDARY OF 2.5 VOLT
DEC. 1-1940
ONE TUBE PHONOGRAPH
ALL VOLTAGES BASED ON 118 VOLTS A.C.
FERGUSON RADIO INC. - 2 TUBE PHONOGRAPH
500,000 Ω VOL CONT.
118 VOLTS A.C. ONLY

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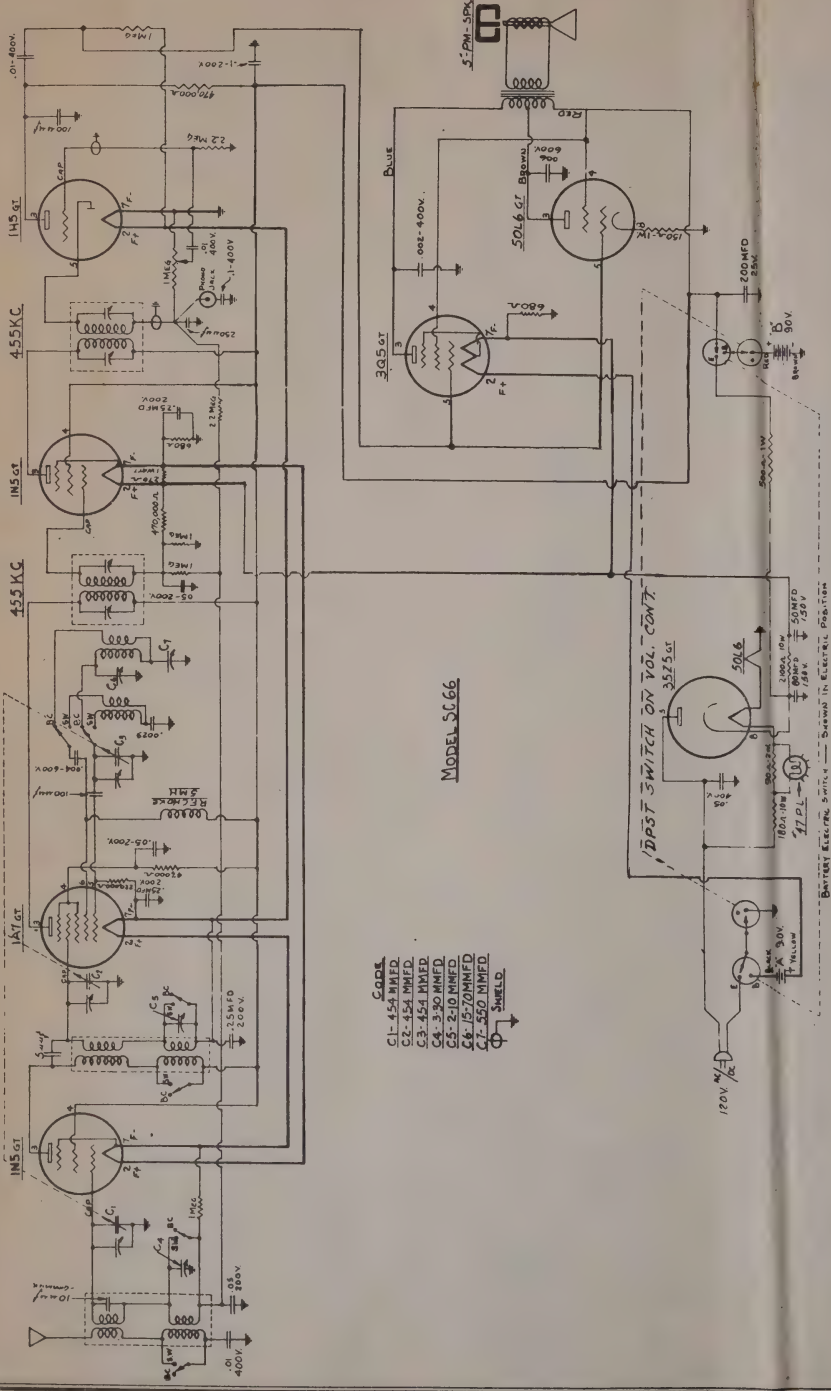
MODEL SC66

HAMILTON RADIO CORP.



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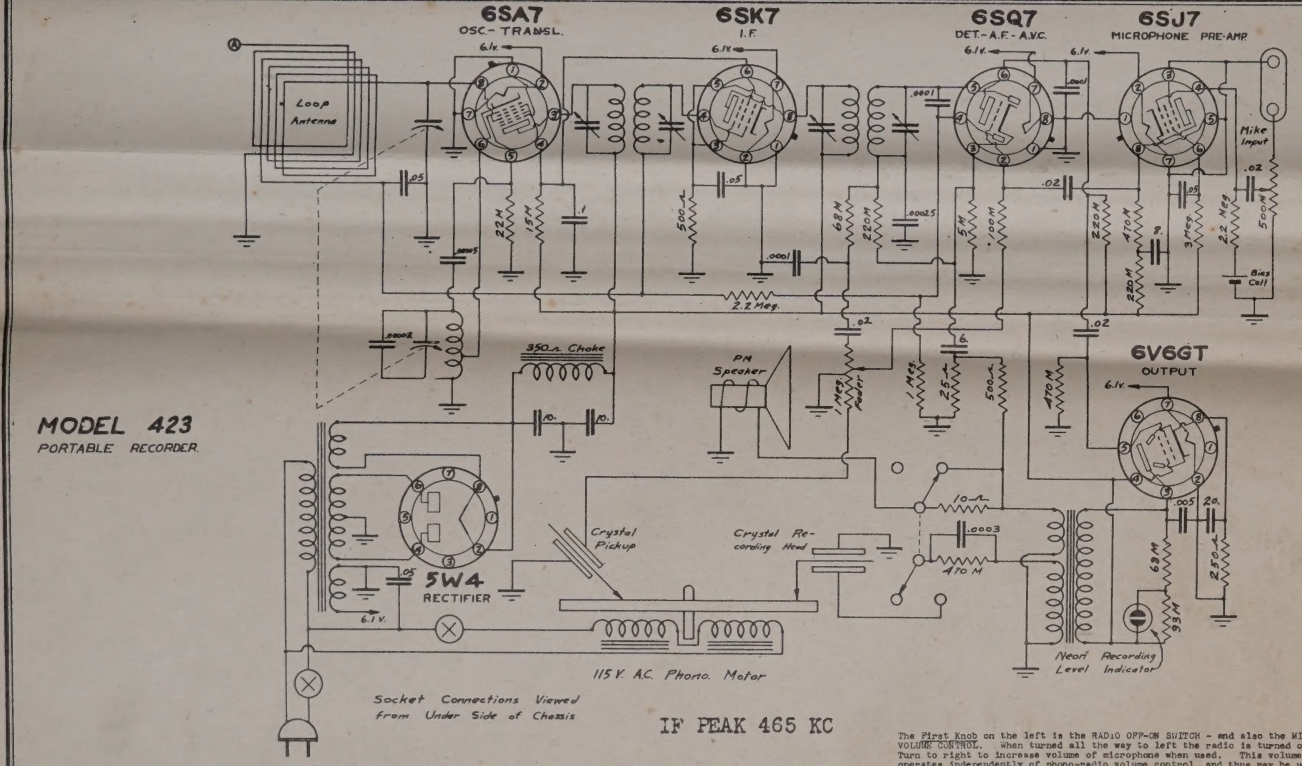

MODEL 423
PORTABLE RECORDER

IF PEAK 465 KC

CONVENTIONAL ALIGNMENT-SEE SPECIAL SECTION VOL. VIII

RECORDING

Place blank disc on turntable, making certain that the drive pin protrudes through the small hole which is about one-inch from the center spindle hole. Insert a recording stylus in the recording head, which is mounted on the right rear of the motor board. Make certain that the flat side of the stylus shank is against the set screw.

If a radio program is to be recorded, first select the desired station. When the program is properly tuned in, place the RECORD-PLAYBACK SWITCH in the "Record" position, and adjust the volume control to the point where the neon lamp begins to flash on loud signals. Do not attempt to estimate the proper recording level by ear. When recording, the speaker volume will be lower than when using the unit as a conventional radio. The level indicator is also used in the same manner when recording with the microphone.

Start the motor by turning motor switch to left. Carefully place the cutting stylus about 1/8th inch from outside edge of the disc. While cutting a record watch the thread which is being cut from the disc, and do not allow it to become entangled in the cutting needle. After the recording is completed, replace the recording head on its rest. When moving the recording arm to or from the disc it must be in a raised position. This is necessary to disengage the recording feed mechanism.

Do not be discouraged if your first recording is not perfect. A little practice is necessary to become accustomed to proper operation of the controls.

CAUTION: The thread cut from most acetate and nitro-cellulose discs is very inflammable, and care should be taken to keep it away from ash trays and open flames. Read the instructions furnished by the disc manufacturer.

The First Knob on the left is the RADIO OFF-ON SWITCH - and also the MICROPHONE VOLUME CONTROL. When turned all the way to left the radio is turned off. Turn to right to increase volume of microphone when used. This volume control operates independently of phono-radio volume control, and thus may be used to mix the microphone broadcast with either radio or phonograph music in recording or playback; and when desiring to use MICROPHONE, plug the two tip-jacks on the end of microphone cord into the holes marked "Microphone". The tip-jack attached to the shielding should be plugged into the top hole. If microphone hums, reverse the tip wires in the holes.

The Second Knob from the left is the DUAL VOLUME CONTROL. To the extreme left is full volume for playing phonograph records. To the extreme right is full volume for radio reception and the recording of programs. Half way between extreme left or right on this knob is zero volume on either phonograph or radio.

The Third Knob from left is the STATION SELECTOR for tuning in the radio stations.

The Fourth knob from left is RECORDING and PLAYBACK SWITCH. When knob is turned to left on the record position, all recordings from radio or microphone may be made. When in this position the program may still be heard from the loud speaker, but at reduced volume. This makes it possible to hear what is being recorded. When knob is turned to right, or playback position, the recorder is disconnected, and full volume may be had from loud speaker on radio reception, or from the playing of phonograph records.

The Small Brass Knob on motor base is the off-on switch for the phonograph and recording motor.

The receptacle or hole marked "Monitor" on extreme right of instrument panel is for plugging in the two tip jacks attached to the end of speaker cord. There is no polarity on this connection - the speaker should be plugged in before operating the instrument.

There is a pilot light beneath the round hole to the left, to indicate when the instrument is turned on. The round hole to the right contains a neon lamp to indicate the correct volume to be used in recording.